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Coping Strategies Mediate the Relationship Between Alexithymia and Health

Jennifer Bernard

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**COPING STRATEGIES MEDIATE THE RELATIONSHIP
BETWEEN
ALEXITHYMIA AND HEALTH**

by

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B.A., Psychology, Wichita State University, 2003
M.S., Psychology, University of New Mexico, 2008

DISSERTATION

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Requirements for the Degree of

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ABSTRACT

Alexithymia, a construct of impaired emotion processing, has been shown to negatively impact mental health and is associated with higher physical symptom reporting. This study examined the relationship between alexithymia, coping, and health in a large ethnically diverse sample of undergraduate university students ($N = 605$; 65% female; 45% Hispanic). Exploratory factor analyses were conducted to create a latent measurement model for emotional approach, active coping and avoidant coping. Structural equation modeling was used to test a hypothesized structural model for coping mediating the effects of alexithymia on mental and physical health. Results indicated the association between alexithymia and negative emotion was mediated by avoidant coping. The relationship between alexithymia and physical symptoms was mediated by avoidant coping. Further, the association between alexithymia and positive emotion was mediated through the relationships between emotional approach and active coping. Women reported higher emotional approach coping, negative emotion, physical symptoms, and lower positive emotion than men. Non-Hispanic reported higher alexithymia and Hispanic reported higher positive emotion. The current study contributes to further understanding of the

pathways from alexithymia and health by identifying coping mediators. Further, the differences in alexithymia, coping and outcomes for women and Non-Hispanic raises questions about treatment approaches and increasing coping skills for alexithymia within these populations.

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INTRODUCTION

The first instance from which one can see that a tranquil mind making use of right reason aids the health in many ways is that it adjusts and regulates both its own functions and those attributable to the body... (Gaub, 1763, in Graeme, Taylor, Bagby, 1999, p. 59)

From ancient times to the present day, and across diverse cultures, the idea has persisted that emotions can induce disease or at least have a modulating effect on health and wellbeing. Many eminent philosophers, physicians, and psychologists have explored the importance of emotion and a person's ability to understand and even gain control in expressing emotions in thought and behavior. The quote above from Jerome Gaub, professor of medicine and chemistry at the University of Leiden, illustrates the importance of this idea regarding the interrelationship of thoughts, emotions and health. Sixty years later, David Hume defended the importance of emotions and impact on reason in his famous quote "Reason is, and ought only to be the slave of the passions, and can never pretend to any other office than to serve and obey them" (Hume, 1739, p. 753). Although this statement was originally an attack on reason as the pathway to moral truths, it also highlights the importance of emotion in guiding behavior and the inadequacy of reason alone. Currently, clinicians from a variety of psychotherapeutic approaches are working to better understand how our emotions impact our behavior and our health. In light of this paradigm, it is important for clinicians to understand and describe the harmful effects that disturbances in emotional processing and self-regulatory capacities can have on the body.

Alexithymia, a word derived from Greek meaning “without words for emotion,” is a personality construct that refers to a pattern of disturbances in emotion regulation that impact the processing of emotional events and associated complications with regard to both self and interpersonal relationships. This in turn, contributes to higher reporting of physical symptoms and psychological distress. Specifically, disturbances are measured as a continuous construct defined by difficulty in identifying one’s feelings, difficulties in articulating emotional experience, and externally-oriented thinking or thinking described as more objective, concrete, and with the use of little introspection or fantasy (Sifneos, 1973). Although initially described in the context of psychosomatic illness, alexithymic characteristics may be observed in patients with a wide range of medical and psychiatric disorders (Taylor, 1984).

Individuals with ‘alexithymic characteristics,’ or for the sake of simplicity, ‘alexithymic individuals’ are typically described as people who possess a diminished capacity for recalling dreams, an absence of fantasy production, and verbal output that is concrete, detailed, and repetitious. Additional clinical observations include a tendency toward action, either to express emotion or to avoid conflicts rather than introspection. Further, alexithymic individuals report infrequent recollection of dreams, and show a somewhat stiff wooden posture, and paucity of facial emotions (Krystal, 1979). The prototypic person with alexithymia has been described as anxious, over controlled, submissive, boring, ethically consistent, and socially conforming (Haviland, Sonne, & Kowert, 2004). However, these characteristics are not part of the theoretical core of the construct.

The focus of this study is to better understand alexithymia, both as a deficit in

emotional processing and through its impact on coping behaviors and health. The paper will begin with a brief overview of prominent definitions of emotion and the components of emotional experience before proceeding to a discussion of alexithymia. The discussion will cover a review of the construct's theoretical history, its current conceptualization and how it is measured, including differences observed in sex and ethnicity. Next, the concepts of coping and "coping strategies" are presented, including the influence of alexithymia on coping. Following this, and borrowing from research on emotion competence, the paper addresses the importance of competence in emotion processing in order to establish the pathway through which alexithymia leads to the variables of interest in this study. Finally, a review of the current literature on alexithymia and related outcomes in mental and physical health is presented in order to frame the hypotheses and methodology of the current study.

Theories of Emotion

Before beginning the review of a construct defined by a deficit in emotion processing it is important to be clear on the operationalization of emotion and its important components in processing that are impacted by alexithymia. There are several theories posited for capturing the phenomena we call emotion; they use different language to describe similar processes, or the same language for different processes that can lead to contradicting assumptions and confusion. But there are substantial differences too in various theorists' explanation of the phenomena of emotion and sequential processing of experience. A brief review on theories of the sequential processing of emotion stimuli and theories on development of these skills is helpful in beginning to understand the developmental arrest or interruption of emotion processing

abilities for an individual with alexithymic traits in comparison with others without these characteristics.

For example, the James-Lange theory holds that we feel emotion after we notice our bodily responses. Further, according to Richard's Lane's theory of developmental progression in sophistication of processing, normal development entails an increasing sensitivity and aptitude in sensing and describing our emotions from experiencing bodily sensations to recognizing the complexity of blends of emotions and subtle nuances (Lane, Quinlan, Schwartz, Walker, & Zeitlin, 1990). These theories can account for why alexithymics would have problems in articulating emotional experience and regulation if they have difficulties in differentiating physiological arousal since this ability is central to the beginning process of emotion.

In contrast to James-Lange and Richard Lane's theories, Cannon and Bard contended that we feel emotion when our body responds, or put another way, that behavior precedes the perception of emotion. Further, Schachter and Singer's two-factor theory states that to experience emotion, we must be aroused and cognitively label the emotion. Although each of these theories differs in placing the primacy of cognition or physiological arousal, they both incorporate the *activeness* of emotional experiencing and responding. Emotions involve a "readiness to action," a notion implicit in the Latin verb *emovere* (meaning 'to move out' or 'expel') from which the word emotion is derived.

Nico Frijda (1986) another influential figure in the research of emotion, in his book *The Emotions* differentiates between affect and feelings. He defines "feelings" as self-contained experiences with a sense of impeded or unimpeded functioning holding a hedonic quality of positive to negative and "emotion" as observable phenomena of action

readiness, which includes the processes of evaluation that give rise to behavior, other bodily phenomena, as well as feelings. “Affect” is an all-encompassing term consisting of emotions and feelings. The experience of emotion is not a passive process, as Fridja indicates, people not only experience emotions, they also manage or handle them. This process is outlined as an event occurs, which we then interpret (appraisal or evaluation), and our appraisal determines the action readiness, affect, and arousal thus motivating behavior. It is exactly this process of experiencing emotion through awareness, communication, and managing of one’s experience that this study seeks to understand, particularly as it relates to alexithymia as a deficit in emotional processing, and the impact alexithymia has on the *activeness* of coping behaviors relative to the outcomes on physical and mental health.

For the sake of clarity, in this study we will begin with these basic statements and assumptions on defining emotion in our attempt to be clear in conceptualizing the junctions at which alexithymia impacts the process. Emotions are psychological responses that involve the interplay among (1) physiological arousal, (2) expressive behavior sometimes referred to as affect, and (3) appraisal as a conscious experience. These components capture the concept of emotion as incorporating internal physiological responding and cognitive appraisal with *active* responding. Important to the relationship between alexithymia and negative outcomes for mental health and physical health, alexithymia involves a disconnect between linking physiological arousal to one’s accurate appraisal or conscious experience of emotion and one’s interpreting the expressive behavior of emotion of self and others. The assumption is also made here that emotion competence follows the normative developmental projection outlined by Lane’s

theory. This study attempts to link the alexithymic deficit in emotion processing with the consequent deficit in emotion responding (i.e., coping with emotion).

It is argued that emotion stimuli must be accurately interpreted for efficient emotion regulation, and that this process of “meaning-making” is essential to emotion regulation (Mayer, Salovey, & Caruso, 2001). Meaning-making is defined as the appraisal of thoughts and feelings that can be articulated to capture one’s past, present, or future expectations of experience. It is important in the process of potentiating “effective action” or goal-directed behaviors for obtaining valued outcomes, including emotion regulation. A brief example illustrates my point. Consider that emotional regulation is a process that involves initiating, inhibiting, or modulating one's state or behavior in a given situation through intrinsic and extrinsic processes. This process can be adaptive and maladaptive dependent on the success in attaining the desired short and long-term goals of a person. If a person experiencing a racing heart and higher respiration, having thoughts that they “are losing their mind” gets up out of their chair and leaves the room, they may find that their anxiety has subsided and physiological responses have returned to baseline in doing so. This is an example of symptoms of a panic attack and self-regulatory strategy involving an escape response. Unfortunately, this particular set of behaviors is highly effective as a short-term strategy for down-regulating negative emotion but as a long-term strategy contributes to higher frequency of panic and a continued escape and avoidance repertoire.

We know from extensive research the most successful treatment for panic incorporates emotional approach coping methods (i.e., exposure through emotional processing and expression) and active coping to down regulate sympathetic nervous

activity, thus changing behavior and the emotional experience (Barlow, Gorman, Shear & Woods, 2000). This example illustrates one scenario in which the inability to process emotional information and respond in an adaptive fashion to successfully down-regulate emotion and physiological responding, contributes to repeated episodes of emotional arousal and of internal stimuli remaining elevated for sustained periods of time. A similar process of inefficient emotional processing and avoidant forms of responding for a person with alexithymia can over time contribute to chronic stress and ‘allostatic load’ that can adversely impact not only emotional but also physical health (McEwen, 2000). Allostatic load refers to the “wear and tear” on the body as it attempts to adapt to adverse psychosocial or physical situations. This can result from either prolonged need for adaptation or the inefficient operation of the physiological response systems, which must be turned on and then turned off again after the stressful situation is over. We must consider what occurs for the individual with a deficit in emotion processing on a physical and emotional level when they are unable to process emotion or respond in an adaptive manner.

History & Current Conceptualization Of Alexithymia

Much of the initial conceptualization of alexithymia originated in the 1940s around the study of patients who had disturbances in their verbal expression of emotion, primarily from discussions of psychoanalysts and evolutionary neuroscientists regarding these disturbances. At the time there was a strong emphasis on early developmental factors in these initial conceptualizations, but there was little systematic investigation. Later, the central concepts were synthesized and the term alexithymia formally introduced by Sifneos (1973) from observations made while working with clinical

patients with psychosomatic disorders and patients reporting medically unexplained symptoms. In addition to the marked reporting of physical symptoms in the absence of sufficient medical explanation, these individuals reportedly were unable to identify and describe their feelings; differentiate their emotion arousal from other physiological sensations; showed a lack of fantasy, and *pensee operateire* (operatory thinking), a cognitive style that shows a preference for the external details and objects of everyday life (Apfel & Sifneos, 1979; Nemiah, 1996). Further refinement of the construct that came through additional studies and factor analyses led to a de-emphasis on paucity of fantasy as questions arose regarding the strength of the relationship between alexithymia and constricted imaginal processes or lack of fantasy. Later refinements in construct measurement led to the current dominant paradigm of alexithymia and measurement through three theoretically distinct facets of the alexithymia construct: (1) difficulties identifying feelings and distinguishing between feelings and bodily sensations of emotional arousal; (2) difficulty describing feelings to other people; and (3) a stimulus-bound, externally-oriented thinking style (Parker, Bagby, Taylor, Endler, & Schmitz, 1993).

Alexithymia: state or trait? One question of the alexithymia construct is of the stability of the construct and whether alexithymia may be state-dependent to negative emotion, thus more of an epiphenomenal symptom of anxiety, depression, and physical symptom reporting. In an effort to explore this hypothesis numerous studies have been conducted to measure the stability of the alexithymia construct and its relationship to anxiety and depression. The majority of studies have found alexithymia to be an independent and separate factor from negative mood (Porcelli, Bagby, Taylor, De Carne,

Leandro, et al., 2003) remaining stable, even when other markers of mental health or physical symptom reporting improves (Porcelli, Leoci, Guerra, Taylor, & Bagby; 1996) with only limited evidence of fluctuations in alexithymia scores relative to changes in negative emotion (Honkalampi, Hintikka, Saarinen, Lehtonen, & Viinamäki, 2000). Further, in clinical populations with mental disorders, who are found to have higher reporting in levels of alexithymia than nonclinical populations, alexithymia was found only moderately correlated with depression and anxiety (Picardi, Toni, & Caroppo, 2005). Therefore, rather than being viewed as a symptom of anxiety and depression, alexithymia may be better understood as a stable construct and an important pathway in the development of these clinical disorders.

Clinical presentation of alexithymia. One of the first and most basic assumptions about alexithymic individuals has been that they experience limited and undifferentiated emotional experiences. It has been hypothesized that alexithymic individuals are more likely to experience emotions as sensations, perceptions, or impulses to action that lack complexity (Frosch, 1995). As Taylor, Bagby, Parker, and Grotstein (1999) point out, “at first glance, individuals labeled as alexithymic seem to contradict this definition, because they usually present with emotional distress, as evidenced by chronic dysphoria or manifest outbursts of weeping or rage” (p. 29). Intensive questioning, however, reveals that they have very little depth of knowledge about their own feelings beyond superficial labeling and, in most instances, are unable to link them with memories, higher order emotions, or specific situations. Further, there is often a necessity for the intensity of emotion to be strong in order for it to be labeled; even still, the emotions are described in discrete terms rather than complex ones. Some have

characterized the difficulty describing feelings and externally-oriented thinking as an inhibited emotion style (i.e., lower self-reference and introspection; Luminet, Rime, Bagby & Taylor, 2004).

Alexithymia is considered a relatively stable personality trait and not a fluctuating coping response. Contrary to what is typically found in cases of suppression and denial, alexithymia is not associated with intrusions of rumination and search for meaning. Rather, there is evidence for less active emotional processing or less engagement with one's emotional state or condition (Luminet et al., 2004). Alexithymia is distinguished from coping processes or defense mechanisms of denial and inhibition of emotion in that the trait doesn't derive from differentiated emotions kept out of conscious awareness or uncommunicativeness, but rather as a deficit in emotion differentiation and as a cognitive preference (Lane, Sechrest, Reidel, Weldon, Kasniak, & Schwartz, 1996). In this regard it is viewed as an innate deficiency or limitation in emotion processing abilities and not a temporary coping response that would resolve as personal stressors lower. Thus, despite some ongoing questions as to a best definition, most theorists view alexithymia as a neurologically-based deficit or emotional learning deficit rather than a psychological defense (Kooiman, Spinhoven, Trijsburg, & Rooijmans, 1998).

Current Theories for Alexithymia

Common to many constructs investigated within psychology are questions of etiology and influences of nature (i.e., nativism, biology) and nurture (empiricism, personal experiences). Neurobiological theories arguing for innate individual differences in the experiencing and processing of emotion have dominated the explanations of

alexithymia. More recently, researchers are beginning to examine more potential sociocultural and environmental influences as mediators to alexithymia.

Neurobiological accounts of alexithymia. The prevailing theory of alexithymia argues that innate neurobiological differences constitute the root cause of alexithymia, characterizing it as an inborn deficit that makes the developmental progression of processing of emotional information less than optimal. This particular theory would support Sifneos' (1994) hypothesis of primary alexithymia, described as an innate, life-long, dispositional factor. Although several neurobiological models have been proposed, there is little direct evidence investigating the neurobiology of alexithymia to elucidate the pathogenesis of stress-related disorders and the normal functions of emotion.

Differences in the processing of affect for people with alexithymia in relation to people without alexithymia may account for the disorder of affect regulation and consequent social-emotional behaviors. Additionally, its presence at birth may exert a bi-directional influence on the family system as the child grows lending even higher complexity to our understanding of the social influences on emotional development.

There have been four major neurobiological models posited for alexithymia. One of them postulates a miscommunication between the limbic and neocortical areas. In this model the limbic system provides the physiological sensation of emotions, while the neocortex offers the symbolic representation of emotions. Studies on patients with lesional deficits in the limbic system, especially the gyrus cinguli anterior provide speculation to the presence of functional deficits (Taylor, 2000). The second model points to reduced interhemispheric communication. Numerous studies on inter-hemispheric transfer (information from the right to the left cerebral hemispheres) in

healthy volunteers have supported this hypothesis (Parker, Keightley, Smith & Taylor, 1999; Houtveen, Bermond, & Elton, 1997). Additionally, studies of split-brain patients have evidenced higher alexithymic characteristics than controls (TenHouten, Walter, Hoppe & Bogen, 1987). A third model posits a dysfunction in the right hemisphere because highly alexithymic individuals and traumatic brain injury individuals with right hemispheric damage, show less accuracy in recognizing facial expressions of emotions (Lane et al., 1996), lower expressiveness and bland unconcern for their disability and other distress (Nemiah, 1970). This hemisphericity might reflect a tendency to focus on external events and poor awareness of emotion. Additionally, the theory for hemispheric specialization for emotional valence suggests the processing of negative emotion may be more impaired in alexithymic subjects (Kano et al., 2003). The fourth model postulates a deficiency in the activation of the anterior cingulate cortex during emotional processing affecting the conscious awareness of emotion (Lane et al., 1996). In support of a diathesis of neurobiological correlates and environmental influences to alexithymic deficits, Schore (1994) has summarized a vast array of neuro-developmental research showing that the mother's skill in emotional responding to her infant has a direct effect on the quantity and quality of the infant's brain development, particularly involving the orbito-frontal cortex, work that provides a strong basis for understanding the interaction between neurobiology and environmental factors in alexithymia.

Nativism and empiricism. In the foreword for *Disorders of Affect Regulation*, Taylor (1999) states, "One can say that the earlier infant is developmentally 'alexithymic' but, with normal maturational epigenesis, achieves lexithymia" (p. xv). The fact that most individuals achieve a successful level of lexithymia than that associated with

alexithymia introduces the question of developmental influences or interruptions in normative emotional development.

One area in which the question of environmental influence has played out is in the question of whether or not there are different typologies of alexithymia. This is often more implicitly implied through designations of ‘clinical’ and ‘subclinical’ alexithymia and has only been explicitly addressed by a handful of researchers. Investigation for this hypothesis may be undertaken in various ways, such as in exploring etiological factors, levels of severity, or differences in symptomological expression. Freyberger (1977) originally suggested it is possible to differentiate between "primary" and "secondary" alexithymia by the stability of the trait for the individual. *Primary alexithymia* is described as a life-long, dispositional factor. *Secondary alexithymia*, however, is seen as a state symptom arising in the context of a significant stressor. It has been posited once secondary alexithymia has been acquired, one could potentially recover or it could persist if the alexithymic behaviors are reinforced or continue to be adaptive for the individual, for instance if the stressor remains constant. Authors taking this position have argued that secondary alexithymia is best understood as a way of coping with a serious stressor rather than as a genuine personality trait (Berthoz, Consoli, Perez-Diaz, & Jouvent, 1999). Of importance here are the ongoing discussions of trait alexithymia and potentially state alexithymic symptoms and the innate differences versus environmental contributing factors in the development of alexithymia. This also has important implications for treatment considerations for disorders associated with alexithymia.

Sifneos (1988, 1994) uses the term secondary alexithymia somewhat differently to refer to alexithymic characteristics resulting from unique etiological pathways, (e.g.,

developmental arrests, massive psychological trauma in childhood or later in life, socio-cultural factors, or psychodynamic factors). Krystal's (1979) earlier work on the consequences of massive trauma experienced by victims in concentration camps and their coping responses supports this distinction of an acquired type. Sondergaard and Theorell (2004) found alexithymia and shared experience of trauma in a longitudinal study of refugees was predictive of higher levels of dysphoria and higher levels of prolactin (i.e. a biological marker of immune functioning) indicating higher physiological stress. These results were independent of whether the individuals had a diagnosis of posttraumatic stress disorder. Sifneos contrasted this acquired type with primary alexithymia, which he attributed to neurobiological deficits present from birth through the life span and associated with heredity.

Normative male alexithymia is proposed to describe differences in emotion socialization for subclinical levels of alexithymia in men (Levant et al., 2006). This particular type is acquired through emotion socialization and the cultural values placed on emotion and emotion expression. Though it is not innate in the sense of "hardwired" neurobiology, it can be potentially problematic depending on the environmental context and goal-directives for the individual. This theory has been used to account for higher prevalence rates of alexithymia in different ethnic groups and individuals endorsing higher traditional role ideologies. The different contributors and pathways through which this may manifest will be discussed at higher length in the section on emotion socialization. The concept of a normative form of alexithymia that is shaped and strongly maintained by sociocultural factors is particularly useful when considering issues in treating culturally diverse clients. This idea has not been as equally pursued with women,

which may indicate either less need or a neglected area to be further explored. The current study will not be able to directly contribute to furthering either argument for innate or environmental differences, but contributes to the literature on observed differences in alexithymia and mediators of the effects on health in a large, sex and ethnically diverse sample.

Measuring alexithymia. Researchers have attempted to capture the alexithymia construct through a variety of methods, including self-report scales such as the Minnesota Multiphasic Personality Inventory, projective tests such as the Rorschach, the observer-rated Beth Israel Hospital Psychosomatic Questionnaire, and performance tasks utilizing eye-tracking and emotion recognition technology (see review Taylor, Bagby, & Parker, 1997). Each of these methods of measurement has its own strengths and weaknesses in capturing facets of the phenomena. One of the most commonly used measurement tools used in current research is the Toronto Alexithymia Scale, a parsimonious self-report scale that elucidates the construct nicely (TAS-20; Bagby, Taylor, & Parker, 1994). The TAS-20 measures alexithymia on three subscale dimensions: (1) difficulty identifying feelings and distinguishing them from the bodily sensations of emotion; (2) difficulty describing feelings to others; and (3) an externally oriented style of thinking. This scale has been used dimensionally and categorically to differentiate alexithymic (score higher than 65) from non-alexithymic individuals by total scale score. Interpreted as such, scores higher than 61 are often associated with mental disorders and other clinical criteria associated with a worse prognosis (Taylor cited in Lane et al., 1996); scores between 51 and 64 are considered to identify borderline alexithymics. Increasingly, researchers

analyze not only the total score, but also the individual subscales, as each of these sometimes has different correlates.

The sub-factor “difficulty-identifying feelings” (DIF) reflects the confusion that alexithymic individuals experience around awareness of differentiating physiological arousal and emotion appraisal. As indicated in the discussion on normative development of emotion processing and regulation, impairment in identification can be abstracted as occurring at Lane’s (1987) preoperational stage of emotion processing. This subscale measures responses to items relating to the awareness of one’s own internal sensations and emotion. As stated above, typical individuals with alexithymic characteristics have difficulty recognizing discrete emotions or differentiating complex emotional states. DIF is obvious in such self-reports, as, “When I am upset, I don’t know if I am sad, frightened, or angry.” Despite controversies and disagreements over what it may mean, in long term and short-term interactions, both self-reports and performance measures of emotion recognition have supported alexithymic reports of difficulty identifying feelings. A study by Parker and colleagues of 216 undergraduates found that self-report alexithymic individuals were also less competent in accurately identifying posed facial expressions of emotion (Parker et al., 1993). Additionally, Lane et al. (1996) found that high and low alexithymia individuals differ in the predicted direction on their ability to match verbal and nonverbal emotional stimuli with accurate emotional responses.

The subfactor “difficulty-describing-feelings” (DDF) is characterized by the inability to communicate feelings to other people (Lesser, 1981). This subscale involves items that address the process of putting internal states into words. It is thus linked to the labeling and interpersonal communication of emotion that may be thought of as a kind of

elaborative processing of emotional stimuli. DDF appears in the assertion, “It is difficult for me to find the right words for my feelings.” Critics of the construct have questioned whether this may merely reflect a deficit in the individual’s emotional lexicon to adequately describe their internal experience. However, a multimodal investigation was conducted, in part, to answer this challenge to construct validity. Luminet, Rime, Bagby, and Taylor (2004) found alexithymic individual’s use a lower proportion of emotion words related to a specific emotional situation, but in turn showed no deficit in the ability to access a general emotional lexicon. This finding challenges the assertion that alexithymia is simply a measure of verbal intelligence.

Language is important to development in integrating previously developed modes of thinking and feeling with newly acquired experiences. However, acquiring language does not guarantee that emotion experiences can always be identified and communicated verbally. As an individual becomes more aware of affective cues and acquires language, he or she can express himself or herself in a more coherent fashion and receive feedback from the environment in the development of an emotional lexicon. The processes of verbal mediation between experience and environmental feedback is necessary in interpreting both bodily and social cues and recognizing when a behavior is warranted (Greenberg, 2007). Additionally, verbal labeling of emotional states allows for higher self-control and self-expression. John Dewey (1894, p. 245) wrote about the verbal mediation of impulse and its effect on higher expression of the “whole self.” In support of this idea, Hesse and Cicchetti (1982) suggest that the use of language to express emotions facilitates control over behavior and other nonverbal expressions and thus, enhances emotion regulation. Language then serves as a cognitive organizing function

by mediating intention and behavioral action, bringing conscious awareness to self of one's internal state, exerting control over behavior and communicating to others.

Further, Thompson (1989) theorized improved emotional understanding allowed for higher complexity and accuracy of interpretations. This would in turn affect the reciprocal nature of emotion communication, how we react to others and they react to us.

Without accurate awareness of one's own emotional state and that of another's, it is unlikely we can implement successful strategies to manage our emotional experience or respond to another's. There is evidence that parental expectancies' differentially shape the emotional responsiveness and emotion lexicon for boys and girls. Both parents participate in the gender-differentiated development of language for emotions. Parents discourage their son's learning to express vulnerable emotions (e.g. sadness and fear), and whereas they encourage their daughters to learn to express their vulnerable and caring emotions (e.g. warmth and affection), they discourage their expression of anger and aggression (Brody & Hall, 1993; Fivush, 1989).

Externally-oriented thinking is described (EOT) as a cognitive style that includes constricted imaginative processes and stimulus-bound or utilitarian way of thinking. Some alexithymic individuals rely on external cues rather than their internal experience, feelings and fantasies for making decisions (Mallinkrodt, King, & Coble, 1998). Studies have supported that having an external orientation is associated with assigning less emotional meaning or importance to an emotion-evoking task (Luminet et al., 2004). EOT is further exemplified in the statement, "I prefer to just let things happen rather than to understand why they turned out that way." The use of little introspection and a preference for external events is conceptualized as a deliberate avoidance of emotion,

which is theorized to contribute to the *inhibition* of the development or cultivation of the identification and communication of emotion. Further, if introspection is not a viable method for emotion regulation or success in goal directives, external behaviors are going to be more reinforcing than internal behaviors of elaborative meaning making, introspection or fantasy.

Some researchers view EOT as differentiated from DIF and DDF as a “thinking style” rather than describing dimensions of emotion. In this way, EOT refers more to skills, habits, or an overall approach to the world and may not be as strongly related to the other sub-factors or overall alexithymia construct (Waller, Scheldt, & Hartmann, 2004). Even though the total alexithymia scores have retained predictive utility and withstood numerous validation studies (Taylor, Bagby, Ryan, Parker, Dowdy, & Keefe, 1988) one of the ongoing main problems related to the alexithymia construct has been the inconsistent strength of the relationship between its conceptual components. It has been suggested that the two dimensions of the alexithymia construct DIF and DDF represent an important aspect of emotional awareness more strongly related to emotional functioning than EOT, especially at the nonclinical levels of the spectrum. The two factors, DIF and DDF seem to have a stronger relationship and covary together better than EOT. For example, in both clinical and nonclinical populations, the subfacets of alexithymia DIF and DDF have consistently predicted negative emotion, including depression and anxiety, whereas the third factor EOT has not (Saarijarvi, Saliminen, & Toikka, 2001). The originators of the TAS-20 have acknowledged that it is possible for some patients to manifest difficulties in describing feelings, and in distinguishing between feelings and physical sensations, but to not show a preoccupation with external

events or a paucity of fantasies—or vice versa (Taylor et al., 1988). Nonetheless, the factor structure of the TAS-20 and measurement as a continuous variable has withstood over numerous studies (Kooiman, Spinhoven, & Trijsburg, 2002).

Epidemiology of Differences in Alexithymia

Reports of sex differences in alexithymia have been mixed across studies, with the majority of studies using non-clinical populations reporting men as more alexithymic. For instance, a study reported higher rates of alexithymia in males (9.4%) and than in females (5.2%) in a very large-scale cohort (Kokkonen et al., 2001). Levant et al. (2006) reviewed 45 studies on sex differences in alexithymia among adults. The investigators found separate results based on whether the study used a clinical (usually psychiatric) or nonclinical (usually college students) sample of adults. No differences were found in clinical samples but significant differences were found in nonclinical samples. Concluding, although alexithymia is found in both men and women, it is evidenced in higher rates among non-clinical samples of men than women. In line with the results of previous studies, in this study with an undergraduate population, as a socially higher functioning population we would anticipate lower rates of psychopathology and therefore potentially higher observed sex differences.

Different gender role stereotypes and the conflicts that arise for men and women have been posited for observed sex differences in emotional processing (Levant et al, 2003; Fischer & Good, 1997). Gender role strain paradigm, a social constructionist perspective, hypothesizes that gender ideologies inform socialization practices thereby influencing behavior (Pleck, 1995). This theory proposes that contemporary gender roles are contradictory and inconsistent and that the proportion of persons who violate gender

roles is high. Actual or imagined violation of gender roles leads to condemnation and negative emotional consequences that influence people to stringently conform to them. Further, women are afforded more flexibility than men within their roles resulting in more severe consequences for males than for females; also, certain prescribed gender role traits (such as male aggression) are often dysfunctional. In this view, prevailing gender ideologies vary according to the psychological, historical, social, and political contexts, and serve to influence parents, teachers, and peers, who in turn, socialize children according to those ideologies. That being said, even though women are afforded more flexibility in their gender role, if the expectations are higher for women that they will have higher prowess in processing emotion in self and in recognizing the emotional needs in others, alexithymia might impact women more significantly, given the higher expectations and demands. To put it simply, alexithymia could be more common in men but result in higher impairment for women. In this sense, socialization is the mechanism through which the importance and methods of emotional processing and emotional expression are taught and emulated.

Mild to moderate forms of alexithymia are theorized to occur more frequently among men who were socialized as boys to conform to the requirements of traditional masculine norms, and thus were required to restrict emotional expression. Through differences in the social-emotional expectations for boys in relation to girls, boys are expected to suppress their emotions, and their emotion-related behaviors are more severely restricted. Levels of alexithymia in men have been linked with higher traditional masculine ideology, gender role conflict, and fear of intimacy (Fischer et al., 1997). These investigations provide a couple of important contributions to the study of emotion

socialization. One is the importance of gathering data to support the idea of gender roles and their potentially negative impact on individuals emotion processing. The other is the associated characteristic's that may accompany traditional role ideology (i.e., fear of intimacy) and their impact on interpersonal relationships. According to Levant et al. (2003) traditional gender role socialization serves to uphold patriarchal codes by requiring that males adopt dominant and aggressive behaviors and function in the public sphere, while requiring that females adopt adaptive and nurturing behaviors and function in the private sphere of the family. This common subclinical form of alexithymia has been termed *normative male alexithymia* to be distinguished from more severe alexithymia and alexithymia in women. It is important to note that even though it is labeled as "normative," *normative male alexithymia* may still lead to negative outcomes and problematic in that normalizing can lend itself to being more easily dismissed and not given clinical consideration. Given the influence of gender socialization impacting behaviors for men and women differently, it is important to examine not only sex differences but also differences in behavioral correlates such as coping.

Alexithymia and Cultural Influences. Such consideration of sex differences in gender roles across countries leads to a larger question: Is alexithymia a sociocultural phenomenon? Fukunishi, Nakagawa, Nakamura, Kikuchi and Takubo (1997) suggest "alexithymia may be a culture-bound construct." Kirmayer (1987) states labeling a person as alexithymic reflects value judgments about the appropriate modes of expression and behavior. Further asserting alexithymia is a product of Western psychotherapy emphasis on verbal expression:

[T]he emphasis on verbal description of emotion as inner states of the individual that characterizes Western psychotherapy is one possible way of organizing experience. . . . Cross-cultural studies of healing, as well as clinical work with somaticizing Western patients, suggest that the body, social events, moral and religious concerns all provide apt metaphors for human conflict. . . .Forms of healing that recognize the metaphoric language of emotion are able to achieve talking cures without psychological insight (pp. 132-133).

There is evidence that culture-specific patterns of parenting and self-construal impact cognition and emotion-related social consequences. Moreover, cultural variations in gender role identity have been observed across societies in the emotion socialization and the value attached to both emotional awareness and expression (Ekman, Sorenson, & Friesen, 1969; Markus & Kitayama, 1991). The teaching or social learning processes involved in increasing or decreasing attention to the recognition and expression of emotions vary according to cultural proscriptions in display rules and value in an individual's emotion. Display rules are a social group's informal rules about when, where and how it is appropriate to express emotions. Within some cultures, families do not freely share emotions and children are left to make sense of their own emotional experiences and the affect of others. These differences in social emotional learning have been posited as a reason for differential rates of alexithymia across countries and sex. For example, studies have reported rates of 17.1% in France (Loas, Fremaux, Otmani, & Verrier, 1995), 18.8% in Canada (Parker, Taylor, & Bagby, 1989), and 13% in Finland (Salminen, Saarijarvi, Aarela, Toikka, & Kauhanen, 1999). Previous studies examining

alexithymia in Eastern and Western cultural groups have typically found Eastern cultural groups showing higher mean levels of alexithymia (Dion, 1996; Huynh-Nhu, Berenbaum, & Raghavan, 2002). Examples of differences in expectations for emotion management and expression include studies finding that Indian girls at young ages report managing emotional-expressive behavior out of fear of punishment (Joshi & MacLean, 1994), and Chinese child-rearing practices that emphasize restraint and temperance in emotional-expressiveness (Chen, et al., 1998).

In consideration of observed differences in the reporting of alexithymia across countries and different practices of emotion socialization, some critics have asked whether alexithymia is merely a culture-bound construct reflecting the emphasis on Western psychological-mindedness. This question is important in considering the relationship of personality traits to a particular outcome. Evidence contradicting this notion that it is culture-bound phenomena has been provided by investigators in several other countries who developed and translated versions of the TAS into more than 14 different languages and countries (Taylor, et al., 1999).

There appear to be evidence of alexithymia functioning as a trait across countries. However, there are differences in the prevalence rates of alexithymia that speak to cultural differences in emotion socialization and the value placed on emotional awareness and emotion communication. Recently, in a large-scale study conducted by Bermond et al. (2007), a measure of alexithymia validated in six languages and seven populations found differences in mean scores across various populations. The subjects consisted mainly of college undergraduates but also included various clinical groups and subjects in the general population. Overall, the results indicated the Italian, Polish and Russian

respondents were more alexithymic than the Dutch, Belgian and English respondents, with the Australian respondents somewhere in between. To the knowledge of this author there have been very few studies attempting to understand the reasons behind the differences in reporting rates, with one study citing differences between Chinese students and student of European-ethno cultural backgrounds and attributing this to Chinese culture encouraging somatic expressions of emotional states as opposed to psychological expressions prominent in many Western cultures (Le, Berenbaum & Raghavan, 2002). The influence of geographic residency is a factor that can produce differences within ethnic cultures as well. In fact, Levant and colleagues (2003) found geographic residency impacted the association between alexithymia and masculine ideology within Hispanic culture depending on whether the male participants resides in urban northeastern United States (i.e. New York, New York) or Puerto Rico. This study also included a large sample of women and found alexithymia higher in men and women endorsing traditional male ideology. Another study finding differences within the Finnish population examined rural versus urban residence as possible sociocultural influences (Joukamaa et al., 2007).

Alexithymia and Emotion Competence

The prevailing theory, borrowing from the research on emotion competence or emotional intelligence, is that alexithymic characteristics interfere with the regulation of negative emotion by the inefficient emotional processing (Taylor et al., 1997). In fact, alexithymia has been considered as an extreme deficit on the continuum of emotional intelligence. A brief discussion of Mayer and Salovey's (1997) model of emotional intelligence (EI) provides another useful heuristic for understanding the importance of

proficiency in emotion processing and the pathway through which alexithymia leads to higher negative emotion and lower positive emotion. Examination of the literature on emotion competence provides higher access to understanding the potential impact of a deficit in these abilities and for comparison of the two constructs for overlap. The four emotional abilities comprising the model include perceiving emotion, using emotion, understanding emotion and managing emotion. Perceiving emotion pertains to the ability to identify emotions in oneself and others, and in other stimuli, including voices, stories, music, and works of art (Ekman & Friesen, 1975; Scherer, Banse, & Wallbott, 2001). Using emotion involves the ability to harness feelings that assist in certain cognitive enterprises, such as reasoning, problem solving, decision-making, and interpersonal communication (Palfai & Salovey, 1993). Understanding emotion involves language and propositional thought that reflect the capacity to analyze emotions. This skill includes understanding the “emotional lexicon,” or the manner in which emotions combine, progress, transition from one to the other, the outcomes of emotional experiences (Frijda, 1986; Lane, et al., 1990). Managing emotion pertains to the ability to reduce, enhance, or modify an emotional response in oneself and others, as well as the ability to experience a range of emotions while also making decisions about the appropriateness or usefulness of the emotion in a given situation (Gross, 1998).

Upon examination of the EI model, it becomes clearer why some conceptualize alexithymia as a deficiency on the same “intelligence” continuum; it is directly measured by the effect on perceiving and understanding emotion. A few studies have focused on the relationship between EI and alexithymia. In a small study of EI, researchers found a correlation of $r = -.65$ between the 2 constructs (Schutte & Malouff, 1999). In a larger

community study of 734 adults, Parker, Taylor, and Bagby (2001) found that alexithymia and EI were highly and inversely correlated, $r = -.72$. The consensus is emotional intelligence and alexithymia are related constructs on the opposite ends of the continuum of abilities in emotional awareness and regulation.

A review of the research suggests that the inefficiency of emotion processing in perceiving emotion observed in alexithymia differs between the hedonic value of emotion (i.e., positive emotion or negative emotion) and in processing emotion in self and in recognizing others' emotion. There is growing interest in using multiple methods of studying emotion processing in alexithymia and whether the deficit extends to social processing of emotions. In an effort to explore this hypothesis, 146 participants completed the Toronto Alexithymia Scale, the Positive and Negative Affect Schedule and a performance task judging facial expressions depicting neutral or negative emotions under slow and rapid presentation conditions. The results showed that difficulty with describing feelings was inversely related to the ability to detect expressions of negative emotion in the rapid condition, relative to neutral and positive emotion (Parker, Prkachin & Prkachin, 2005). This study provides understanding that emotion processing in alexithymia is not limited to one's own emotions but also in processing other's emotions. This would potentially impede social information processing and influence relationship processes. The study also suggests that judging negative emotions for alexithymics is more difficult than positive or neutral emotions. If this extends to processing negative emotions in oneself, this can be especially problematic for coping in times of stress and contribute to vulnerability for depression, anxiety, and other mental disorders. The premise of the current study is alexithymia involves difficulties in perceiving, and

understanding emotion thereby impacting the process of using and managing emotion as reflected in the effect on coping strategies and outcomes of health.

Alexithymia and Coping Strategies

In the current study it is proposed alexithymia impacts coping strategies, at least partially accounting for the relationship of alexithymia to poorer mental and physical health outcomes. Coping strategies are typically defined as an individual's cognitive, behavioral, and emotional efforts to manage external and internal demands that are taxing or exceed the individual's resources (Folkman, Lazarus, Gruen, & DeLongis, 1986). Coping may be characterized by both an individual's coping style and by coping processes. Coping style refers to an individual's more stable trait-like pattern of responding to stress and presumes that strategies involve habitual problem-solving thoughts and actions to manage demands. It is at least moderately stable across diverse situations, over the long term, affects adaptational outcomes (Folkman et al., 1986), including physical health. Coping processes, on the other hand, refer more narrowly to the contextual interaction between person and situation or event, whereby an individual's coping efforts are different, and can change from one situation to another depending on the nature and appraisal of a stressful encounter, which can lead to different outcomes based on these interrelated factors (Lazarus & Folkman 1984). The present study will investigate coping style in a dispositional format (i.e. trait coping) and its relationship with mental health and physical health.

Health and well-being is a criterion that should be used for evaluating the success of coping efforts. A leading model in the area of stress and coping is that of Lazarus and Folkman (1984). This model emphasizes a person-environment relationship, whereby an

individual constructs meaning from a social and physical environment. In their view, stress, as the first component of the model, can be thought of as part of a complex, organized biosocial-psychological whole that may endanger well-being. It consists of two processes – (1) cognitive appraisals, composed of primary and secondary appraisals and (2) coping. In primary appraisal, the individual evaluates whether an encounter is to be identified as a threat, challenge, or loss. In secondary appraisal, the individual determines their available resources and how to respond to overcome harm or to improve the prospects for benefit. Coping, as part of the second component of the model, refers to the individual's cognitive and behavioral responses to manage the internal and external demands of the person-environment transaction.

Active and avoidant coping. Previous research has identified coping strategies as problem-focused and emotion-focused (Stanton, Sullivan, & Austenfeld, 2009), adaptive and maladaptive (Voss, Müller, & Schermelleh-Engel, 2006), functional and dysfunctional (McIlvane, Popa, Robinson, Houseweart, & Haley, 2008), and active and avoidant forms of coping (Carver, 1997). Each of the theoretical models attempt to differentiate between an individual's typical pattern of responding to stress or coping style, the focus of the behavior (e.g., emotion, problem-focused), and effectiveness in the world in efficiently regulating stress and achieving goal directives.

Several measures have been used to identify the relationships between approach and avoidant forms of coping (Carver, 1997). Through these two mechanisms an individual displays certain behaviors that are thought to moderate the effect of stressful stimuli. Approach coping behaviors involve defining the stressful situation, actively seeking support, reflecting on possible solutions, and taking actions to resolve the

situation. Approach forms of coping are thought to include; active coping, planning, positive reframing, acceptance, humor, religion, using emotional support, and using instrumental support. Such actions resolve the stressful situation and result in positive emotional adjustment. Conversely, avoidant coping behaviors include efforts to withdraw from the stressful situation or avoid seeking solutions; this may result in a failure to resolve the stressful situation and can be associated with anxiety. Avoidant forms of coping are thought to include: self-distraction, denial, venting, substance use, behavioral disengagement, and self-blame. Studies show that individuals typically progress in their utilization of approach coping across their life span; for example, adolescents and young adults use more avoidant coping strategies, such as escape-avoidance, compared to other age groups (Blanchard-Fields, Sulsky, & Robinson-Whelen, 1991). Therefore, it is expected that avoidant coping will be higher in a younger undergraduate college sample than in an older sample of community adults. Nevertheless, the present study does not offer another sample for comparison.

In this study, a more contextual approach to understanding the efficacy of certain coping responses is taken in the acknowledgment that avoidant coping strategies in certain contexts can be adaptive, especially in the short-term but can lead to long-term problems if they become inflexible to the unique demands of the environment and need for responding. Therefore, one of the primary analytic methods used in the study was to conduct an exploratory analyses to develop a measurement model of avoidant and active/approach coping strategies specific to the sample in lieu of utilizing other researchers previous modifications to the coping inventory used in this study. Although the term maladaptive coping is commonly used and often includes avoidant coping, for

the sake of specificity as it relates to alexithymia, we are most interested in an approach and avoidant responses to emotion states and problem-solving. Conversely, in place of adaptive coping the term approach coping is used to denote an *active* movement to engaging in strategies for relieving stress through problem-solving or engagement in one's emotional state.

Emotion-focused coping and emotional approach coping. Another line of research on coping examines the process of emotion-focused strategies in coping. Reviewers of the coping literature often have concluded that coping attempts directed toward managing negative emotions in stressful encounters (i.e., emotion-focused coping; Lazarus et al., 1984) demonstrate robust associations with maladaptive outcomes (Kohn, 1996). In view of the literature on emotional competence the idea that emotion-focused strategies can be maladaptive at first appear counter-intuitive. The explanation for this is that task-oriented coping is “a primary control style that is adaptive when situations are appraised as changeable, where focus is maintained and emotions are controlled” and emotion-focused coping is thought to be “a secondary control style adaptive when situations are appraised as unchangeable” (Endler & Parker, 1990, p. 845). Both are situation specific coping responses that can be adaptive dependent on contextual qualities of the stressor and whether the situation calls for an action oriented approach to institute change or an acceptance approach for situations that are unchangeable. It is argued, emotion-focused coping is maladaptive when the situation calls for action and a person appraises it as unchangeable and does not engage in actions to change the situation. According to Endler et al. (1990) the aim in emotion-focused coping is to reduce stress, but over the long term it can increase stress and produce negative outcomes like anxiety

and depression. A second contention surrounds the item wording of oft-used measures of emotion-focused coping. Items within these measures often include words with negative emotion, producing confounds of the measure with self-deprecation and distress. This quality is apparent in one of the questions for venting in the popularly used short form for measuring coping, the Brief-COPE, “I express my negative feelings” and “I say things to let my unpleasant feelings escape.” Neither of these questions address the expression of positive emotion states.

Austenfeld and Stanton (2004) have taken a positive approach in examining the importance of emotional coping strategies and developed an instrument, the Emotional approach Coping scale (EAC) to measure emotional approach coping based on the literature of emotion competence and emotional intelligence (Salovey, Bedell, Detweiler, & Mayer, 1999). The EAC measure is comprised of two correlated but distinct subscales: emotion expression and emotion processing. Emotional processing is the deliberate attempt to “...acknowledge, explore, and understand...” ones emotions (Stanton, Sullivan & Austenfeld, 2009, p. 225). Emotional expression is any verbal or nonverbal attempts communicate or represent an emotional experience. In contrast to emotion-focused strategies captured by other coping inventories, the EAC is positively-worded and represents an active approach to using one’s emotions rather than passive acceptance of the un-changeability of a stressor. It has been found to be adaptive with interesting sex differences and fluctuations, depending on the situational context and perceived severity of stress. In a one-month longitudinal study of young adults, emotional approach enhanced adjustment (i.e., depressive symptoms, life satisfaction) over time in women and diminished in men (Stanton, Kirk, Cameron, & Danoff-Burg,

2000). These results suggest emotional approach strategies are particularly important to adjustment for women, but result in lower adjustment in men over time.

Sex and ethnic differences in coping. In further efforts to explore the variability and importance of coping strategies researchers have examined differences in coping practices between men and women, and by ethnicity. A study by Karekla and Panayiotou (2011) on coping and experiential avoidance found differences between men and women in coping strategies, with women scoring significantly higher than men in denial, seeking emotional support, and venting while males scored significantly higher in substance use. Reliable sex differences have been reported for emotional approach coping with women reporting higher emotion processing and emotion expression than men, however, sex has been found to account for only a small portion of the variance (e.g., 7% of the variance in the use of EAC in two studies of undergraduates; Stanton et al., 2000, Study 1 and 3).

To this author's knowledge, few studies have examined for differences in coping for Hispanic and non-Hispanic White populations. One study conducted to examine coping with stress for Mexican-immigrants found differences in coping strategies and relationship to health-related quality of life for Mexican-immigrants, Mexican Americans, and non-Hispanic White Americans (Farley, Galves, Dickinsons & Perez, 2005). In this study, Mexican-immigrants reported better physical functioning than Mexican Americans and non-Hispanic White Americans, and were more likely to use positive reframing, denial, and religion. They were also less likely to use substance abuse and self-distraction, as stress-coping strategies. Moreover, there were also differences between American populations, with Mexican Americans reporting better mental health functioning than non-Hispanic White Americans, even though there was no

difference among groups in perceived stress. This study supports the Hispanic Paradox, the collective phenomenon of reporting higher health in Hispanic/Mexican Americans in comparison to non-Hispanic White and African Americans even when they share certain socioeconomic markers that are often implicated in poorer mental and physical health functioning (Markeides & Coreil, 1986). This highlights the importance of investigating for potential differences in ethnicity of our hypothesized model of alexithymia and coping for men and women. The current study will contribute to furthering understanding of the interrelationships between coping and alexithymia for these groups.

Coping as a mediator of alexithymia. Relative to the interest in alexithymia on health and literature on emotion competence, there have been few studies specifically examining alexithymia and coping. However, there is increasing attention directed towards understanding the relationship between alexithymia and coping. A deficit in emotion processing contributes to difficulties in problem solving abilities for emotion regulation. If an individual does not value exploration of their internal experience as a useful activity towards problem solving, they are limiting this as an available coping resource they might otherwise have. This can lead to a sense of helplessness in the face of stress and thus to both intrapersonal strategies of emotional and problem avoidance. Not only does this affect the individual's internal experience and regulatory strategies but also interpersonal coping strategies that can negatively impact social relationships, such as venting and reliance on others for problem-solving. A study assessing alexithymia and attachment style found alexithymia to be related to high levels of external reliance on others for making decisions, rather than internal experience, to solve problems and make decisions (Mallinckrodt et al., 1998). Besharat (2010) found that alexithymia, as

measured by TAS-20 in student samples, was positively associated with the use of passive emotion- and avoidance-oriented coping strategies and negatively with the use of task-oriented coping strategies. These findings are consistent with those of previous studies in which alexithymia were found to be associated with maladaptive coping styles (Parker, Taylor, & Bagby, 1989).

Most of the studies of alexithymia that have included coping measures have examined direct effects of alexithymia on coping and have not explored coping strategies as a potential mediator of alexithymia to outcomes. It is hypothesized alexithymia impacts coping behaviors through the inefficiency of emotional responding. When unexpected, novel or stressful events occur this can generate negative emotions with associated thoughts and memories. Ideally, these emotions would be promptly regulated using a wide range of adaptive strategies, resulting in continued health and social functioning. Skills in the ability to accurately identify emotions and engage in proactive coping behaviors facilitate higher efficiency in mood repair and regulation. On the other hand, if the person inhibits or avoids experiencing the negative emotions and memories then the emotions are not adaptively regulated and the stress experience is prolonged leading to problems in social and health functioning. One study of adolescents, which found that alexithymia was correlated with an inability to regulate negative emotion, provides partial support for this hypothesized pathway (Horton, Gewirtz, & Keutter, 1992). In a study of coping, alexithymia was positively correlated with the number of physical symptoms, with anxiety and depression, but negatively correlated with problem solving, seeking social support, and positive reappraisal coping scores (Tominaga, Choi, Nagoshi, Wada, & Fukui, 2013). However, some studies have reported exceptions to the

relationship between each form of coping and outcome, depending on the context of the stressor and most appropriate avenue of engaging or withdrawing from a problem. For example, alexithymia and approach coping, generally considered beneficial, negatively predicted adherence to diet for individuals enrolled in a cardiac rehabilitation program (Jackson & Emery, 2013). The authors concluded that difficulty identifying feelings interferes with treatment engagement when combined with approach coping because patients may overestimate their abilities in managing their own health and do not adhere to treatment protocols.

A few studies show promising results in further understanding the pathways from alexithymia to avoidant forms of coping for emotion regulation. Central to the issue of whether alexithymia is an issue of unwillingness or inability, research is beginning to further explore the relationship between alexithymia and *experiential avoidance* a term coined for a process when “a person is unwilling to remain in contact with particular private experiences” and engage in efforts to inhibit these thoughts, feelings, and bodily sensations (Hayes, Wilson, Gifford, Follette, & Strosahl, 1996, p. 1152). Experiential avoidance is thought to be a self-regulatory strategy for emotion regulation. In a study of 177 adults attending medical school, experiential avoidance and avoidant coping were correlated with alexithymia, $r = .47$ and $r = .37$ respectively. However, experiential avoidance did not mediate the relationship between alexithymia and negative mental health outcomes (Berrocal, Pennato & Bernini, 2009). It appears that experiential avoidance and alexithymia are two independent constructs that may be related but each accounts for separate variance in predicting negative mental health outcomes and avoidant coping. In experiential avoidance the person is able to adequately identify and

describe their feelings and act upon them but *chooses* not to for reasons of escape and avoidance of distress. In terms of alexithymia, the person is reportedly unable to and performance-based studies have supported this idea (Parker et al., 1993).

Not surprisingly, difficulties in emotion processing appear to impact emotion-focused strategies of coping, as well. Lumley, Gustavson, Patridge, and Labouvie-Vief (2005) examined relationships among measures of emotional intelligence, emotional approach coping, and alexithymia. In this study, they reported alexithymia was moderate, negatively correlated with emotional approach coping. Another study of alexithymia and emotional approach coping in a sample of 162 African American adults, found a moderate negative correlation between alexithymia and emotional approach coping (Peters, 2006). These studies support the hypothesis that alexithymia will predict a negative relationship to emotional approach coping.

Alexithymia's Association with Health

Mental health. This section will review the literature on alexithymia and markers of mental health. Alexithymia has been consistently related to poor mental health outcomes with lower positive emotion and higher negative emotion. Bagby and colleagues (1994) used Costa and McCrae's (1985) NEO Personality Inventory and found that the TAS-20 showed positive correlations, ranging from $r = .25$ to $r = .36$, with anxiety, depression, and shame/embarrassment, but correlated negatively with positive emotions, $r = -.36$. A recent cross-sectional study using structural relationship modeling found a direct effect for alexithymia on somatic and mental health and indirect effects through higher negative emotion and lower positive emotion (Dubey & Pandey, 2013). These authors suggest the association between alexithymia and poor health are partially

mediated through the experience of higher negative emotion and anhedonic tendencies (i.e., lower pleasure) in alexithymia individuals.

The clinical features of alexithymia are observed in numerous mental disorders, including depression, anxiety, posttraumatic stress disorder (Hyer, Woods, & Boudewyns, 1991), somatoform disorders, panic disorder, eating disorders (Bourke, Taylor, Parker, & Bagby, 1992), alcohol and other forms of substance abuse (Haviland, Hendryx, & Shaw, 1994), and disordered personalities, specifically Borderline Personality disorder (Levine, Marziali, & Hood, 1997). For example, Berthoz, Consoli, Perez-Diaz and Jouvent (1999) found positive correlations between depression, anxiety (state and trait) and alexithymia scores. In another longitudinal study, Honkalampi et al. (2000) found a strong association for depression and alexithymia with a high prevalence rate of alexithymia of 32.1% at six months follow-up among participants having elevated scores (>9) on the Beck Depression Inventory in comparison to rates of 4.3% in non-depressed men and women.

Due to the different effects that the two dimensions of positive emotion and negative emotion have on mental health, it is important to study the relationship between alexithymia and positive emotion. Positive emotion may be defined as feelings that reflect a level of pleasurable engagement with the environment, such as happiness, joy, excitement, enthusiasm, and contentment (Clark, Watson, & Leeka, 1989). This can be brief or longer lasting, or even reflect more stable trait-like feelings. Positive emotion arises when events are congruent with matched goals or the appraisal of “reasonable progress toward the realization of our goals” (Lazarus, 1991, p. 267). Importantly, the lack of positive engagement does not necessarily imply negative emotion such as anger,

anxiety, and depression nor does the lack of negative emotion imply presence of positive emotions. Research on positive emotion suggests it is independent of negative emotions (Watson, Clark, & Tellegen, 1988) except when stress is high (Zautra, Berkhof, & Nicholson, 2002). A person may indeed experience positive emotions while even under stress. Common examples of life events used to demonstrate the idea of mixed emotion states of increased positive and higher negative emotion are having a baby, getting married, or beginning a new job. These are all events that require a degree of adjustment and flexibility that places new demands and stress on the individual. Positive emotions are thought to be important in mental health by providing the individual a protective “buffer” to stress (Davis, Zautra, & Smith, 2004) and the role of “undoing” negative emotions (Fredrickson & Levenson, 1998). In the case where stress becomes too great or prolonged then negative emotion states can override positive emotion resulting in high negative emotion and lower positive emotion.

The relationship between positive emotion and alexithymia has been less established due to the lack of attention to positive emotion as a variable of interest. Alexithymia may reduce positive emotion by increasing the duration and effect of perceived stress, and limiting abilities in emotion regulation thus moderating the effect of pleasure. In the few studies that have been conducted, alexithymia has been negatively correlated with positive emotion (Prince & Berenbaum, 1993) and with life satisfaction (Huynh-Nhu, et al., 2000). In a community sample of adults, when trait anxiety and depression were controlled, positive emotion remained negatively correlated with alexithymia (Lundh & Simonsson-Sarnecki, 2001). This association was much more robust than neuroticism or trait negative emotion which is more often studied with

alexithymia. Berenbaum and James (1994) found an association between alexithymia and diminished positive family emotional expressiveness. In this study, the childhood memories of one's family as emotionally cold and unsafe were associated with alexithymia. In their conclusion, difficulty identifying and communicating emotion results from a family environment without appropriate models of attending to emotion, even positive emotion, or models providing the nonthreatening expression of emotion. This lends itself to questioning emotion socialization and learning as a pathway to developing alexithymia. These studies support the need for further work in exploring the effects of alexithymia on positive emotion.

Physical health. Historically, the alexithymia construct has been associated with illness associated with psychogenic influences (e.g., chronic pain, fibromyalgia). Moreover, even in individuals not presenting with psychosomatic or functional diseases, alexithymia is associated with higher physical symptom reporting than non-alexithymia individuals (Lumley, Stettner, & Wehmer, 1996). This relationship is thought to occur through the misinterpretation of bodily signals leading one to somaticize rather than express emotions verbally (Lesser, 1981). As a result of the difficulty they have identifying their feelings, alexithymic individuals focus on the somatic sensations that accompany arousal. This leads to amplification and misinterpretation of signs of physical illness and hyperarousal in the autonomic nervous system and neuroendocrine system (Waldstein, Kauhanen, Neumann & Katzel, 2002), which in turn leads alexithymic individuals to seek medical treatment for physical symptoms rather than identifying psychological factors in their distress and seeking psychological services (Marchesi, Brusamonti, & Maggini, 1999). This contributes to an increase in disability days,

healthcare utilization, and symptom-related difficulty in activities and relationships (Kroencke, Spitzer, & Williams, 2002).

One hypothesis for the association between alexithymia and higher responsiveness of the autonomic nervous system is related to emotional concordance. Lacey (1959) originally proposed that *emotional concordance* was important in down-regulating physiological responding. He posited the specific autonomic pattern a person exhibited when encountering a stimulus was dependent on the action tendency or what the person was trying to do with that stimulus and not on the apparent physiological content or feelings. For example, the heart rate tends to slow and skin conductance decreases when a person wants to relate attentively to the environment. On the other hand, when a person wants to avoid or buffer environmental inputs, both heart rate and skin conductance increase. Recent studies have supported his proposition of emotional concordance with reported emotion and physiological responding especially with basic emotions (Friedman, Stephens & Thayer, 2013). This theory is also resonant with Frijda's (1986) theory of emotion positing our appraisal impacts action readiness, affect, and arousal. Studies have shown alexithymic individuals have elevated autonomic responding (Gannon & Hanes, 1986). If a person is externally-oriented they may not be attuned to internal sensations that would serve as signals to action tendencies or appraisal. The nonattention or buffering of environmental inputs may contribute to higher subjective reporting of physiological distress or sustained physiological responding (Connelly & Denney, 2007). Additionally, in alexithymics the nonattention may disrupt emotional concordance in assigning meaning and responding with appropriate behavior for emotion regulation.

Although the alexithymia theory of somatization presents an interesting hypothesis to account for medically unexplained symptoms and symptom reporting, it has not been consistently supported in research. Researchers on somatization have found alexithymia to be independent of somatization but associated (see review, De Gucht & Heiser, 2003). However, this evidence does not contradict nor necessarily lend any substantiation to the question of whether a unique pattern of physiological arousal exists for alexithymic individuals.

Alexithymia also has been associated with various functional diseases, including cardiovascular disease and fibromyalgia. The theory that alexithymic individuals fail to modulate emotions through cognitive processes, by attributing internal stimuli as somatic causes rather than emotion, suggests that they would exhibit higher physiological responses when viewing a stressful stimulus. However, studies have produced inconsistent results with some reporting hypoarousal (Linden, Linz, & Stossel, 1996; Rodema & Simons, 1999), others hyperarousal (Infrasca, 1997) and many indicating no differences (Stone & Nielson, 2001). Some researchers suggest this may be explained, at least in part, by the use of different emotion-inducing stimuli in various studies (e.g., viewing disturbing emotional scenes, giving a personally-relevant speech, and hearing stressful tones), and also to the monitoring of different physiological variables (e.g., heart rate, blood pressure; skin conductance, or muscle tone). Others have suggested alexithymia does not predict higher arousal per se but does increase illness behavior, the subjectivity of experience and higher reporting of symptoms (Lumley, et al., 2013).

There are numerous methodological problems when comparing across these studies because different emotion stimuli will elicit different patterns and variability of

responding among different physiological measures. In fact, Luminet and colleagues (2004) found DDF associated with higher mean heart rate while viewing an emotion stimulus but no significant relationship to blood pressure, two indicators of the cardiovascular system and sympathetic arousal. In contrast, another study of alexithymia and cardiovascular risk in older adults found alexithymia to be associated with higher blood pressure response to an anger provocation task (Waldstein et al., 2002).

Turning an eye towards a different functional illness and its link to alexithymia, fibromyalgia (FM) is a syndrome characterized by chronic, widespread musculoskeletal pain with tenderness over specific trigger points. In a review of seven studies Di Tella and Castelli (2013) reported that one study found no differences between FM patients and the control group, four studies reported significant differences with higher alexithymia in the FM sample, and two showed unclear results. Despite these questions and inconsistencies among studies on the consistency, strength and mechanism of the relationship between alexithymia and symptom reporting, a review done by Lumley, Neely, and Burger (2007) continues to maintain alexithymia is a potential risk factor for physical symptom reporting and illness behavior.

In summary, the literature on alexithymia has consistently linked the construct with poor mental health outcomes but has inconsistently linked it to physical symptom reporting. Although the direct effects on mental health have been supported and somewhat supported for physical health, the processes of emotion processing and pathways to negative outcomes are not well understood. Preliminary research supports an association between alexithymia and higher avoidant coping and lower active coping as potential pathways to the relationship between alexithymia and health.

STATEMENT OF RESEARCH PURPOSE

The four aims of the current study were directed to furthering the understanding of the relationship of alexithymia to coping strategies and physical and mental health in an undergraduate student population. Given the evidence that alexithymia impacts mental and physical health, the limited research on how alexithymia impacts coping behaviors, and questions regarding etiological differences for sex and ethnicity this warrants further investigation. First, the current study examined the relationships between alexithymia, mental and physical health in an ethnically diverse undergraduate population. Second, the study seeks to understand the relationship between alexithymia and forms of coping, including approach and avoidant forms of coping. Third, in support of understanding factors involved in the relationship of alexithymia and mental and physical health, the data were examined for support for a path model testing whether avoidant coping, emotional approach coping and active coping strategies partially mediate the relationship between alexithymia and mental and physical health. Finally, after support was found for the proposed model in the participant sample, it was examined post-hoc for differences in partial mediation of coping for alexithymia and mental and physical health outcomes by sex and ethnicity.

Overview of the Hypothesized Model

Because there is no comprehensive, empirically validated model of the association between alexithymia and coping, a structural equation model was tested in a nonclinical sample of college men and women in this study. This study improves on previous studies of alexithymia and coping by including multiple indicators of mental and physical health, employing structural equation modeling on a large ethnically diverse

ethnic sample, and examining coping as a mediator between alexithymia and outcome. Since alexithymia is a construct describing an individual's struggle with emotion processing and preference for the externally oriented thinking and action, as opposed to internal process, it was posited alexithymia would have the greatest impact on coping behaviors that would elicit the need for emotion processing, emotional arousal, and thus potentiate an avoidance repertoire of coping. In this study, the relationship of coping to action tendency of emotional approach, active and avoidance was of greatest interest in the context of individual's levels of alexithymia.

In the theoretical model (see Figure 1), it was proposed that alexithymia would be related to higher negative emotion (path a), higher levels of physical symptoms (path b), and lower positive emotion (path c). In turn, alexithymia was expected to be related to higher avoidant coping (path d) and lower active coping (path e). Furthermore, using SEM instead of regression allowed us to hypothesize specific mediating associations while simultaneously accounting for the interrelationships between all main study variables. It was hypothesized that avoidant coping would mediate the relationship between alexithymia and negative emotion (path f). It was hypothesized that avoidant coping would mediate the relationship between alexithymia and physical symptoms (path g). It was further hypothesized negative emotion and physical symptoms would be correlated (path h). It was also hypothesized active coping would mediate the relationship between alexithymia and positive emotion (path i). Finally, the observed variables for avoidant coping and active coping would be distinct latent factors.

Research Questions and Hypotheses

In accordance with the review of alexithymia and coping the current study tested these specific research questions and related hypotheses concerning alexithymia, coping, and health of the current study including:

Research question (A): Is alexithymia associated with lower mental health and physical health in an undergraduate population? Hypothesis 1. Levels of alexithymia will be related to mental and physical health. (1a) Higher levels of alexithymia is related to higher negative emotion. (1b) Higher levels of alexithymia is related to lower positive emotion. (1c) Higher levels of alexithymia is related to higher physical symptom reporting.

Research question (B): Is alexithymia related to differences in coping behaviors? Hypotheses 2. Levels of alexithymia is related to latent variables of approach/active (i.e., emotional approach and active coping) and avoidant coping identified through exploratory factor analysis (EFA) and the relationships hypothesized in the measurement model tested through structural equation modeling (SEM). (2a) Higher levels of Alexithymia is related to higher avoidant coping. (2b) Higher levels of alexithymia is related to lower emotional approach coping. (2c) Higher levels of alexithymia is related to lower active coping.

Research question (C): Do approach and avoidant coping behaviors explain the effect of alexithymia on mental and physical health? Hypotheses 3. The relationships between alexithymia and mental and physical health is partially mediated by latent variables of approach/active (i.e., emotional approach and active coping) and avoidant coping as identified through exploratory factor analysis and the structural model

tested through structural equation modeling. (3a) The relationship between alexithymia and higher negative emotion is partially mediated (i.e., indirect effects) by higher avoidant coping. (3b) The relationship between alexithymia and higher physical symptoms is partially mediated (i.e., indirect effects) by higher avoidant coping. (3c) The relationship between alexithymia and lower positive emotion is partially mediated (i.e., indirect effects) by lower approach/active coping. After EFA analysis this hypothesis was further specified as the relationship between alexithymia and lower positive emotion is partially mediated (i.e., indirect effects) by lower emotional approach coping; and (3d) The relationship between alexithymia and positive emotion is partially mediated (i.e., indirect effects) by lower active coping.

Research question (D): Are there observed differences in sex and ethnicity for the relationships of alexithymia, coping, and outcomes of mental and physical health? Exploratory comparisons for sex and ethnicity. A total of four analyses were run to explore for comparisons of the structural model for sex and ethnicity: (a) Differences in sex (i.e., male and female) for the main study variables and proposed structural model were examined without specific initial hypotheses. (b) Differences in ethnicity (i.e., Hispanic and Non-Hispanics) for the main study variables and proposed structural model were examined without specific initial hypotheses.

The current study tested a hypothesized model of alexithymia and coping behaviors beginning with examining the factor structure of the modified Brief-COPE using exploratory factor analysis for a latent measurement model. Next, analyses proceeded with structural equation modeling to examine the hypothesized structural model, testing the proposed direct and indirect effects (Research questions A through D)

of alexithymia and coping to health outcomes.

METHODS

Participants

Undergraduate male and female students age 18 to 60 ($N = 603$; 65% female, 45% Hispanic) were recruited in three phases from introductory psychology courses for a two independent studies approved by the Institutional Review Board. A study announcement was posted for each of the three phases on the University of New Mexico (UNM) psychology research participation website. The first phase of recruiting announced a study on emotion functioning in Fall 2005; the second phase an announcement was made for a study for “Native Americans and Emotion Functioning,” in Fall 2006-Spring 2007; and the third phase of study was recruited as “Social Factors Associated with Risk for Depression” during the semesters of Spring 2009 to Spring 2011. Students of all racial/ethnic backgrounds were invited to participate in a study of emotional functioning and were offered class credit for their participation. Further exclusions were based on students needed to be at least 18 years of age, enrolled in a class at UNM offering research credit, and able to give meaningful consent.

Procedure

During the testing, all participants were asked to come into the laboratory for one 2-hour session. Participants were run either one or two at a time. When two participants were run together, they were kept apart in separate rooms the entire length of the session. The participants were consented into the study and completed a series of self-report questionnaires. All participants were debriefed at the end of testing and were granted research credits toward a class requirement for their participation in the study.

Measures

The questionnaires included demographic questions and self-report measures of alexithymia (TAS-20), modified coping inventory (Brief-COPE; EAC), physical functioning (PHQ-15), and mental health functioning (PANAS).

Demographics. Basic demographics were collected for each participant, including age, education, sex, marital status, annual income and ethnicity.

Alexithymia. Toronto Alexithymia Scale (TAS-20). The TAS-20 (Taylor, et al., 1988) is commonly used to assess deficits in emotion processing. The TAS-20 is a 20-item self-administered questionnaire with three subscales: (1) difficulty identifying feelings and distinguishing them from the bodily sensations of emotion; (2) difficulty describing feelings to others; and (3) an externally oriented style of thinking. Respondents were asked to rate their agreement (1 = *strongly disagree* to 5 = *strongly agree*) to a series of statements. Sample items include: “I find it hard to describe how I feel about people” and “I often don’t know why I am angry.” A total score for alexithymia can be obtained by summing the 20 items, resulting in a possible total score ranging from 20 to 100. Subscale scores can be obtained by summing items of the respective subscales. Higher scores are indicative of higher alexithymic traits. The TAS-20 has shown adequate internal consistency, $\alpha = 0.73 - 0.81$, and good reliability, $\alpha = 0.77$, in clinical and non-clinical samples (Kooiman et al., 2002; Parker et al, 1993).

Coping strategies. The measure used for coping strategies included a modified coping inventory using items from the Brief Coping Inventory (Brief-COPE), the abbreviated version of the original 60-item COPE Inventory (Carver, Scheier, & Weintraub, 1989; Carver, 1997), with 4 additional items added from the Emotional

approach Scale (Stanton et al., 2000). The Brief-COPE inventory is a 28-item self-report, 4-point Likert scale (ranged 0-3) instrument that includes 14 theoretically-derived 2-item subscales including: (a) active coping, (b) planning, (c) positive reframing, (d) acceptance, (e) humor, (f) religion, (g) using emotional support, (h) using instrumental support, (i) self-distraction, (j) denial, (k) venting, (l) substance use, (m) behavioral disengagement, and (n) self-blame. The developers of the scale have elected to retain the 14 scales as independent and have not endorsed or pursued second-order factor structures. They have given license to use all or part of the scales and to explore for second-order factors and using the factors as predictors in a given data set.

In this study, the Brief COPE was modified in order to capture emotion-focused coping with items free from stress or self-deprecation. Four items from the Emotional Approach Coping scale (EACS) developed by Stanton et al. (2000) have been included with 2 items each representing emotion processing and emotion-expression. The same rating format was used for these 4-items as the Brief COPE with each subscale summed (0-6). The EACS demonstrate high internal consistency reliability, $\alpha=0.74$ to 0.94 , and a high 4 week test-retest reliability, $r=0.72-0.78$. For the modified coping inventory, the original questions and answering format was retained and the responses on each item vary from 0 (I usually don't do this at all) to 3 (I usually do this a lot). Each 2-item scale represents its own distinct form of coping, the strength of which is the sum of two-items with scores ranging from 0-6.

Based on evidence that these factors tend to be either generally adaptive or problematic, previous studies have aggregated the original scales into subscales for adaptive (i.e., active) and maladaptive (i.e., avoidant) coping (Carver, 1997). The

Adaptive Coping subscale contains 16 items from the subscales: active coping, planning, positive reframing, acceptance, humor, religion, using emotional support, and using instrumental support. The Maladaptive Coping subscale contains 12 items from the subscales: self-distraction, denial, venting, substance use, behavioral disengagement, and self-blame (Morre, Biegel, & McMahon, 2011). Cronbach's alphas had acceptable reliability for adaptive coping, $\alpha = .78$, and maladaptive coping, $\alpha = .70$.

In recognition to the contextual nature of stress and strategies used to manage stress—in that behaviors may be successful in one context and not in another—in this study the term approach coping is favored over adaptive. Exploratory factor analyses were conducted to determine the second-order factors by constraining the model and examining the best goodness of fit. The factor structures for active coping, emotional approach coping, and avoidant coping were determined and the sum of the subscales were calculated and weighted for each factor as a predictor.

Mental health. Positive and Negative Affect Schedule (PANAS). The PANAS (Watson et al., 1988) is a self-administered questionnaire used to assess the degree to which respondents have experienced positive and negative emotions in the past week. The PANAS consists of two scales: positive and negative emotion. Each scale consists of 10 items that characterize dimensions of positive (interested, excited, strong, enthusiastic, proud, alert, inspired, determined, attentive, and active) and negative emotion (distressed, upset, nervous, scared, hostile, irritable, ashamed, jittery, afraid, and guilty). Respondents were asked to rate the degree to which they have experienced each of these emotions in the past week using a five-point Likert scale (1 = *not at all* to 5 = *extremely*). Positive and Negative scores were obtained by summing items for the

respective scale, resulting in a total possible score ranging from 10 to 50 for each scale. Higher scores on either scale are indicative of higher experience of either positive or negative emotions items. Both PANAS scales possess high internal consistency, with alpha coefficients ranging from 0.86 to 0.90 for the Positive Affect Scale and alpha coefficients ranging from 0.84 to 0.87 for the Negative Affect Scale (Watson et al., 1988). The correlation between the PA and NA scales is low, ranging from - 0.12 to - 0.23, which suggests independence between both scales. Additionally, both scales possess adequate reliability, with alpha coefficients of 0.68 for the PA scale and 0.71 for the NA scale (Watson et al., 1988).

Physical health. Patient Health Questionnaire: Somatic symptom severity (PHQ-15). The PHQ-15 is used as a measure of physical health and somatic symptom reporting. It assesses 15 somatic symptoms or symptom clusters that account for more than 90% of the physical complaints (excluding upper respiratory tract symptoms) reported in the outpatient medical setting (Kroencke, Arrington & Mangelsdorf, 1990). Also, the symptoms assessed in the PHQ-15 include 14 of the 15 most prevalent DSM-IV somatization disorder somatic symptoms (Liu, Clark & Eaton, 1997). Thirteen of the PHQ-15 somatic symptoms were included in the PHQ somatic symptom module. Subjects were asked to rate the severity of each symptom as 1 (“not bothered at all”), 2 (“bothered a little”), or 3 (“bothered a lot”). Two additional physical symptoms—feeling tired or having little energy, and trouble sleeping—are contained in the PHQ depression module, in which subjects are asked: “Over the last 2 weeks, how often have you been bothered by any of the following problems?” For scoring, response options for these two symptoms were coded as 1 (“not at all”), 2 (“several days”), or 3 (“more than half the

days” or “nearly every day”). Thus, in determining the PHQ-15 score, each individual symptom is coded as 1, 2, or 3, and the total score ranges from 15 to 45. The internal reliability of the PHQ-15 was reported as Cronbach’s $\alpha = .80$ (Kroencke, et al., 2002). Construct validity of the PHQ-15 is supported by the evidence of impact on functional status as measured by disability days, symptom-related difficulty, and healthcare utilization (clinic visits) as symptom reporting increases.

Power Analysis

Based on prior research examining alexithymia and avoidant coping (Berrocal et al., 2009), the anticipated effect size for hypotheses in the current study was approximately $f^2 = .58$. Using an online effect size calculator for structural equation modeling with 1 predictor for alexithymia (general score), 3 latent variables and 19 observed dependent variables (coping items and health outcomes) (Retrieved <http://www.danielsoper.com/statcalc3/calc.aspx?id=89> on February 3, 2014) the power analysis indicated that for this study to have power of .80, 256 individuals were required to reach sufficient power for the model structure. According to these calculations, sufficient power has been reached for this study to test the structural model for the full sample with limitations on making comparisons between sex and ethnicity because of insufficient sample sizes and increasing alpha inflation with multiple group analyses.

Statistical Analyses Plan

This section outlines the statistical analyses applied in testing the hypothesized relationships and rationale for particular statistical approaches. First, issues of normality and missing data was addressed. Secondly, demographic characteristics of the sample were examined for the sample as a whole and separately for sex and ethnic groups. The

analyses for the EFA and SEM were conducted using the statistical software MPLUS 7.11 (Asparouhov & Muthen, 2009). Descriptive statistics (means, standard deviations) and correlations were calculated between the main study variables using Statistical Package for the Social Sciences 22.0 (SPSS) (IBM Corp, 2013). Results from the EFA provided a measurement model to simultaneously test the main effects of alexithymia on health outcomes (i.e., hypothesis 1), indirect effects between alexithymia and coping (i.e., hypothesis 2) and indirect mediation effects of coping (i.e., hypotheses 3) using structural equation modeling. The standardized beta coefficients (STDYX) are reported, provided by Mplus output along with results for the delta method (i.e. Sobel) of testing the significance of indirect effects (MacKinnon, 2008). Independent samples *t*-tests were conducted (in SPSS) for exploratory analyses of differences in sex and ethnicity on main study variables: alexithymia, emotional approach coping, active coping, mental health (positive emotion and negative emotion; PANAS), and physical health (physical symptoms; PHQ-15). Finally, exploratory analyses of group comparisons (i.e., research question D) for the structural model are presented. An alpha level of .05 was used to determine statistical significance for all statistical tests used in this study and goodness of fit indicators were examined for the testing of the structural model. Before presenting the results of the analyses an explanation for the statistical approach of exploratory factor analysis, structural equation modeling, and examining significance and goodness of fit in model-testing is provided.

Exploratory factor analysis. An exploratory factor analysis was conducted for the underlying latent structure of the modified coping inventory used in the study. Do these factors best capture this latent structure (as posited by theory), and if so, which

items are the most reliable and relatively pure factors of these latent constructs?

Answering this question involved examining the theory's definitions of active coping and avoidant coping in addition to the results from the EFA.

As discussed in the literature review, coping strategies can be described through their action (i.e., approach, avoidant) or outcome (adaptive, maladaptive). There are active coping behaviors as demonstrated by planning and cognitive perspective-taking and there are also active or approach behaviors surrounding emotion as captured in the items from the EAC scale (Austenfeld et al., 2004). Therefore, the latent structures produced in the EFA that were of greatest interest in this study were those thought to demonstrate an action orientation of approach or avoidance to resolving a stressor and emotion processing. It was unknown before beginning the analyses whether these constructs (i.e., approach and avoidant) or the other scales of the modified coping instrument used in the study would converge onto two or more latent variables structures. It was suspected that emotional approach could load separately or together with active coping.

The measurement model was identified by the two-indicator rule where there are at least two factors with at least two indicators per factor (Bollen, 1989). The EFA was assessed using the full information maximum likelihood (FIML) estimation method (Asparouhov et al., 2009). Asparahouv and Muthen (2009) recommend the geomin criterion for transformation of structural coefficients for simple to moderately complicated factor structures, as such it is the default rotation criterion in Mplus. To determine the appropriate number of specified factors, multiple criteria were examined and included through the Kaiser-Guttman rule (i.e., eigenvalues higher than one), the

visual scree test (Cattell, 1966), parallel analysis (Hayton, Allen, & Scarpello, 2004), comparison of model fit statistics, and theoretical expectation. Items that have consistent low factor loadings $<.3$ were removed (Nunally & Bernstein, 1994).

Structural equation modeling. Structural equation modeling was used to test a structural model incorporating the relationships hypothesized in this study (Figure 1) with latent factors identified through the measurement model and EFA. The model was analyzed in Mplus 7.11 using the FIML estimation method. Structural equation modeling was chosen over regression and path analysis because of its unique ability to test an entire set of regression analyses for latent variables to estimate and test direct and indirect effects without the influence of measurement errors (Schumacker & Lomax, 2004). It also provides a way to test the specified set of relationships among observed and latent variables as a whole, and allow theory testing.

In the present study, analysis entailed specifying a series of progressively more restrictive path models, following Bollen's (1989) recommendations for three nested path models allowing for an examination of the present study hypotheses regarding main effects and moderation effects: 1) an initial baseline measurement model B1 (Coping Scales: Brief COPE and EAC) to examine latent variables of model fit to the data, 2) a series of more restrictive theoretically-driven structural models examined for goodness-of-fit, from baseline to modifications B2 (Figure 2), incorporating the hypothesized main effects for alexithymia and latent variables of coping as predictors of outcomes to mental health and physical health, and 3) and further testing of the restrictive model, B3 and Models B4, for comparisons by sex and ethnicity of the best model of fit for the effects of moderation. The baseline model B1 is first tested and goodness of fit determined before

it is appropriate to move on to the second more restrictive model B2. Comparing B2 to the baseline model B1 tests whether the paths hypothesized to be main effects were equal or not. In other words, if the chi-square difference test comparing the fit of model B1 and model B2 is not statistically significant, indicating no significant change in model fit, then it is not appropriate to move to testing for mediation of the final model B3 and B4 for effects of the path analysis for sex and ethnicity. Additionally, a test for the significance of indirect effects of mediation will be conducted using the Sobel method and an online calculator (<http://www.danielsoper.com/statcalc3/calc.aspx?id=31>). A total of two analyses will be run to explore for comparisons of the structural model for sex and ethnicity: (a) Differences in sex (i.e., male and female) for the main study variables and proposed structural model will be examined without specific initial hypotheses. (b) Differences in ethnicity (i.e., Hispanic and Non-Hispanic) for the main study variables and proposed structural model will be examined without specific initial hypotheses.

Goodness-of-Fit criteria. Assessment of fit essentially calculates how similar the predicted data are to matrices containing the relationships in the actual data. Several goodness-of-fit indices were used to evaluate model fit: the chi-square statistic, comparative fit index (CFI; Bentler, 1990), root-mean-square error of approximation (RMSEA; Steiger, 1990), and the standardized root mean square residual (SRMR; Hu & Bentler, 1999). The chi-square statistic measures the absolute fit of the model to the data, although it is subject to sample size bias (Hu et al., 1999); nonsignificant values indicate close fit to the data. The CFI tests the proportionate improvement in fit by comparing the target model with a more restricted, nested baseline model; a value of .90 is acceptable

(Hu et al., 1999), a value of .95 indicates a good fit, and a value at or close to 1.00 indicates an excellent fit (Browne & Cudeck, 1993). RMSEA demonstrates a close fit of the model at a value at .05 and exact fit of the model at a value of .00; a value between .05 and .08 is considered acceptable (Brown et al., 1993). The SRMR is an absolute measure of fit and is defined as the standardized difference between the observed correlation and the predicted correlation. A value less than .08 is generally considered a good fit (Hu et al, 1999). The chi-square difference test has been shown to be unreliable for large sample sizes.

RESULTS

The purpose of the present study was to explore the effect of alexithymia and the quality of coping behaviors in an ethnically diverse sample of undergraduate students. Few studies have examined the relationship between alexithymia and coping as a potential mediator of the direct effects of alexithymia on mental health and physical health. Studies are beginning to explore the relationship between alexithymia and coping strategies. A few previous studies have indicated alexithymia is positively related to avoidant coping (Berrocal, et al, 2009) and negatively related to active coping (Tominaga et al, 2013) and emotional approach coping (Peters, 2006).

The data were thoroughly screened before conducting statistical analyses to ensure the accuracy of the data file. The data was screened for univariate outliers. Two out-of-range values in the cope responses, due to administrative errors, were identified and recoded as missing data. Prior to conducting the confirmatory factor analysis and path analysis, a search for missing data was conducted using a two-step approach: 1) listwise deletion in SPSS for missing data, followed by 2) model estimation in Mplus

7.11 with the smaller sample using complete data. Mplus 7.11, the statistical analysis package used in the analysis for this study, has an option to choose for missing data “not by design” that uses all data that is available to estimate the model using full information maximum likelihood and missing at random assumptions (Little & Rubin, 1990). For all samples, all available data were used in estimation, with missing data handled by direct maximum likelihood (ML) using the robust maximum likelihood estimator (MLR). For all samples, examination of the missing data patterns indicated lowest covariance coverages well above the proposed minimum accepted value (Muthen & Muthen, 1998-2007). The assumption of multivariate normality deemed necessary for confirmatory factor analysis and path analysis is not needed when using the ML and MLR estimators. Missing data was identified and recoded as 99999. The original sample included 605 participants; missing data appears across all variables.

Demographics

The full sample consisted of 605 college undergraduates (65% female) with an average age of 21 years ($SD = 5.47$) and the majority reporting having never been married (90%) and only 5% reported currently married. Hispanic (45%) is the largest represented ethnic group followed by White/European (37%) and smaller representations of other identified ethnic groups including, African American 6.3%, Asian 5.8%, Native American 4%, and Arab 1.8 and Pacific Islander .3%. For the purposes of data analysis for the groups of interest, effects for ethnicity was examined between Hispanic and Non-Hispanic, without inclusion of the smaller representations of ethnic groups (i.e., Asian, American Indian/Alaska Native, African American, Pacific Islander, Arab, and other of Non-Hispanic).

In this study, the decision to compare Hispanic with Non-Hispanic including all groups not identifying as Hispanic (i.e., non-Hispanic White, Asian, American Indian/Alaska Native, African American, Pacific Islander, Arab, and other of non-Hispanic) was made for a few reasons pertinent to the study. First, it was decided Hispanic ethnicity is a special population of interest based on the few previous studies, included in the review, identifying differences between Caucasian and Mexican Americans on alexithymia and coping. The decision to collapse non-Hispanic across Caucasian and other ethnic groups was made because the main research question of ethnic differences in alexithymia and coping is whether there are differences between Hispanic and non-Hispanic, not of Hispanic and Caucasian individuals. Further, the author would like to acknowledge that decisions made in analyzing data by race and ethnicity is an ongoing source of debate for social scientists. Ford and Kelly (2005) provide a nice discussion of race as a social construct and the problem of arbitrary distinctions made and conclusions drawn from observed differences. Second, the study was conducted at the University of New Mexico located in Albuquerque, New Mexico offering a unique opportunity to recruit from a culturally rich Hispanic minority-majority state in the Southwestern region of the United States, an area that would likely lend itself to capturing observed differences in cultural patterns or in ethnicity. Thirdly, the sample did not contain adequate numbers to allow for separate analysis of other minority groups represented.

Exploratory Factor Analyses

An exploratory factor analysis was conducted of the 32 items from coping measure used in the study (28 items from Brief COPE and 4 items from Emotional

approach Scale) to identify latent structures representing the coping strategies of interest of approach and avoidant forms. The baseline measurement model represents an independent clusters model whereby each of the 32 observed variables loads on only one of the latent factor structures (McDonald & Ho, 2002). The measurement model was identified by the two-indicator rule where there are at least two factors with at least two indicators per factor, noncorrelated errors and factors are all correlated (Bollen, 1989) beginning with 1 factor model with 464 degrees of freedom and examined 1 through 15 factors. The EFA was assessed using the full information maximum likelihood (FIML) estimation method (Asparouhov et al., 2009). The models did not converge for more than 10 factors. Asparouhov and Muthen (2009) recommend the geomin criterion for transformation of structural coefficients for simple to moderately complicated factor structures, as such it is the default rotation criterion in Mplus. To determine the appropriate number of specified factors, multiple criteria were examined and included through the Kaiser-Guttman rule (i.e., eigenvalues higher than one), the visual scree test (Cattell, 1966), parallel analysis (Hayton, Allen, & Scarpello, 2004), comparison of model fit statistics, and theoretical expectation. The Kaiser-Guttman rule suggested a 10-factor-solution, however, parallel analysis suggested a 7-factor solution, and was chosen as supported by the scree test, fit statistics, and theoretical expectations. The EFA helped to identify problematic items that had consistently low factor loadings $<.3$ (Nunally & Bernstein, 1994). A total of two items were eliminated because they did not contribute to a simple factor structure and failed to meet a minimum criteria of having a primary factor loading of $.3$ or above, and no cross-loading of $.3$ or above. The items "I give up the

attempt to cope” which represents behavioral disengagement and “I express my negative feelings” representing venting did not load above a .3 on any factor.

Three factors out of the identified 7 factors were chosen from the EFA for analysis within our hypothesized structural model, including: avoidant coping, emotional approach coping, and active coping. Although the final latent factors were comprised of different items than the original authors of the scales (Carver, 1997; Austenfeld et al., 2004) these factors were chosen and the original names were aptly retained to represent the *active movement toward* one’s emotions and efforts at directly reducing stress and the label avoidant coping was chosen to reflect the nature of the collection of behaviors as efforts in dealing with a stressor by *movement away* from coping with stress. The results of the EFA for the final latent factor for avoidant coping included one item for denial, two items for behavioral disengagement, and two items for self-blame. The composition of the final scale is consistent with previous studies on avoidant coping (Hasking & Oei, 2009).

The decision to conceptually divide “active/approach coping” as named in the original hypothesized model into active coping and emotional approach coping was made in consideration of the position of Austenfeld and Stanton (2009) that emotional approach coping is an active process that can be contextually adaptive or maladaptive. It was supported through the EFA that emotional approach coping is a separate factor from active coping and hypothesized it would be similarly impacted by alexithymia as active coping. The results of the EFA for the final latent factor for active coping included one item of acceptance, one item for emotional processing, one item for planning, two items for positive reframing and two items for active coping. The results were mostly

consistent with previous conceptualizations of active coping with the additions of acceptance and emotional processing typically associated solely with emotion-focused strategies and not as active processes. It is argued that both acceptance and emotional processing can be active processes themselves through the intentional non-avoidance of emotion.

The results of the EFA for the final latent factor for emotional approach included one item from the Brief COPE subscale for venting, two items from the EAC subscale for emotional expression and one item from the EAC subscale for emotional processing. The composition of the final scale for emotional approach coping in the sample is interesting with the inclusion of one item for venting given its association with negative affect which has previously been discussed as a potential confound in studies of emotional approach coping. Although it has a relatively smaller factor loading than the other items in the scale, $r = .39$). The 4-latent factors identified for substance use, religion, humor and social support were not included in the analysis of the structural model as it was deemed they were not directly pertinent to the current research questions at hand. Composite scores were created for each of the three factors, with their primary loadings on each factor. Higher scores indicated higher use of that particular coping strategy.

After identification of the three coping factors for the structural model, two factors representing active processes (i.e., emotional approach and active coping) and one factor of avoidant coping, analysis of the hypothesized relationships between alexithymia and coping proceeded to test for mediation effects of higher avoidant coping and lower emotional approach and active coping. Table 1 displays the items and factor-loadings for the 7-latent factors in the EFA.

Research Question (A): Is Alexithymia Associated with Lower Mental Health and Physical Health in an Undergraduate Population?

The first research question was initially addressed with correlation analyses assessing the relationship between alexithymia, coping and health measures. The relationship between alexithymia and health was further examined with structural equation modeling and the hypothesized measurement model incorporating hypotheses associated with coping.

Descriptives. Descriptive analyses were run for alexithymia, indicators of health, and the three coping indicators. The mean level of alexithymia for the entire sample was 53.39 ($SD = 7.93$). Active coping was the coping factor that students reported using the most ($M = 15.02$, $SD = 3.71$) followed by emotional approach coping ($M = 7.14$, $SD = 2.78$) and avoidant coping reported the least ($M = 5.03$, $SD = 2.86$). Table 2 displays the means, and standard deviations for alexithymia, coping, and health outcome variables.

Correlation analyses for alexithymia and outcomes of health. It was hypothesized that levels of alexithymia are related to mental and physical health. An examination of the correlation coefficients indicated that, at the bivariate level, the hypothesized relationships between alexithymia, health, and coping were in the expected directions and statistically significant at the $p < .001$ level. Alexithymia was moderately negatively correlated with positive emotion, $r(547) = -.35$. Alexithymia was strongly positively correlated with negative emotion, $r(551) = .49$ and strongly positively correlated with physical symptoms, $r(449) = .42$. Table 2 shows the correlations for alexithymia and health outcome variables.

Research Question (B): Is Alexithymia Related to Differences in Coping Behaviors?

Correlation analyses for alexithymia and coping. To begin analysis of the relationship between alexithymia and the coping factors, correlations were run indicating that, at the bivariate level, the hypothesized relationships between alexithymia and coping were found to be significant in the predicted direction, $p < .001$; See Table 2.

Alexithymia and avoidant coping was strongly correlated, $r(556) = .43$. Alexithymia and active coping were weakly negatively correlated, $r(553) = -.23$, and alexithymia was moderately negatively correlated with emotional approach coping, $r(593) = -.30$.

Research Question (C): Do Approach and Avoidant Coping Behaviors Explain the Effect of Alexithymia on Mental and Physical Health?

Next, structural equation modeling was used to test the hypothesized structural model (Figure 1) incorporating the coping factors (i.e., avoidant coping, emotional approach coping, and active coping) identified through the measurement model and EFA. Specifically, it was hypothesized the relationships between alexithymia and mental and physical health would be partially mediated by coping factors. Analyses followed by fitting structural models to the previously defined latent factors.

Structural equation modeling for the full sample. Structural equation modeling (SEM) was used to test the hypothesized moderating effect of the associations between coping, alexithymia, and health. A series of theoretically and empirically-driven structural models was tested using structural equation modeling and examined for goodness-of-fit, B1 (see Figure 1 for theoretical model), to test the hypothesis that coping would mediate the effects of alexithymia on physical health and mental health. The error terms of mental and physical health were allowed to correlate because mental (i.e.,

positive emotion and negative emotion) and physical health were strongly related, see Table 2, $p < 0.001$.

Overall, the results of hypothesis testing of the structural model supported the hypotheses with some deviations from the original theoretical measurement model. The results of the initial theoretical baseline model hypothesizing the indirect effects of active coping and emotional approach coping on positive affect indicated a poor fit to the sample, $\chi^2 (159) = 605.09, p < .001, CFI = .867, RMSEA = .071, SRMR = .101$; see Table 4. Therefore modifications to the baseline model were made based on examining the Modification Indices output of Mplus and were theoretically driven. It is important to note that when modifications are made to the original structural model that they are not only adjusted according to modification indices but also step-wise according to theoretically driven (and not simply “data mining” procedures) for goodness-of-fit. Therefore, the specific modifications to the original model are given, as well as theoretical explanations for each.

Two total modifications were made to the original model contributing to the final structural model. As was discussed in the literature review, emotional approach coping has inconsistently predicted positive emotion and is considered somewhat controversial in the measurement. The effect of emotional approach coping on positive emotion may be contextual to the time and particular stressor and have effects dependent on biological sex (Austenfeld et al., 2004). Unfortunately, the present study is cross-sectional in time and does not allow for examination of function of coping over time. Therefore, the first modification was to remove the direct path from emotional approach coping to positive emotion.

Secondly, the modification indices indicated the direct path from alexithymia to active coping did not provide a good fit. Previous studies have demonstrated a relationship between alexithymia and avoidance and there is limited evidence for alexithymia's relation to active coping. Therefore, the hypothesis was maintained that active coping would indirectly mediate alexithymia, but it was understood that there might be one other factor (or more) contributing. Given the discussion on the function of emotion processing, it was hypothesized that emotional approach coping would be related to active coping, mediating the relationship of the indirect effects of active coping between alexithymia and health outcomes. For that reason, the second modification made was to remove the direct path from alexithymia to active coping and an "on statement" for emotional approach and active coping was added. These modifications provided the final model satisfying goodness-of-fit criteria. All of the path coefficients were significant and the model provided a good fit for the data, $\chi^2 (157) = 464.682, p < .001$, CFI = .908, RMSEA = .059, SRMR = .071. The standardized beta coefficients for the structural model with modifications of the full sample are displayed in Figure 2.

The first hypothesis was supported for the continued direct effects of alexithymia on lower positive emotion, $\beta = -.22, p < .001$, and higher negative emotion, $\beta = .16, p < .01$, and physical symptom reporting, $\beta = .15, p < .05$, with mediation of coping. The second set of hypotheses was partially supported in that alexithymia did have a direct effect on higher avoidant coping, $\beta = .57, p < .001$, and lower emotional approach coping, $\beta = -.43, p < .001$. However, alexithymia did not have a direct effect on higher active coping. The third set of hypotheses was mostly supported. Avoidant coping partially mediated the effects of alexithymia on higher negative emotion, $\beta = .32, p < .001; z =$

7.90, $p < .001$. Avoidant coping also partially mediated the effects of alexithymia on physical symptoms, $\beta = .26, p < .001; z = 5.85, p < .001$. There were two relationships in the original theoretical model whose indirect effects were supported but deviated from our original theoretical conceptualization of the path model. There was no direct effect of alexithymia on active coping. Rather, lower emotional approach coping partially mediated the effects of alexithymia on higher active coping, $\beta = -.27, p < .001; z = -8.88, p < .001$, and active coping partially mediated the effects of emotional approach coping on positive emotion, $\beta = .28, p < .001; z = 9.15, p < .001$. It appears the relationship between active coping and alexithymia is mediated through lower emotional approach coping, as well as the indirect effects of emotional approach coping on positive emotion is through its relationship to active coping. After confirming the fit of the model with modifications it was appropriate to move to testing for mediation of this model for differences in moderation effects for sex and for ethnicity.

Research Question (D): Are There Observed Differences in Sex and Ethnicity for the Relationships of Alexithymia, Coping, and Outcomes of Mental and Physical Health?

Analyses were conducted for between-subject differences in men and women and Hispanic and Non-Hispanic for all main study variables: predictors, criteria, and outcomes. The first stage of analysis began with conducting independent t -tests in order to test the mean differences for alexithymia, active coping, emotional approach coping, avoidant coping, negative emotion, positive emotion, and physical symptom reporting to determine if there were any significant differences in the relationships for sex and ethnicity. After these relationships were examined it was deemed appropriate to test the

structural model of the hypothesized relationships for alexithymia, coping, and health for group comparisons separately for sex and ethnicity of the direct and indirect effects.

Independent samples *t*-tests for group comparisons. A series of independent samples *t*-tests was conducted for comparisons in reported levels of alexithymia, health, and coping across groups with Cohens D calculated (Retrieved April 6, <http://www.danielsoper.com/statcalc3/calc.aspx?id=48>) as a measure of effect size). Results indicated no significant differences between groups for men and women on alexithymia ($M = 53.41$; $SD = 8.0$ and $M = 53.31$; $SD = 7.9$, respectively). There was a significant difference for alexithymia with Non-Hispanic ($M = 54.05$, $SD = 7.6$) reporting higher levels of alexithymia than Hispanic ($M = 52.42$, $SD = 8.3$), $t(428) = 2.1$, $p < .05$, $d = 1.144$.

In comparing the groups on health measures there were differences observed between men and women and Hispanic and non-Hispanic. Firstly, women reported higher negative emotion ($M = 23.11$, $SD = 7.94$), $t(464) = -3.16$, $p < .01$, $d = .269$, and lower positive emotion ($M = 34.91$, $SD = 8.17$), $t(422) = 3.01$, $p < .01$, $d = .261$, in comparison to men ($M = 21.17$, $SD = 6.39$; $M = 36.93$, $SD = 7.30$; respectively). In comparing men and women on physical symptoms, there was a significant difference in the reporting of higher physical symptoms for women ($M = 23.10$, $SD = 4.6$) than in men ($M = 20.82$, $SD = 4.6$) $t(131) = -5.7$, $p < .001$, $d = .671$. In comparing the groups by ethnicity, there were no significant differences in levels of reported negative emotion or physical symptoms between Hispanic and Non-Hispanic. There was, however, a significant difference in levels of positive emotion with Hispanic ($M = 36.36$, $SD = 8.5$) reporting higher levels of positive emotion than Non-Hispanic ($M = 34.70$, $SD = 8.5$),

$t(393) = -2.23, p < .05, d = .217$. These results suggest women in the sample reported worse physical and mental health outcomes overall in comparison to men in the sample as measured by higher physical symptoms, higher negative emotion, and higher physical symptom reporting. Also, non-Hispanic of the sample has higher levels of alexithymia and less positive emotion in comparison to the Hispanic sample.

In comparing groups on coping, there were observed differences by sex but not for ethnicity. There was a significant medium effect size for emotional approach coping with women ($M = 7.48, SD = 2.8$) reporting higher levels than men ($M = 6.43, SD = 2.6$), $t(399) = -4.4, p < .001; d = .392$. There were no significant differences in coping between the two ethnic groups. Descriptive statistics are provided together with a measure of the effect size for the t -tests run for group comparisons in Table 3.

Exploratory comparisons of the structural model for men and women. The structural model was compared for the sample of men and women and differences were observed. In women, there were continued direct effects of alexithymia on negative emotions, $\beta = .21, p < .001$, and for alexithymia on physical symptoms, $\beta = .17, p < .01$, but not in men. The direct effects of alexithymia on positive emotion were not significantly different, $\beta = -.23, p < .01; \beta = -.22, p < .001$, for men and women, respectively. In men, avoidant coping fully mediated the effect of alexithymia on negative emotion, $\beta = .38, p < .001; z = 2.87, p < .01$, but there was no effect of mediation for avoidant coping on physical symptoms. In both men and women, emotional approach coping partially mediated the relationship between alexithymia and active coping, in men $\beta = -.23, p < .001; z = -3.28, p < .001$; in women $\beta = -.28, p < .001; z = -7.43, p < .001$. Also, in both men and women, active coping partially mediated the

relationship between emotional approach coping and positive emotion, in men $\beta = .44, p < .001; z = 6.58, p < .001$; in women $\beta = .25, p < .001; z = 6.97, p < .001$. The fit statistics for the model with male and female indicated an acceptable fit $\chi^2 (342) = 716.875, p < .001, CFI = .889, RMSEA = .064, SRMR = .084$. Contribution from male, $N = 179, \chi^2 (342) = 341.120$. Contribution from female, $N = 369, \chi^2 (342) = 375.755$. The standardized beta coefficients for the male sample are displayed in Figure 3 and standardized beta coefficients for the female sample are displayed in Figure 4.

Comparisons of the structural model for non-Hispanic and Hispanic.

There were observed differences between ethnicity in the sample. Ethnic differences were observed in that there were direct effects for alexithymia and negative emotion, $\beta = .21, p < .01$, in non-Hispanic but no direct effects for alexithymia on negative emotion in Hispanic. There was a larger direct effect of alexithymia on lower positive emotion in non-Hispanic than in Hispanic, $\beta = -.25, p < .001$ and $\beta = -.17, p < .01$, respectively. The direct effect of alexithymia on physical symptoms was nonsignificant for both non-Hispanic and Hispanic when coping was accounted for.

In both non-Hispanic and Hispanic samples, avoidant coping fully mediated the effects of alexithymia on physical symptoms, $\beta = .21, p < .001; z = 5.36, p < .001$ and $\beta = .33, p < .001, z = 4.52, p < .001$, respectively. Also, negative emotion correlated with physical symptoms in non-Hispanic, $\beta = .44, p < .001$, but was not significant for Hispanic. In Hispanic, avoidant coping fully mediated the effect of alexithymia on negative emotion, $\beta = .43, p < .001, z = 6.26, p < .001$, and partially mediated the effect for non-Hispanic, $\beta = .25, p < .001, z = 4.76, p < .001$. In both non-Hispanic and Hispanic, lower levels emotional approach coping partially mediated the effect of

alexithymia on active coping, $\beta = -.24, p < .001, z = -5.85, p < .001$ and $\beta = -.33, p < .01, z = -6.50, p < .001$, respectively. In both Non-Hispanic and Hispanic, active coping partially mediated the effect of emotional approach coping on positive emotion, $\beta = .29, p < .001, z = 7.54, p < .001$ and $\beta = .29, p < .01, z = 6.13, p < .001$, respectively. The fit statistics for the model with Hispanic and non-Hispanic indicated a good fit $\chi^2 (340) = 685.905, p < .001, CFI = .899, RMSEA = .060, SRMR = .080$. Contribution from non-Hispanic, $N = 310, \chi^2 (340) = 345.714$. Contribution from Hispanic, $N = 250, \chi^2 (340) = 340.191$. The standardized beta coefficients for the non-Hispanic sample are displayed in Figure 5 and standardized beta coefficients for the Hispanic sample are displayed in Figure 6. The fit statistics for the baseline model, the final structural with modifications, and comparisons of sex and ethnicity are displayed in Table 4.

DISCUSSION

The four aims of the current study were directed to furthering the understanding of the relationship of alexithymia to coping strategies and physical and mental health in an undergraduate student population. Given the evidence that alexithymia impacts mental and physical health, and the limited research on how alexithymia impacts coping behaviors, it was determined these relationships warranted further investigation. It was hypothesized and found in this study that alexithymia is indeed associated with mental and physical health by its relationship to higher negative emotion, higher physical symptoms and lower positive emotion. It was hypothesized and demonstrated in the study that coping strategies mediate the relationships the relationships between alexithymia and health.

Alexithymia as a Predictor of Health Outcomes and Coping

The present undergraduate student sample reported higher mean levels of alexithymia than have been reported in similar studies in Britain and the United States of undergraduate students (Mason, Tyson, Jones, & Potts, 2005; Parker, Keefer, Taylor & Bagby, 2008). In the analyses of the study, alexithymia scores were treated as a continuous variable. However, this scale has been used categorically to differentiate alexithymic >65 from non-alexithymic individuals by total scale score. Interpreted as such, scores >61 are often associated with mental disorders and other clinical criteria associated with a worse prognosis (Taylor cited in Lane et al., 1996); scores between 51 and 64 are considered to identify borderline alexithymics. A large portion of the sample fell within the borderline alexithymic range (51-64, 48.6%) and a portion fell within the clinical alexithymic range (>65; 8.2%). However, the mean score for alexithymia ($M = 53.39$) did not fall within the clinical range of alexithymia. This is noteworthy in that it is higher than previous studies and demonstrates that the current sample provided a rich data set to examine the impact of alexithymia on coping behaviors and health.

Alexithymia as a predictor of mental health outcomes. This study explored the relationships between alexithymia and mental health as measured by the reporting of positive and negative emotion (PANAS). It was hypothesized and found in this study that there is an association between alexithymia and mental health through the relationship to higher negative emotion and lower positive emotion in correlational analyses and in the final model testing. These results support similar studies of undergraduates and the review of deficits in emotional processing and effects on mood (Dubey, Pandey, & Mishra, 2010). This study adds to the growing awareness of not only

the impact of alexithymia on negative mood but also the effect on reducing positive emotion. The impact of alexithymia on positive emotion is important as it impacts a potentially important resource to *buffering stress* and increases vulnerability to psychological disorders and higher physical symptom reporting. These results are important and indicate that alexithymia remains a potential vulnerability factor for higher stress, anxiety and depression or other mental health disorders in a college population.

Alexithymia as a predictor of physical health outcomes. Alexithymia has been associated with higher physical symptom reporting. Previous researchers have posited this effect through mechanisms of failure to differentiate emotion arousal from medical symptoms (De Gucht et al., 2003). The results of this study support the direct effects of alexithymia on physical symptoms. It was found that alexithymia was associated with higher reporting of physical symptoms in correlational analyses and in final model testing. A relationship between negative affect and physical symptom reporting was also found. These findings support the literature tying alexithymia to higher vulnerability for symptom reporting. This study sought to answer what are the mechanisms that may explain this effect? The study findings for coping mediating this relationship are discussed in the following sections.

Alexithymia as a predictor of coping strategies. Does alexithymia influence inefficient coping responses? Lazarus and Folkman (1984) defined coping as “constantly changing cognitive and behavioral efforts to manage specific external and/or internal demands that are appraised as taxing or exceeding the resources of the person” (p. 141). It is important to reiterate that the present study presumes that coping styles are psychological resources, as consistent with the contextual approach to coping

and positive psychology (Nelson & Cooper, 2005). As such, the coping styles examined in the present study were not classified as diametrically opposed problem-focused and emotion-focused (e.g., Folkman et al., 1986), adaptive and maladaptive (e.g., Voss et al., 2006), or functional and dysfunctional (e.g., McIlvane, et al., 2008). However, the relationships between active and avoidant coping with health outcomes were consistent with previous literature. In this study, an exploratory factor analysis was conducted on a modified coping inventory using items from the Brief COPE and Emotional Approach Coping Scale to identify latent factor structures for active/approach and avoidant coping. Active and avoidant coping strategies have been reported as important predictors of health adjustment. However, as discussed in the review, emotion-focused coping and emotional approach coping have had a mostly negative but inconsistent relationship to health and well-being (Austenfeld et al., 2004).

The relationship between alexithymia and coping strategies was tested to determine if alexithymia predicted avoidant coping, emotional approach coping and active coping behaviors consistent with theoretical assumptions about the nature of the alexithymia construct. Results of correlational analyses demonstrated that alexithymia predicted higher avoidant coping, lower emotional approach coping, and lower active coping. Consistent with the original hypotheses the results from testing the structural model indicated a direct effect for alexithymia to higher avoidant coping and lower emotional approach coping. The relationship between alexithymia and avoidant coping is consistent with previous literature that demonstrates a higher reliance on others for making decisions (Mallinckrodt et al., 1998) and higher use of passive and avoidance-oriented strategies (Besharat, 2010). Though there was no direct effect from alexithymia

to active coping, there was an indirect effect of lower levels of emotional approach coping mediating the relationship between alexithymia and active coping. The connection between emotional approach coping and alexithymia is interesting to note and potentially clinically relevant. Kandarlis (2013) in a study of hope and flourishing in college students discusses how emotional approach coping can lead to higher rumination and impede forward action or goal clarification. Further, active coping mediated the effects of emotional approach coping on positive emotion. The evidence is suggestive that alexithymia is related to lower levels of emotional approach coping and active coping, which is an important predictor of positive emotion.

Coping strategies as a Predictor of Mental Health

This study explored the relationship between coping strategies and mental health and adds to the growing literature on the measurement of emotion processing and expression. As hypothesized emotional approach and active coping were found to be predictive of levels of positive emotion. Avoidant coping, not dealing directly with a stressor, was found to be predictive of higher levels of negative emotion and physical symptoms. Results from the correlational analyses and testing of the structural model supported these relationships in the hypothesized direction. These results support the literature on active coping (Smith, 1996), emotional approach coping (Stanton et al., 2000), and avoidant coping (Berrocal et al., 2009). Not only does the present study substantiate the benefits of active coping and problems with avoidant coping but it also contributes to greater understanding of the context of emotional approach coping and its interaction with other coping approaches.

Coping is a Mediator of Alexithymia to Health Outcomes

Coping behaviors were predicted to partially mediate the effects of alexithymia on mental and physical health. The findings produced from the structural model for coping as a mediator of the relationship between alexithymia and health outcomes were consistent. It was hypothesized and demonstrated in the study that avoidant coping partially mediates the relationship between alexithymia and negative emotion. Avoidant coping also partially mediates the relationship between alexithymia and physical symptoms. It was hypothesized and demonstrated that emotional approach coping and active coping partially mediate the relationship between alexithymia and positive emotion. The effects of mediation were supported, however, active coping is mediated by emotional approach coping. Specifically, emotional approach coping mediated the relationship of alexithymia to active coping, and active coping mediated the relationship of emotional approach coping to positive emotion. This potentially raises more interest regarding the influence and role of emotional approach coping to active forms of coping.

There have been limited studies examining the relationship between emotional approach coping and active coping. One research group has dominated this area of study producing mixed results specific to emotional processing in relation to active coping and adjustment (Austenfeld et al, 2004). In a 1-month longitudinal study of college undergraduates, emotional approach coping was found to be more adaptive for women and predictive of higher hope but associated with higher rumination in men. However, there were interesting interaction effects that may be relevant to the current study in that emotional approach coping was most adaptive when emotion processing was used singly followed by emotion expression. The authors hypothesized that it may be particularly

important to have clarity on one's feelings before sharing them with others. In addition, this study revealed emotional processing predicted positive reframing at time 2 (Stanton et al., 2000).

Mowrer's (1960) two-factor learning theory is useful in conceptualizing the relationship between alexithymia and patterns of avoidant coping. This model emphasizes, first, the importance of classical conditioning in the etiology of disordered patterns and second, instrumental conditioning in the maintenance of psychopathology. The demands for heightened emotional processing of previously unconditioned aversive stimuli with an alexithymic deficit lead to acquisition of classically conditioned psychological and behavioral fear responses. The autonomic distress is essentially "blocked" from meaning making usually made through identification and from proactive regulatory strategies, leading to sustained autonomic arousal and even hypersensitivity to additional negative emotion stimuli. Initially, without sophisticated means of emotion identification and established regulatory strategies, self-regulation comes under the control of instrumental learning through disorganized means of tension reduction. Over time, in the absence of healthier, more adaptive forms of coping, instrumental learning of escape and avoidance patterns of tension reduction becomes more established taking the form of avoidant forms of coping, denial, and behavioral disengagement. This theory may account for the relationship between alexithymia and avoidance patterns of coping in that individuals with alexithymia are more prone to escape and avoidance conditioning because of emotional distress regulation taking precedence over long term self-regulatory goals. Further studies would be required to explore this particular hypothesis for

understanding the relationship between alexithymia and avoidant coping in the context escape conditioning.

Differences in Alexithymia, Coping, and Health Outcomes

Sex differences. Analyses were conducted for between-subject differences in men and women and Hispanic and Non-Hispanic for all main study variables predictors, criterion, and outcome using independent samples *t*-tests. In addition, structural equation modeling was used to test the final model and comparisons made between samples by sex and ethnicity. One of the first interesting results to note is the lack of difference in the reporting of alexithymia for men and women. Despite Levant et al. (2006) meta-analysis supporting sex differences in alexithymia, the present study failed to find a significant difference between men and women on alexithymia.

The testing of the structural model provided an acceptable fit for analyses of sex differences and good fit for analyses of ethnicity. Differences between men and women were found in the relationships between alexithymia, coping and health outcomes. In examining the means testing of main study variables, women reported more physical symptoms, more negative emotion and less positive emotion than men. Women also reported significantly higher levels of emotional approach coping than men. This finding resonates with the Gender Role Strain paradigm and the interaction of emotion socialization and gender role expectancies on the differences in outcome for alexithymia. Given the comparable levels of alexithymia, why would men in the study report fewer symptoms associated with poor health outcomes than women? As previously discussed the “Normative Male Alexithymia” hypothesis has been applied to account for the socialized restrictive emotionality for men influenced by traditional notions of

masculinity. It is further argued it could be adaptive in certain contexts, such as highly competitive environments, and non-adaptive in other contexts, like dealing with interpersonal problems including marital difficulties. Therefore, to a degree, men with alexithymia might experience less impact on health functioning because they are conforming to social norms. In contrast, women with alexithymia are under the social expectation to have higher prowess in processing emotion in self and in recognizing emotional needs in others and it might impact women's health and distress more significantly given the higher expectations and demands.

If we now turn our attention to behaviors mediating the association between alexithymia and health outcomes, there were also differences observed in the effect sizes in the structural modeling for these relationships. Whereas in men avoidant coping fully mediated the relationship between alexithymia and negative emotion, in women there was still a direct effect of alexithymia on negative emotions and on physical symptoms. There was also an indirect effect of avoidant coping on physical symptoms in women. In men, neither alexithymia nor avoidant coping significantly accounted for physical symptom reporting. Also, in this study alexithymia in women was related to significantly higher levels of lower emotional approach coping than in men, which is an interpersonal strategy of coping and related to positive emotion. Given demonstrated benefits of positive emotion on providing a "buffer to stress" it is important to understand differences in the pathways for men and women. On one hand an argument can be made that alexithymia in women is functionally more maladaptive than in men in some contexts, at least as it relates to accessing active coping and preserving positive emotion. On the other hand, it is still little understood what other factors are at play that influence

the differences in the experience of alexithymia and in preference of coping styles. This study demonstrated observed sex differences in the relationship between alexithymia and coping styles mediating the pathways to mental and physical health. Alexithymia appears to differentially impact men and women's behavior by differentially contributing to lower use of emotional approach coping strategies. This study supports the limited previous research of sex differences in the use of emotional approach coping and its relationship to other active forms of coping.

Ethnic differences. The study included a large Hispanic sample, which allowed for comparisons in ethnicity for all main study variables and comparison of the structural model. There were differences in the effects for ethnicity on alexithymia observed with non-Hispanic reporting higher levels of alexithymia than Hispanic. Although there were no specific hypotheses made regarding ethnic differences these results contradict the reporting from a few studies reviewed in this paper of higher rates of alexithymia in community samples of Hispanic and Mexican American populations. These studies attributed the observed differences in alexithymia to traditional male ideology and machismo within the culture. One reason that may account for the findings of this study is the degree of acculturation of our college sample in comparison to community samples in these previous studies. Acculturation was not measured in this study but previous studies have found this can mediate the effects of traditional cultural norms.

There were also differences observed in ethnicity for mental health with Hispanic reporting more positive emotion than Non-Hispanic. This is consistent with previous studies supporting the Hispanic paradox and the reporting of higher health in Hispanic American populations and other ethnic groups even when they share certain markers that

are often implicated in poorer mental and physical health functioning. Hispanic participants reported significantly lower levels of alexithymia than Non-Hispanic and significantly higher levels of positive emotion. Although the specific mechanisms beyond those measured in the present study remain unclear, lower levels of alexithymia or higher skills in emotion processing may be one of the protective factors in Hispanic ethnicity contributing to higher positive emotion.

Implications for Theory, Research, and Practice

Theory. The present study did not modify the current measurement or theoretical underpinnings of the alexithymia construct as captured by the Toronto Alexithymia Scale. However, given the mediating effect of coping strategies in the association between alexithymia and health outcomes, further consideration of different typologies or other contextual factors may better inform our clinical case formulations and guide treatment. It is important to continue to explore the value in determining if there are subtypes of alexithymia that may be distinguished by not only the severity (as currently measured by total score and subdivided by clinical and subclinical), but also the etiological factors maintaining this collection of behaviors, and differences in symptomological expression. For example, Freyberger's (1977) distinction between primary and secondary alexithymia is important in considering prognosis and therapeutic outcome. If a patient has acquired alexithymic characteristics as a symptom of trauma or of a developmental process then this would have a higher likelihood of resolving with appropriate treatment than someone who has an innate neurobiological deficit in emotion processing. Another typology to consider is Bermond's (1997) Type 1 and Type 2 alexithymia differentiated by the differences in symptomological impairment. According

to this account, Type I alexithymia is characterized by a low degree of conscious awareness of emotional arousal and a low degree of emotion accompanying cognitions. Type II alexithymia is characterized by a normal or high degree of conscious awareness of emotional arousal together with a low degree of accompanying cognitions. These prototypes may be particularly useful in considering the appropriate level or type of intervention and course of treatment planning. Moreover, Bermond's types I and II may be adopted as a heuristic to identify prevalent patterns in symptomological expression for higher predictive validity.

Research. As discussed, future studies should include other methods than cross-sectional design whenever feasible. For example, it would be useful to examine interactions between self-report, performance-measures, and environmental factors in the relationships of alexithymia and coping longitudinally. As posited in the literature review, the relationships between alexithymia and health can possibly be explained through inefficient emotion regulation leading to difficulties in meaning-making and inefficient responding likely leading to higher rumination, diffuse distress, and finally exacerbated mental and physical responding (e.g., allostatic load). The importance of “meaning-making” is important to the process of emotion regulation as it is operationalized as cognitions that potentiate “effective action” or behaviors that are effective at obtaining valued outcomes. The current study demonstrates the associations between alexithymia and inefficient coping as a behavior but does not account for rumination, generalized distress, or effects of perceived stress. Future studies could address these issues to further elucidate the clinical picture.

Daily diary studies have become increasingly common in psychology for the rich idiographic and longitudinal source of information they can provide. A study including a daily diary of emotions, thoughts and behaviors with others could be recorded over 30 days. Other factors known to influence alexithymia and coping could be assessed including perceived stress and positive and negative social interactions. These “diaries” could be transcribed and emotional content scored as a performance measure of emotional awareness and sophistication using a modified coding system akin to Richard Lane’s cognitive developmental framework based on the Levels of Emotion Awareness Scale (Lane, et al., 1990). Following individuals over time would allow for higher fidelity of identifying environmental factors influencing the impact and maintenance of alexithymia and use of a performance measure for assessing emotional awareness would further buttress the strength of the study.

Practice. It is important to reiterate that alexithymia is a personality construct identified as a contributor to mental health outcomes and physical symptom reporting, but it is not a mental disorder. That being said, it is a valuable indicator of emotional competence that can be important in psychological and medical treatment outcomes. Several recommendations can be made to practitioners working in the medical and mental health fields but no comprehensive treatment protocols have been established. Although the interest and research in alexithymia has continued in the last 40 years there has been limited progress in developing a comprehensive treatment.

Alexithymic clients have long been recognized as difficult and poor candidates for many psychotherapeutic approaches. The strength of the associations of alexithymia to avoidant coping in this study may be telling of this difficulty. Alexithymia is

negatively related to therapy outcome and tends to remain constant, even when other psychological or psychosomatic symptoms improve (Salminen, Saarijarvi, Aarela, & Tamminen, 1994). In a 12-week longitudinal study of group therapy by Grabe, et al. (2008) significant reductions in global measures of distress and symptom scores were found in both alexithymic and non-alexithymic subjects. However, alexithymic subjects maintained significantly higher symptom scores than non-alexithymic clients at all time-points. One reason for this is most therapeutic approaches rely on some abilities in introspection within the client, to cultivate understanding and desire for change in order to motivate actual behavioral changes. Traditional “talk-therapy” approaches may be particularly difficult for the client described as “awkward but dedicated efforts of a troubled man to describe what he can only vaguely discern (his mind-body connection) in a language that he barely speaks (emotion and psychology)” (Lumley, 2004, p. 1296). This study found a negative relationship between alexithymia and emotional processing and expression coping strategies. The difficulty in articulating one’s emotional experience combined with a lack of appreciation for self-reflection could certainly be a contributor to higher frustration with the psychotherapeutic process for client and therapist and potentially contribute to not completing therapy. In contrast, psychotherapy may be most beneficial when clients are able to acknowledge their distress, identify contributing factors to the stress and identify and communicate emotional states and feelings, and value and have the motivation to disclose. Another factor that may contribute to treatment outcome is the clients’ willingness to disclose and findings on alexithymic clients suggest an intense ambivalence about emotional closeness (Mallinckrodt et al., 1998).

Given the research demonstrating the importance of the therapeutic relationship in outcomes it is important to be aware of the potential influence of alexithymic characteristics when problems in connection to the client are identified. Experts on the treatment of alexithymic clients point out that clients with high levels of alexithymia find close attachments aversive and often work to actively prevent forming emotional connection to their therapist (Brown, 1985). This has been shown to be bidirectional in that clients have difficulty connecting to therapist and the therapist has reactions to the client (Rasting, 2005). The problem of avoidance of emotional connectedness has been linked to insecure attachment – a fearful, perhaps hostile avoidance and an obsessive preoccupation with the therapist (Mallinckrodt et al., 1998). With this in mind, an assessment of the *therapeutic alliance* or therapeutic relationship in the beginning process of therapy might inform the therapist in treatment planning. It can also be useful to actively monitor and assess the therapeutic alliance to determine whether the client and therapist feel engaged in the current treatment protocol and whose efforts feel supported. This information can then be used to clarify treatment goals and make adjustments to interventions. Otherwise, these clients are less likely to offer feedback on their experience in therapy or feelings about the therapeutic relationship of their own accord; potentially interfering with the effectiveness of the intervention.

It is important to consider the type of intervention when working with alexithymic clients. When alexithymic characteristics are identified it is intuitive to target these symptoms of characteristics for treatment. However, like any good case formulation the clinician must ask him or herself whether a particular treatment is the most effective for the problem presented for this particular client. For whom is emotional disclosure most

effective, and for whom will no benefit—or even worsening—occur? This study found the association between active coping and alexithymia was mediated by lower emotional approach coping. This may seem counterintuitive in the context of psychotherapy and requires some dismantling to understand the best approach with patients with alexithymic qualities. Considerations should be made when alexithymic characteristics are identified in clients and efforts in decreasing avoidant coping and increasing active coping approaches in treatment should be addressed.

There is a robust literature demonstrating the health benefits for emotional disclosure via writing interventions (Pennebaker & Beall, 1986; Pennebaker, 1997). However, few studies have measured alexithymia and examined for differences in treatment effects. Recent research suggests clients with higher levels of alexithymia are not likely to benefit from emotional disclosure or expressive writing without some modifications in treatment (Lumley, 2004). Lumley discussed potential mediators of the effects of writing interventions and emotional disclosure with alexithymic clients that make these interventions not as effective as with non-alexithymic clients. Firstly, emotional disclosure activates negative affect and arousal. In clients that already do not value the process of emotional disclosure and are therefore not motivated for this specific rationale of treatment they may become frustrated with the process or find it non-reinforcing. Those lacking internal motivation, as is suggested with alexithymia and external orientation, are more likely to respond to external contingencies and will benefit less from an internal process. Lumley posited these characteristics would interfere with forming a coherent and meaningful narrative, suggested to be the mechanism of change (Pennebaker, 1997). In a review of four studies conducted within his lab or as

collaborations, Lumley has found alexithymia to moderate health outcomes and decrease the effectiveness of writing interventions (see review, Lumley, 2004). He further suggests cognitive-behavioral interventions may be particularly beneficial for alexithymic people because the structured, often external, and nonemotional focus may fit the cognitive style of alexithymia.

Current approaches referred to as *third-wave* behavior therapies and others incorporating mindfulness should be considered (e.g., Acceptance and Commitment Therapy, Dialectical Behavior Therapy and Mindfulness-based Cognitive Therapy) in psychotherapy clients with alexithymic characteristics'. Acceptance-based approaches are becoming increasingly more popular as empirical support for beneficial outcomes increases (Powers, Zum Vorde Sive Vording & Emmelkamp, 2009). These therapies attempt to address difficulties in emotion regulation by educating clients about their emotions, teaching them emotional acceptance and impulse control, and promoting responses that are non-avoidant and in the service of one's values and goals (see Linehan, 1993; Hayes, 2004). As well, these approaches teach mindfulness meditation in addition to a focus on behavior changes. Mindfulness meditation is a technique taught to increase skills in *observing* – the tendency to notice or attend to internal and external phenomena, *describing* – the tendency to label internal experiences with words, *acting with awareness* - attending to activities in the moment rather than allowing attention to be focused elsewhere, *non-judging of inner experience* – the tendency to allow and accept current internal and external experience without evaluation and *nonreactivity to inner experience* – the tendency to experience thoughts and feelings as they pass without getting caught up in or carried away by them (Baer, Smith, Lykins, Button, Krietemeyer, et al., 2008). The

benefits of mindfulness can extend to awareness of emotions and acting with awareness and the focus on behavior will benefit *acting with intention* to counteract avoidance and increase active coping in clients with alexithymic characteristics.

Novel ideas for interventions for alexithymia are stemming from the literature with autism spectrum disorders (ASD). The thinking is if abilities in emotional processing and communication may be placed upon a continuum in which the most highly emotionally competent are on one end, alexithymia may be placed somewhere in the mid-lower end of deficit and autism spectrum at an even lower end. The difficulties in emotion processing for ASD and resulting social challenges are congruent with conceptualizations of alexithymia. Included in this core impairment of ASD is a difficulty with social—emotional reciprocity, which has also been found to be problematic for alexithymic individuals. Contributing to this are the difficulties in recognizing emotions—particularly complex emotions that require perspective-taking or cognitive processing (e.g., embarrassed, jealous, sarcastic) in both themselves and others. Many individuals with autism spectrum disorders (ASD) have difficulty recognizing emotions in themselves and others and impairments in social communication (American Psychiatric Association, 2000). Berthoz and Hill (2005) studied the validity of using self-report on emotion regulation abilities with autism spectrum disordered (ASD) adults and found ASD related to Bermond's Type II alexithymia. In their study, ASD adults reported difficulties on the cognitive components but not the affective dimension of alexithymia.

Since understanding emotions is one element of the ability to take another's perspective, there have been several studies exploring interventions to teach individuals

with ASC to recognize emotions that may be particularly applicable to alexithymia depending on the level of severity and presence of social impairment. These include social skill instruction and assistive technology (AT) interventions. Assistive technology has been used with children to predict and recognize emotions in others using computer-based interventions, like the Emotions Trainer and Mind Reading (Golan & Baron-Cohen, 2006; Silver & Oakes, 2001). These approaches have reached some success in social awareness as evidenced by higher abilities to identify emotions in self, and verbal and nonverbal emotions in others. These approaches may be further modified and applied in adults to reinforce attention to social “role play” and shape behaviors to adult norms for social-emotional awareness and responding.

The results of this study contribute to more recent research efforts in identifying coping as a mediator to the relationship between alexithymia and health outcomes. Findings in this study support the use of the coping styles of active coping, planning, positive reframing, and acceptance as compensatory strategies (Bowling, 2006; Diener et al., 1999) related to more positive reports of psychological well-being. This study also supports the existing literature of the negative impact of avoidant coping on health and adds to the growing literature of the connection between alexithymia and avoidant coping. The effects for emotional approach coping mediating the relationship of alexithymia to positive emotion is interesting and supports the claim that baseline levels of alexithymia influence the effects of emotional processing and expression. These analyses suggest that alexithymia interferes with or attenuates the potential health benefits of disclosure or emotional approach coping. Continued research in this area may provide more answers in disentangling the effects of coping and alexithymia and

understanding the specific contexts when one strategy is more effective than another for individuals with alexithymia.

CONCLUSION

Within this paper, a perspective emphasizing coping behaviors was introduced to explore the development of alexithymia. Additionally, an examination of the correlates of alexithymia was conducted to elucidate what function on coping behaviors might the actions of someone with alexithymia characteristics serve contributing to the impact on outcomes of mental and physical health. One such hypothesis was that alexithymic behavior maintains affect avoidance through avoidant coping thereby increasing negative emotion arousal. Although the relationships between alexithymia, avoidant coping, and negative emotion was substantiated there is no way of knowing for sure which comes first: alexithymia, avoidant coping, or negative emotion. Another hypothesis was that alexithymia impedes emotional approach and active coping thereby impacting positive emotion. The relationship between alexithymia and emotional approach withstood testing but active coping was mediated by emotional approach coping which provides interesting implications for interventions to improve coping skills in people high in alexithymia.

To date, more attention has been placed on the study of the phenomenological properties of the alexithymia construct and associated negative outcomes with less attention to the influence on behavior. Although much research has been conducted using measures of the alexithymia construct and its correlates, the relationship of alexithymic traits and behavior are little understood. The continued integration of two

tracts of research on emotion competence and coping behavior may serve to better inform our understanding of the alexithymia construct and guide future research.

One of the primary aims of this thesis has been to highlight potential mediating factors of coping in the association of alexithymia and negative health outcomes. Of particular importance in the literature review is the distinction to be made between the innate and/or acquired aspects of alexithymia, and contributing factors in the maintenance of behaviors. Alexithymia is a product of the interaction between cultural expectations and failures in emotion socialization to appropriate the skills necessary to efficiently achieve goal-directives. Although the thrust of the argument presented within this thesis indicates that alexithymia is strongly associated with socialization factors and is mediated by coping behavior also influenced by socialization, as demonstrated in higher use of emotional approach coping in women, this does not mean that alexithymia itself should be conceptualized as merely a social construct. It is not the intent of the author to encourage the reader to completely disregard the deficit-theories and neurobiological explanations for alexithymia or to lend higher weight to sociocultural explanations. Instead, it is argued here that alexithymia is not exclusively explained by neurobiological or environmental deficits, as most researchers seemingly have in their design. Instead, it is related to a complex array of behaviors and health experiences that potentially contribute to the etiology and maintenance.

In the final analysis, one must view alexithymia as a more complex construct that is ultimately the product of an interaction between developmental, social and neurobiological factors that result, importantly, in preventing an alexithymic from employing a full range of internal and external experience to manage affect, relationships

and their own health and mental well-being. It is necessary to consider the negative outcomes associated with alexithymia and its impact not only on internal experience but also its influence on coping behavior. Consideration of this construct and complex interaction with behavior will better inform our clinical case formulations and guide treatment interventions for mental and physical health. This study improved on previous studies of alexithymia and coping by including multiple indicators of mental and physical health, employing structural equation modeling on a large ethnically diverse ethnic sample, and examined coping as a mediator between alexithymia and outcome. Results from this study contribute to understanding how inefficient affect regulation influences deficient coping responses thereby affecting mental health. Interest in the alexithymia construct may be crucial in the ongoing debates in conceptualizing many of our known clinical disorders as disorders of affect regulation and the identification of a common set of diatheses or underlying psychological vulnerabilities that impact emotion, cognition and behavioral responding.

STRENGTHS AND LIMITATIONS

In the current study there were several strengths and limitations. First, a strength of the study is the large and ethnically diverse population of college undergraduate men and women. The size and diversity of the sample allowed for sophisticated quantitative analysis and comparisons of differences between gender and ethnicity. However, an obvious limitation to this is that the population was comprised of college students of a restricted age range. This is not a representative sample and the results are less generalizable to community adults or clinical populations. Future research should strive for a more diverse sample in terms of age. Another limitation is the sample was primarily

female, a factor that could have impacted the data. It would be interesting to see in future research a more even sample in terms of sex.

Another limitation is the observed relationship between alexithymia and coping strategies in this study could conceivably be an artifact of the sample or of research design. In other words, there could be personality variables associated with alexithymia and avoidant forms of coping that were not assessed. Consistent with the majority of research conducted in the area of alexithymia and coping, there were major methodological problems including cross-sectional design and retrospective self-reporting. The cross-sectional study design provided an efficient way to screen the hypotheses with a shorter time commitment than would a longitudinal design, and also would require fewer resources; however, it does not allow for certain issues to be addressed. Concerns with a cross-sectional design of alexithymia are three-fold. The primary limitation of the cross-sectional study design is that because the exposure and outcome were simultaneously assessed, there is generally no evidence of a temporal relationship between exposure and outcome. That is, although it was determined a relationship exists between alexithymia and coping, there is generally no evidence that alexithymia causes these effects in coping behaviors. Pursuing evidence of a causal effect could be better determined in a longitudinal study studying these behaviors over time. Furthermore, a cross-sectional study evaluates the frequency of a particular attribute, introducing a retrospective bias and the person cannot answer with perfect accuracy questions of past events.

A great strength of the study is that the statistical methods used in analysis are superior to many approaches frequently used in psychological research. This study

employed techniques of exploratory factor analysis and structural equation modeling. Structural equation modeling was chosen over regression and path analysis because of its unique ability to test an entire set of regression analyses for latent variables to estimate and test direct and indirect effects without the influence of measurement errors (Schumacker & Lomax, 2004). It also provides a way to test the specified set of relationships among observed and latent variables as a whole, and allow theory testing. Also, exploratory factor analyses were conducted to determine the coping strategies of interest through examining the patterns of interrelationship, for data reduction, classification of the latent variables, and hypothesis testing. A limitation to the analytic methods employed was that traditional multiple-group analyses utilizing EFA for each sample was not conducted. One reason was the smaller sample sizes of men and for sex X ethnicity. According to Kline (2010) sample sizes of at least 100 are generally recommended in structural equation modeling; however, the initial power analysis indicated a higher need for more power for multiple group analyses. Given the large number of parameters in the model, multiple-group analyses would have contributed to alpha inflation.

Another obvious limitation of the study was the use of self-report measures. Self-report measures have been criticized as measuring an individual's *perception* of their abilities rather than actual performance. Likewise, the data may reflect the influence of alexithymic tendencies on the perception of emotion processing and coping. With this in mind, future studies should consider using multiple methods of assessing alexithymia, such as performance measures of alexithymic responding, along with self-report to assess construct validity.

The final strength of this study is the contribution to the study of alexithymia and that it advances the understanding of mediators to the relationships between alexithymia and health. As the literature review demonstrated, there has been a robust association between alexithymia and mental health with some inconsistencies in the effect of alexithymia on physical symptom reporting. Mediation analysis is integral to theory testing of the magnitude and significance of indirect effects, a relationship not fully explained by confining analyses to direct effects of independent and dependent variables.

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Table 1

Summary of Coefficients of the 7-factor Measurement Model of Coping (N = 603)

Item	Factor loading:	Avo	Sub	Rel	Act	Emo	Hum	Sup
I refuse to believe that it has happened.	.35							
I give up the attempt to cope.	.62							
I give up trying to deal with it.	.75							
I blame myself for things that happened.	.47							
I criticize myself.	.35							
Use alcohol...drugs to...get through it.			.73					
Use alcohol...drugs to make myself feel better.			.92					
I pray or meditate.				.75				
I try to find comfort in my religion or spiritual beliefs.				1.04				
I accept the reality of the fact that it has happened.					.38			
I take time to figure out what I'm really feeling.					.50			
I look for something good in what is happening.					.58			
I try to see it in a different light, to make it seem more positive.					.56			
I take action to try to make the situation better.					.58			
I try to come up with a strategy about what to do.					.56			
I concentrate my efforts on doing something about the situation I'm in.					.74			
I realize that my feelings are valid and important.						.63		
I say things to let my unpleasant feelings escape.						.39		
I let my feelings come out freely.						.86		
I allow myself to express my emotions.						.84		
I learn to live with it.						.42		
I make fun of the situation.							.84	
I make jokes about it.							.90	
I get help and advice from other people.								.46
I get advice or help from other people about what to do								.79
I get emotional support from others.								.82
I get comfort and understanding from someone.								.88

Note. *geomin and oblique rotations of the factor loading matrix; default in Mplus 7.11

Table 2

Means, Standard Deviations, and Bivariate Correlations of Main Study Variables

	1	2	3	4	5	6	7
1. Alexithymia	1.000						
2. Avoidant Coping	.427**	1.00					
3. Emotional approach	-.299**	-.158**	1.00				
4. Active Coping	-.229**	-.280**	.461**	1.00			
5. Positive Emotion	-.305**	-.319**	.252**	.470**	1.00		
6. Negative Emotion	.488**	.517**	-.085*	-.242**	-.305**	1.00	
7. Physical Symptoms	.417**	.408**	-.099*	-.195**	-.299**	.588**	1.00
<i>M</i>	53.39	5.03	7.14	15.02	35.54	22.53	23.31
<i>SD</i>	7.93	2.86	2.78	3.71	7.95	7.59	4.77

Note. * $p < .05$, ** $p < .001$. Alexithymia: Toronto Alexithymia Scale; Avoidant Coping: derived from EFA of modified Brief COPE; Emotional approach: emotional approach coping derived from EFA of modified Brief COPE; Active Coping: derived from EFA of modified Brief COPE; Positive Emotion: positive emotion subscale from Positive and Negative Affect Schedule; Negative Emotion: negative emotion subscale from Positive and Negative Affect Schedule.

Table 3

Descriptives & Independent Samples t-tests of Main Study Variables

	N	Mean	SD	df	t	p	d
Alexithymia							
Hispanic v.	195	52.42	8.28	428	2.13	.034*	1.144
Non-Hispanic	235	54.05	7.56				
Male v.	179	53.48	8.04	348	.231	.817	.021
Female	369	53.31	7.94				
Negative Emotion							
Hispanic v.	195	22.91	7.93	428	-.561	.576	.054
Non-Hispanic	235	22.49	7.63				
Male v.	193	21.17	6.39	464	-3.16	.002**	.269
Female	386	23.11	7.94				
Positive Emotion							
Hispanic v.	195	36.46	8.52	428	-2.25	.025*	.217
Non-Hispanic	235	34.70	7.64				
Male v.	192	36.93	7.30	422	3.01	.003**	.261
Female	386	34.91	8.17				
Physical Symptoms							
Hispanic v.	195	23.28	4.81	428	.520	.603	.051
Non-Hispanic	235	23.52	4.62				
Male v.	89	20.82	4.63	131	-5.71	.000***	.671
Female	385	23.92	4.61				
Avoidant Coping							
Hispanic v.	195	5.06	2.96	428	.393	.695	.038
Non-Hispanic	235	4.95	2.86				
Male v.	195	4.91	2.47	462	-.625	.532	.051
Female	391	5.05	3.02				
Emotional approach							
Hispanic v.	195	7.36	2.83	428	.010	.992	.000
Non-Hispanic	235	7.36	2.70				
Male v.	194	6.43	2.61	411	-4.50	.000**	.392
Female	387	7.49	2.80				
Active Coping							
Hispanic v.	195	15.31	3.29	428	-.325	.745	.034
Non-Hispanic	235	15.19	3.85				
Male v.	191	14.91	3.61	390	-.707	.480	.060
Female	388	15.13	3.74				

Note. * $p < .05$, ** $p < .01$, *** $p < .001$. Alexithymia: Toronto Alexithymia Scale; Avoidant Coping: derived from EFA of modified Brief COPE; Emotional approach: emotional approach coping derived from EFA of modified Brief COPE; Active Coping: derived from EFA of modified Brief COPE; Positive Emotion: positive emotion subscale from Positive and Negative Affect Schedule; Negative Emotion: negative emotion subscale from Positive and Negative Affect Schedule

Table 4

Fit Indices for Measurement and Structural Models

	χ^2	df	pvalue	CFI	RMSEA	90% CI	SRMR
Baseline Model 1	605.092	158	<.001	0.867	0.071	.065-.077	0.101
Model 2(Modification Indices)	464.682	157	<.001	0.908	0.059	.053-.065	0.071
Model 3 (Sex)	716.875	340	<.001	0.889	0.064	.057-.070	0.084
Model 4 (Ethnicity)	685.905	340	<.001	0.899	0.060	.054-.067	0.080

Note. χ^2 : Normal Theory Weighted Least Squares Chi-Square; CFI: comparative fit index; RMSEA: root mean square measure error of approximation; SRMR: standardized root mean square residual.

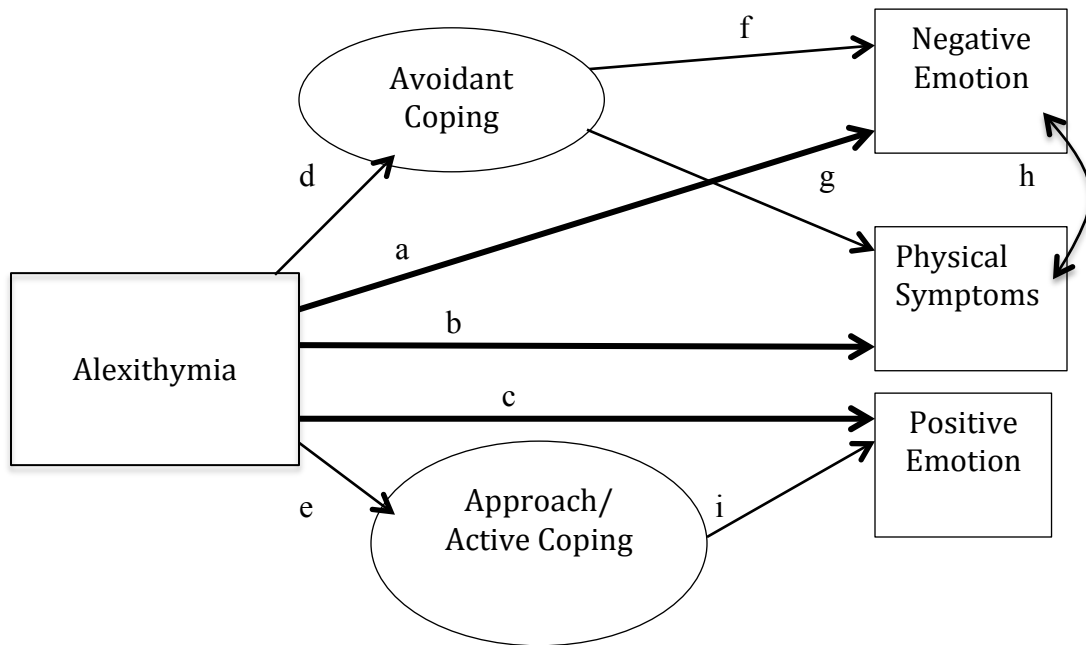


Figure 1. Baseline theoretical model of main study variables. Hypothesized lines for direct effects are bolded and alphas reflect the paths under study.

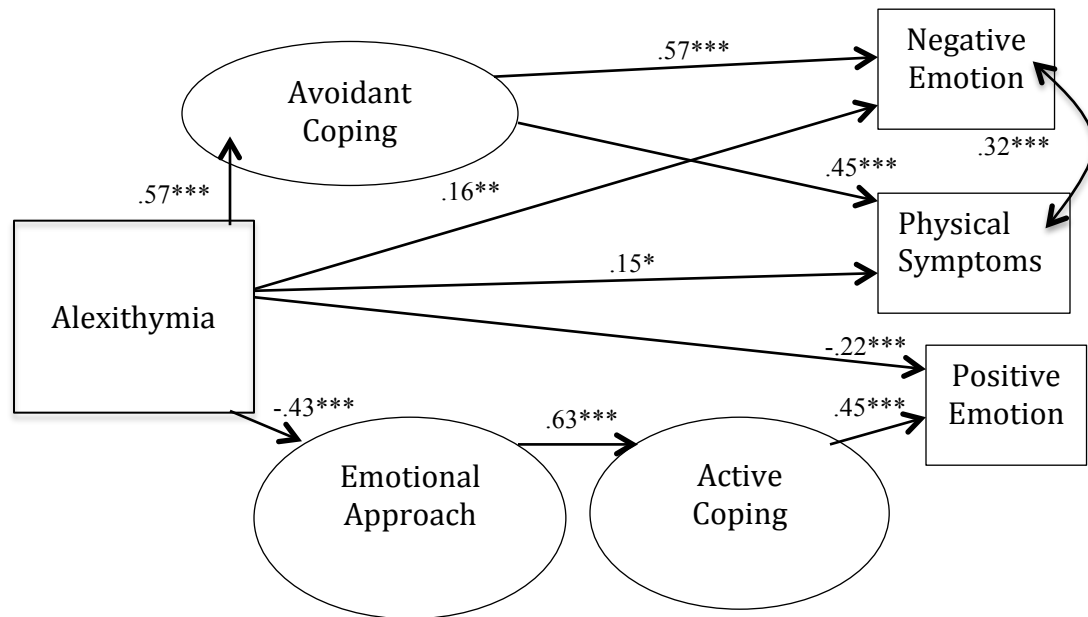


Figure 2. Full sample structural model 2 with modification indices. Standardized path coefficients (STDYX). N=561; * $p < .05$, ** $p < .01$, *** $p < .001$. $\chi^2 (157) = 464.68$, $p < .001$, CFI = .908, RMSEA = .059, SRMR = .071.

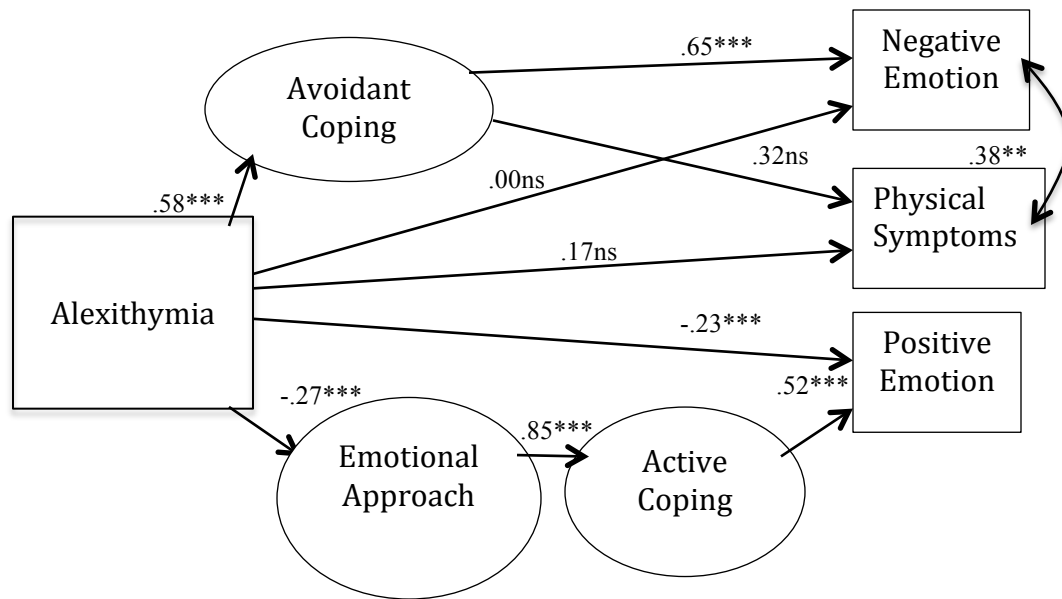


Figure 3. Structural model male sample. Standardized path coefficients (STDYX).

N=179; * $p < .05$, ** $p < .01$, *** $p < .001$. Total model with male and female $\chi^2(342) = 716.875$, $p < .001$, CFI = .889, RMSEA = .064, SRMR = .084. Contribution from male $\chi^2(342) = 341.120$.

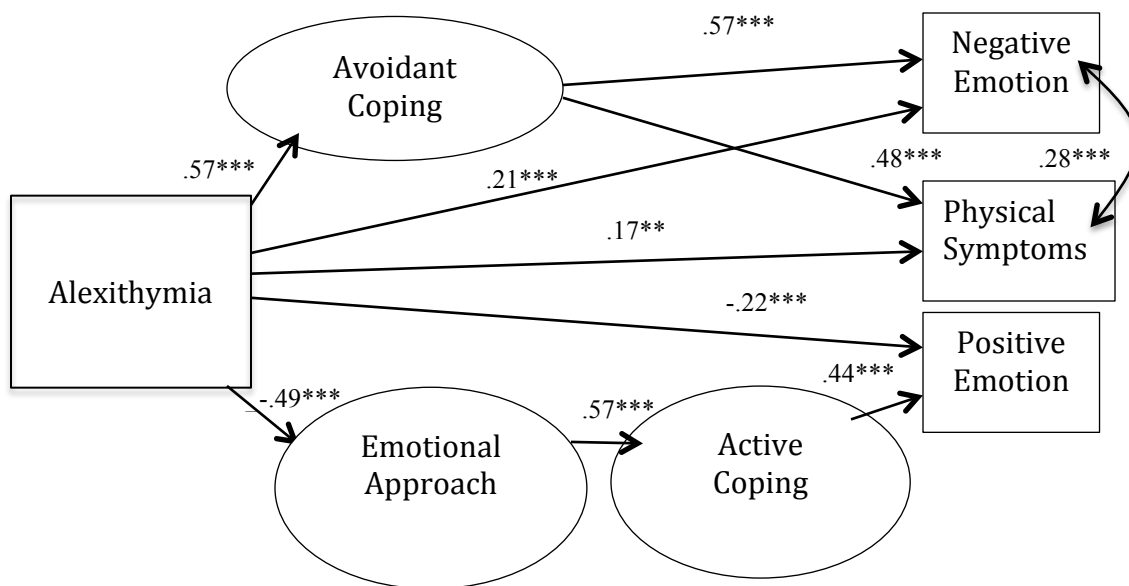


Figure 4. Structural model female sample. Standardized path coefficients (STDYX).

N=369; * $p < .05$, ** $p < .01$, *** $p < .001$; Total model with male and female $\chi^2(342) = 716.875$, $p < .001$, CFI = .889, RMSEA = .064, SRMR = .084. Contribution from female $\chi^2(342) = 375.755$.

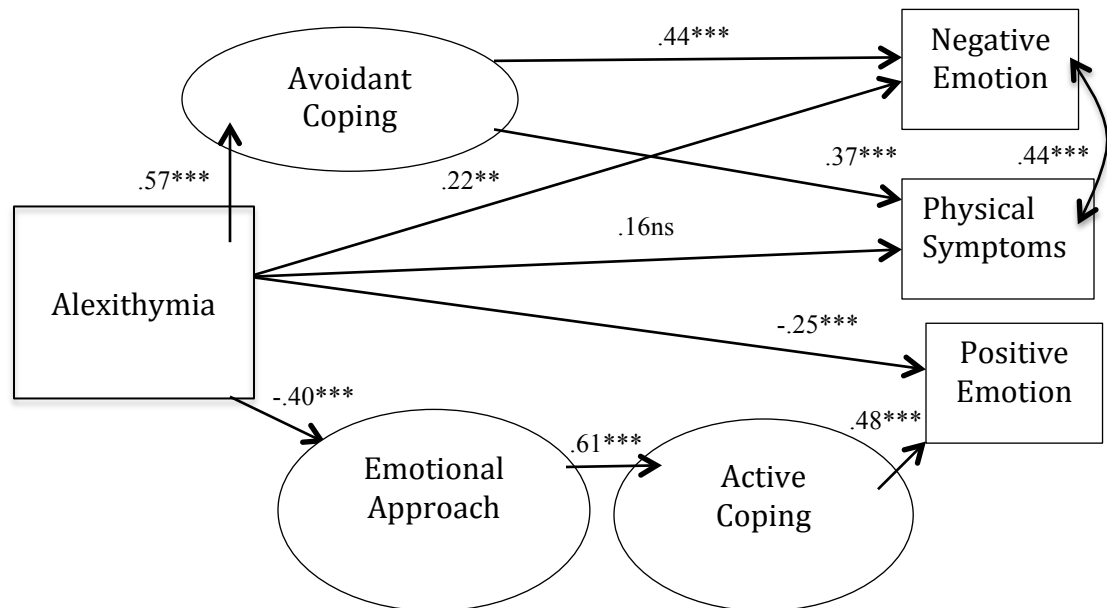


Figure 5. Structural model non-Hispanic sample. Standardized path coefficients (STDYX). $N=310$; * $p < .05$, ** $p < .01$, *** $p < .001$. Total model with Non-Hispanic and Hispanic $\chi^2(340) = 685.905$, $p < .001$, CFI = .899, RMSEA = .060, SRMR = .080. Contribution from Non-Hispanic $\chi^2(340) = 345.714$.

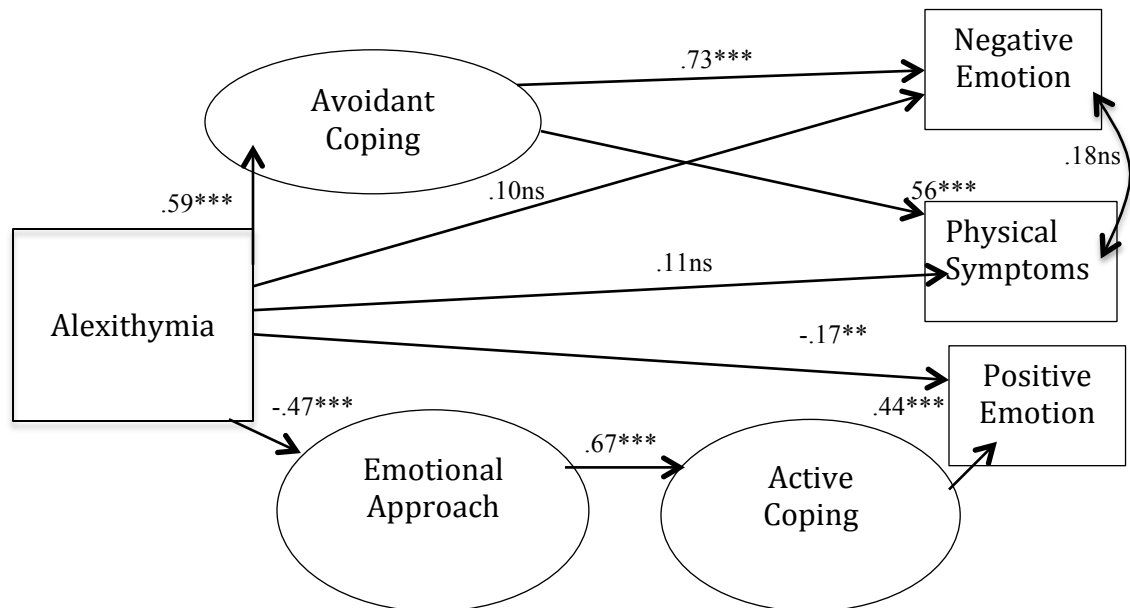


Figure 6. Structural model Hispanic sample. Standardized path coefficients (STDYX).

N=250; * $p < .05$, ** $p < .01$, *** $p < .001$; Total model with Non-Hispanic and Hispanic $\chi^2(340) = 685.905, p < .001, CFI = .899, RMSEA = .060, SRMR = .080$. Contribution from Hispanic $\chi^2(340) = 340.191$.