THE RELATIONSHIP BETWEEN ALEXITHYMIA AND FUNCTIONAL

SOMATIZATION IN COLLEGE STUDENTS IN THE UNITED STATES

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THE RELATIONSHIP BETWEEN ALEXITHYMIA AND FUNCTIONAL SOMATIZATION IN COLLEGE STUDENTS IN THE UNITED STATES

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DISSERTATION ABSTRACT

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The study of functional somatization brings out the struggle of the Western scientific world, which rests of Decartian dualist grounds, to understand the body-mind relations. Individuals who experience functional somatic symptoms have a reduced quality of life because of their constant discomfort. Lack of emotional expressiveness, known as alexithymia, has traditionally been linked to functional somatization. Although the relationship between alexithymia and functional somatization has been studied in adult populations in the U.S., it has not been thoroughly studies among college-age students.

The dissertation study focused on examining the relationship between alexithymia and functional somatization in a sample of college-age students in the U.S. Also, the

relationship between functional somatization and each of three dimensions of alexithymia (difficulty identifying feelings, difficulty describing feelings and externally oriented thinking) was investigated. Additionally, the mediating effect of reported symptoms of depression and anxiety, and general emotional distress in the alexithymia-functional somatization relationship were examined.

College-age students' difficulty to identify and describe feelings was significantly related to experienced symptoms of somatization. Specifically, students who had difficulty identifying feelings were significantly more likely to experience symptoms of somatization. Also, students' symptoms of depression and anxiety, and their general emotional distress, contributed significantly to their experience of symptoms of somatization. General emotional distress, anxiety and depression mediated the relationship between alexithymia and functional somatization.

The results not only confirm a relationship between alexithymia and functional somatization in the sample of college-age students, but also demonstrate a significant level of somatic and emotional distress. The results emphasize the importance of mental health professionals attending to somatic and emotional distress of college-age students through holistic and integrative approaches of psychotherapy. The results also suggest that mental health professionals encourage college-age students to learn how to identify, describe and express their feelings to experience less functional somatization.

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I. INTRODUCTION

Purpose

Existing literature has attempted to describe the etiology of functional somatic complaints through investigation of the relatedness between various biopsychosocial variables and functional somatization. This research study attempted to expand the understanding of the relationship between alexithymia and functional somatization, demonstrating how each one of the major components of alexithymia is related to functional somatization. The study tested the hypothesis that alexithymia and functional somatization are positively related and was based on the premise that a personality trait—alexithymia—is related to the human tendency to experience somatic discomfort in the absence of medically diagnosable cause for the discomfort (De Gucht & Heiser, 2003; Kirmayer, Robbins, & Paris, 1994). More specifically, the study investigated how the difficulty identifying feelings, difficulty describing feelings, and externally oriented thinking, all components of alexithymia, relate to functional somatic complaints among healthy individuals, more specifically, college-age students.

Background

Somatization has fascinated researchers and professionals in the medical and psychological field for more than a century (Gureje, Simon, Ustun, & Goldberg, 1997).

The term somatization has stayed in the language of medicine, more specifically psychiatry, because of the power of the diagnostic classification system of mental disorders created by the American Psychiatric Association-the Diagnostic Statistical Manual (DSM). In the Diagnostic Statistical Manual-Fourth Edition-Text Revision (DSM-IV-TR), disorders that have traditionally been linked with somatization are classified under the Somatoform Disorder section (DSM-IV-TR, 2000).

Kirmayer and Robbins (1991) distinguish between three forms of somatization. The first form is characterized by high levels of medically unexplained symptoms occurring in multiple physiological systems. We know this to be Functional Somatization. The second form is characterized by illness worry beyond what is expected for a demonstrable physical disease, and is known as Hypochondriasis. The third form occurs in individuals diagnosed with one or more mental disorders that do not fall under the Somatoform Disorder category. This form of somatization has not been named by Kirmayer and Robbins (1991). In Functional Somatization, the term "functional" suggests that many unexplainable somatic symptoms may have a physical basis that can not be detected via modern medical diagnostics. Kellner (1990) defines functional somatization as one or more physical complaints (e.g., fatigue, gastrointestinal problems) for which assessment reveals no organic pathology.

Individuals with high somatization are rare in the community and primary care population. Experiencing one or few medically unexplained somatic symptoms is more common in the general population (Katon et al., 1991). Chiouqueta and Stiles (2004) indicate that individuals with high somatization report significantly more history of suicide attempts. The risk for suicide increases when individuals with high somatization

suffer from depression or disthymia, or have a personality disorder. Individuals with high somatization have a self-defeating, depressive and negativistic approach to life. Such traits contribute to care-seeking and difficult doctor-patient relationships. They may be discouraged by the medical inexplicability of their symptoms. They also have less positive attitudes toward mental illness (Noyes et al., 2001).

There are several biopsychosocial variables that play a role in explaining why certain individuals are more prone to somatization. Evidence from adoption and twin studies suggests that genetic factors may play some role in functional somatization (Mai, 2004). Research also provides limited evidence of the effect of physiological mechanisms, more specifically the role of the brain cytokine system, on manifest somatic symptoms. The work of this system only taps into the possible explanation of why some individuals are more prone to experiencing and expressing discomfort in the absence of identifiable physiological changes (Dantzer, 2005). Mai (2004) argues that expressing physical discomfort when experiencing psychological distress is learned through experience. In the process of growing up, we are reinforced by our caretakers to vocalize somatic distress, and get attention and accommodations by caregivers or medical doctors. Limited research evidence also suggests that high somatization occurs in individuals struggling with severe mental illness such as anxiety, mood, and personality disorders. Although there may be individual differences in how different emotional states lead to functional somatization, no specific somatic complaints have thus far been identified as typical for mood, anxiety or personality disorders (Kellner, 1990). Barsky (1992) suggests that individuals who experience a high level of somatic discomfort have

increased attention to unpleasant bodily sensations, focus on weak or infrequent sensations, and interpret somatic sensations as physical illness.

Lack of emotional expressiveness has also been linked to functional somatization. Difficulty with overt emotional expressiveness is known as alexithymia. Individuals with alexithymia have difficulty expressing emotions in words, do not have fantasies expressive of feelings, and their thought content is dominated by details of events in their environment (Kellner, 1990). Lumley (2004) views alexithymia as a deficit rather than a psychological defense. Kellner (1990) suggests that in some individuals alexithymia is a manifestation of a state, and that it is a cognitive style. Thus, people with alexithymia give greater meaning to bodily sensations rather than emotional processes. State alexithymia may occur in response to perceived stress and generalized anxiety, and may be transitory (Hendryx, Haviland & Shaw, 1991). Most research studies have thus far examined alexithymia as a general, stable non-transitory personality trait that may influence the individual's tendency to attribute somatic discomfort to physical illness and experience greater somatic discomfort as a result of emotional conflict.

As cited in Le, Berenbaum, and Raghavan (2002), alexithymia is a personality trait normally distributed throughout the population. Salminen, Saarijarvi, Aarela, Toikka and Kauhanen (1999) suggest that alexithymia may be present in healthy and unhealthy individuals. The authors examined the prevalence of alexithymia on a sample representing the general population in Finland. The overall prevalence of alexithymia was 12.8%, with prevalence of 16.6% among men and 9.6% among women. The authors also reveal low prevalence of high alexithymia (4.1%) and higher prevalence of moderate alexithymia (21%). Mason, Tyson, Jones and Potts (2005) examined the presence of

alexithymia among college students in different countries. The authors report a prevalence of 17.1% in France, 18.8% in Canada, and 13% in Finland. Although authors have argued the generalizability of alexithymia across cultures, it can be safely assumed that the prevalence of alexithymia in non-clinical samples and among college students in the U.S. is similar to that of other countries of the "Western" world. More cross-cultural research is necessary to determine whether alexithymia is a construct which applies universally to all cultures (Dion, 1996).

The lack of emotional expressiveness can be tied to the psychology of emotions, more specifically, to meta-emotional processing. Meta-emotional processing involves identifying, labeling and describing emotions; remembering emotions; reasoning about emotions that one may feel in hypothetical situations; analyzing the emotional consequences of various kinds of behaviors; empathizing with other's emotional experiences, etc. (Lundh, Johnnson, Sundqvist & Olsson, 2002). The presence of alexithymia can be understood as deficit in one's meta-emotional processes. When seen as emotional deficit, alexithymia can be tied to the developmental function of emotions. The Differential Emotional Theory (DET) is based on the premise that emotions serve adaptive functioning during the course of one's development, such that certain emotions become more prominent in a particular period of life to facilitate progress in development (Abe & Izard, 1999). Knowing that alexithymia is characterized by difficulty in expressing and identifying feelings in self and others, it can be argued that from a DET perspective, it is psychologically adaptive for individuals to have low alexithymia.

From a developmental perspective, identifying and expressing emotions is a process that starts at birth, and continues and intensifies in late adolescence and early

adulthood. University students, who are the target population of this study, fall into the late adolescence-early adulthood age range. According to Piaget (1988), individuals of this age range go through the formal operational stage of cognitive development. In this stage, individuals develop and strengthen abilities for abstract and reflective thinking. Awareness of own emotions and emotional processes as well as expression of emotions requires reflective and abstract thinking. A university student in the formal operational stage of cognitive development encounters many college-related experiences that would foster thinking abstractly, recognizing own emotions and emotions of others, and reflecting on own emotions. Thus, the university environment is a rich environment for development of the ability to identify and express feelings as well as development of internally (reflective thinking) rather than externally oriented thinking. From a cognitive development perspective, the processes that occur in the formal operational stage are necessary for hindering the development of alexithymia.

As cited in Pascarella and Terenzini (2005), the psychosocial theorist Arthur Chickering identifies seven vectors of development in college-age students. The seven vectors are as follows: achieving competence, managing emotions, moving toward interdependence, developing mature interpersonal relationships, establishing identity, developing purpose, and developing integrity. The managing emotions vector or developmental task can be directly related to the development and refinement of the ability to identify and express emotions. Managing emotions is about learning to control impulses, respond to emotions appropriately, and handling intense emotional states (Pascarella & Terenzini, 2005). In the process of learning how to manage emotions, individuals have potential to learn how to identify own feelings and express them

verbally. Adult role models such as university counselors, academic advisors, mentors, and professors serve an important role in helping university students reach this developmental task, expressing emotional conflict effectively, and recognizing own emotional states. From a psychosocial developmental perspective, learning how to manage emotional states is also important for hindering the development of alexithymia.

Alexithymia and suppression of emotional expression have both been linked to functional somatization and psychosomatic illness. Gross and James (1993) describe suppression of emotional expression as a conscious act of inhibition of an emotionally expressive behavior in the presence of physiological arousal. There is insufficient evidence to know whether alexithymia is a conscious or an unconscious process, and how alexithymia and suppression are linked. Nonetheless, both alexithymia and suppression are characterized by absence of overt emotional expressiveness. This leads to long-term changes in physiological arousal, which lead to somatic sensations of pain or discomfort (Gross & James, 1993). Kelley, Lumley and Leisen (1997) view functional somatization as communication of emotional distress in somatic language. The authors argue that individuals who have the opportunity to disclose and process emotionally laden events for a prolonged period of time, report better physical and psychological functioning.

Lumley, Stettner and Wehmer (1996) propose that people with alexithymia are excessively attuned to their bodies and amplify bodily sensations. De Gucht and Heiser (2003) suggest that the impaired emotional processes underlying alexithymia may lead to misattribution of a somatic condition rather than psychological distress as the cause of somatic discomfort. Their studies suggest that the difficulty identifying feelings dimension of alexithymia has the strongest association with reported number of

functional somatic symptoms (De Gucht, 2003; De Gucht & Heiser, 2002). Cohen, Auld, and Brooker (1994) argue that alexithymia does not directly cause physical illness or sensations. Lundh and Simonsson-Sarnecki (2001) suggest that the relationship between alexithymia and somatization is mediated by negative affect and emotional distress. More research is necessary to determine the nature of the relationship between alexithymia and somatization. This dissertation study investigated and further elaborated on the relationship between alexithymia and somatization.

There is sufficient research evidence also to link alexithymia with mental illness and mental well-being. Hendryx et al. (1991) suggest that depression and anxiety are particularly related to difficulty identifying and communicating feelings. Bach et al. (1994) describe a relationship between alexithymia and obsessiveness-compulsiveness, depression, eating disorders, post-traumatic stress disorder, personality disorders and social phobia. Bankier, Aigner and Bach (2001) further elaborate that while alexithymia in general relates to panic disorder, the externally oriented thinking dimension of alexithymia relates to obsessive-compulsive disorder. Kauhanen et al. (1996) find a strong association between high alexithymia and risk of death, especially among middle-aged men. The authors suggest that social isolation mediates the relationship between alexithymia and mortality. Lumley et al. (1996) suggest that individuals with high alexithymia have difficulty establishing interpersonal intimate relationships, a lack of social support, social isolation, impoverished mental health and suicidality.

Significance to Counseling Psychology

The study of somatization is interesting in that it brings out the constant struggle of the Western scientific world, which rests on Decartian dualist grounds, to understand the body-mind relations. Experience of somatic discomfort is a common human experience. In the mind of one that understands the mind and the body as two separate, yet interconnected entities, somatic discomfort is easily manageable as long as it is a sign of a disrupted homeostasis in the physical body. Somatic discomfort that may stem from a disrupted homeostasis of the mind, although postulated and studied by numerous authors through the centuries, is still difficult to grasp, accept, and understand. This difficulty partially rests on a dualism-based division of human health services into medical-those that treat physical complaints and psychological/psychiatric-those that treat mental health-related complaints.

Individuals who suffer from functional somatic symptoms struggle on day-to-day basis. They frequently use health services and report more disability. Even when experiencing mental health distress, they prefer the use of medical over mental health services (Escobar, 1987). Most importantly, individuals suffering from chronic functional somatization are under the risk to commit suicide, particularly when their somatic symptoms coincide with depressive feelings. Chioqueta and Stiles (2004) report that individuals with chronic functional somatization are a high-risk population for suicide because of their constant discomfort, hopelessness stemming from lack of cure for their symptoms, and dissatisfaction with quality of life, regardless of whether they do or do not suffer from a mood, anxiety, or personality disorder. Approximately 50% of individuals diagnosable with Somatization Disorder have a history of suicide attempts (Chioqueta &

Stiles, 2004). There is a great concern that suicidal ideation and behavior in individuals suffering from chronic functional somatization may not be addressed by those from whom they must often seek help, the medical community.

As discussed above, from a developmental perspective, identifying and expressing emotions is a process which starts at birth, and continues and intensifies in late adolescence and early adulthood. University students, who were the target population of this study, go through the formal operational stage of cognitive development (Piaget, 1988). A university student in the formal operational stage of cognitive development encounters many college-related experiences that foster thinking abstractly, recognizing own emotions and emotions of others, and reflecting on own emotions. College experiences foster the development of formal operational thinking, and therefore, the development of ability to identify and express feelings as well as development of internally (reflective thinking) rather than externally oriented thinking. The psychosocial theorist Arthur Chickering identifies seven vectors of development in university students. The managing emotions vector or developmental task can be directly related to the development and refinement of the ability to identify and express emotions. Managing emotions is about learning to control impulses, respond to emotions appropriately, and handling intense emotional states (Pascarella & Terenzini, 2005). In the process of learning how to manage emotions, individuals have potential to learn how to identify own feelings and express them verbally. Adult role models such as university counselors, academic advisors, mentors, and professors serve an important role in helping university students reach this developmental task, expressing emotional conflict verbally rather than somatically, and recognizing own emotional states. The cognitive and psychosocial

processes which occur in college-age individuals are significant in contributing to the development or prevention of alexithymia and functional somatization at young age.

There is limited literature that has investigated the presence of alexithymia and somatization among college-age student. There is insufficient literature to guide us to better understand how college student on university campuses across the U.S. receive treatment for somatic complaints as well as what the prevalence of functional somatization is in this population. The prevalence of functional somatization in university students is unknown. Due to lack of research in the area of functional somatization among college students, it can only be assumed that college students experience somatic distress on day to day basis and that most likely the help they turn to is their general physician. There is insufficient knowledge of the prevalence of functional somatization among college students who utilize student counseling services for psychological distress. There is also insufficient knowledge as to how students with somatic distress are treated when they do seek counseling.

Few studies have focused on the presence of alexithymia among college-age students. Hendryx et al. (1991) investigated the multidimensionality of alexithymia in college students. Their study reveals evidence for alexithymia as a response to generalized anxiety and psychological distress, specifically in freshman medical students. Mason et al. (2005) reveal a high prevalence of alexithymia among students in the natural sciences. Dion (1996) reveals greater difficulty in identifying feelings among university students whose English is a second language in comparison to university students whose native language is English. The presence of alexithymia among university students who seek counseling for psychological distress has not been studied extensively.

The study of alexithymia and its relationship with somatic expression of distress greatly adds to the overall understanding of why some individuals are more prone to somatization, and other individuals are not. More importantly, it adds to a better understanding of how our emotional processes shape our experience of physical pain and discomfort, and it emphasizes the importance of treating the human organism more holistically. This study was based on the premise that through confirming the relatedness between alexithymia and functional somatization, functional somatic discomfort would be more appropriately treated by helping individuals with alexithymia to learn to identify and express emotional conflict overtly and verbally, rather through somatization. This study was also based on the premise that the workings of the mind are far more interrelated with the workings of the body than modern medicine can currently reveal, and that the interrelatedness can be partially uncovered through the study of the role of psychological processes in functional somatization. Investigating the relationship between alexithymia and functional somatic distress among university students greatly adds to the body of knowledge as to how the two constructs occur and are related in this population. The relationship between alexithymia and functional somatization has been least studied in young, high functioning, and healthy individuals. This study added to a better understanding of the extent of somatic distress among college-age students.

Definition of Terms

Alexithymia: Kellner (1990) defines alexithymia as a trait in individuals who have difficulties in identifying emotions, difficulties in expressing emotions in words, have no fantasies expressive of feelings, and the thought content is dominated by details of events

in their environment. For the purposes of this study, alexithymia is defined through scores obtained on the 20-Item Toronto Alexithymia Scale (TAS-20) (Bagby, Parker & Taylor, 1994).

Difficulty Describing Feelings: Difficulty describing feelings is considered to be the second factor of TAS-20 (Bagby et al., 1994). It is measured and defined via five items on the TAS-20 assessing the ability to verbally describe feelings to other people.

Difficulty Identifying Feelings: Difficulty identifying feelings is considered to be the first factor of TAS-20 (Bagby et al., 1994). It is measured and defined via seven items on the TAS-20, assessing the ability to identify feelings and distinguish them from somatic sensations that accompany emotional arousal.

Externally Oriented Thinking: Externally oriented thinking is considered to be the third factor of TAS-20 (Bagby et al., 1994). It is measured and defined via eight items assessing externally oriented, operative thinking focused on details of external events and bodily symptoms, and relative absence of internal fantasies.

Functional Somatization: Kirmayer and Robbins (1991) define functional somatization as the presence of one or more somatic symptoms which are medically inexplicable in the current state of medical knowledge yet may prove to have a physical basis in disturbed physiological function. For the purposes of this study, functional somatization is defined through scores obtained on the Somatization scale of the Symptom Checklist-90-Revised (Derogatis, 1994).

Hypotheses

Although the relationship between functional somatization and alexithymia has been investigated in prior studies, results have been inconsistent. There is inconsistency in research evidence as to whether all three dimensions of alexithymia equally contribute to understanding functional somatization. Some evidence suggests that the difficulty identifying feelings dimension is more significantly associated with functional somatization than the other two dimensions (difficulty describing feelings and externally oriented thinking) (De Gucht et al., 2003; Waller & Scheid, 2004). There is also inconsistency in research evidence whether the relationship between a global index of alexithymia and functional somatization offers better understanding of the relationship between the two constructs in comparison to the relationship of each of the dimensions of alexithymia with functional somatization. In this research study, the primary investigator tested the following hypotheses:

H1: People who score high on alexithymia are significantly more likely to report experiencing functional somatic distress.

H2: People who score high on difficulty identifying feelings are significantly more likely to experience functional somatic distress.

H3: People who score high on difficulty describing feelings are significantly more likely to experience functional somatic distress.

H4: People who score high on externally oriented thinking are significantly more likely to experience functional somatic distress.

H5: The difficulty identifying feelings dimension of alexithymia will contribute a significant amount of unique variance to functional somatization in comparison to

the difficulty describing feelings and externally oriented thinking dimensions of alexithymia.

II. LITERATURE REVIEW

Somatization

Defining Somatization

Somatization has been a topic of interest that has fascinated researchers and professionals in the medical and psychological field. The term *Somatization* exists as a result of a mistranslation of a German word first used by the psychoanalyst Wilhelm Steckel in the 1920s. The word *organsprache* is literally translated as "organ speech", which is an ambiguous concept. To simplify Steckel's language, translators have created somatization-a word that has become omnipresent in modern Western society (Mai, 2004). The term somatization has stayed in the language of medicine, more specifically psychiatry, because of its neutral connotation, and also because of the power of the diagnostic classification system of mental disorders created by the American Psychiatric Association-the Diagnostic Statistical Manual (DSM). Steckel defined somatization as a bodily disorder that occurs as an expression of a deep-seated neurosis. He regarded somatization as identical with Freud's concept of conversion. In scholarly work on somatization, attempts have been made to distinguish between conversion disorder, psychosomatic illness and somatization. Separating somatization from similar phenomena has been difficult due to the fact that the boundaries of this construct are arbitrary (Kellner, 1990).

In the Diagnostic Statistical Manual-Fourth Edition-Text Revision (DSM-IV-TR, 2000) disorders that have been traditionally linked with somatization are classified under the Somatoform Disorders section and are the following: Somatization Disorder (300.81), Undifferentiated Somatoform Disorder (300.82), Conversion Disorder (300.11), Pain Disorder (307.8x) and Somatoform Disorder NOS (300.82) (DSM-IV-TR, 2000). This particular section of the diagnostic manual does not deal with illnesses that are psychosomatic in nature and precipitated by emotional distress. While some authors have defined somatization as a way for individuals with psychosocial and emotional problems to express their distress through physical symptoms, others have argued that somatization is neither a discrete clinical entity nor a result of a single pathological process (Kellner, 1990).

Kirmayer and Robbins (1991) describe three forms of somatization as conceptually distinct patterns of experiencing and reporting somatic distress among primary care setting patients. The first form of somatization is characterized by reported high levels of medically unexplained symptoms occurring in multiple physiological systems. Such somatization is known as *Functional Somatization*. An extreme form of such somatization, characterized by few or a maltitude of chronic symptoms is described by the DSM-IV-TR as Somatization Disorder and Undifferentiated Somatoform Disorder (DSM-IV-TR, 2000). The second form of somatization is characterized by illness worry beyond what is expected for demonstrable physical disease. This type of somatization has been introduced to the medical and psychological community as *Hypochondriasis* (DSM-IV-TR, 2000). Kirmayer (1991) does not give a name to the third form of somatization. It occurs in individuals diagnosed with a mental disorder (eg. anxiety, depression) and is

characterized with reported somatic symptoms in various physiological systems (Kirmayer, 1991).

What unifies the three forms of somatization is the presence of symptoms that although suggesting a general medical condition, after appropriate medical assessment, can not be explained by a general medical condition or a direct effect of a substance (DSM-IV-TR, 2000). For the purposes of the study, rather than studying clinically diagnosable somatization (somatization disorder and undifferentiated somatoform disorder), the investigator studied functional somatization in healthy young individuals. In functional somatization, the term "functional" draws attention to the likelihood that many unexplainable somatic symptoms may prove to have a physical basis in disturbed physiological function. Conditions such as tension headache, irritable bowel syndrome, fibromyalgia and chronic fatigue syndrome fall under functional somatization and are judged by many physicians as medically unexplained (Kirmayer & Robbins, 1991). Authors have argued whether such medically unexplained symptoms are truly physically unexplainable through the means of medical diagnostics. Merskey (2004) has argued that functional somatic symptoms are not explained because it is often not worthwhile or feasible for anybody to spend the time and effort involved in tracking down the cause of minor complaints of a headache or constipation. According to this author, functional somatic symptoms are not more than normal transient changes in comfort and discomfort in the general population (Merskey, 2004).

Fascinated by the lack of organic pathology that characterizes somatization, many authors have attempted to give various interpretations as to why and how human beings are capable of experiencing somatic distress with no evidence of organic cause.

Individuals with medically unexplainable symptoms may report pain, gastrointestinal, sexual, or pseudoneurological symptoms. The investigator of this proposal does not use the DSM-IV-TR classification of Somatoform Disorders to refer to medically unexplainable symptoms. Instead, for the purposes of this dissertation proposal, reported medically unexplainable symptoms are named *Functional Somatic Symptoms*, and the experience of such symptoms is referred to as *Functional Somatization* (Kellner, 1990). Kellner (1990) defines functional somatic symptoms as somatization that indicates one or more physical complaints (e.g., fatigue, gastrointestinal, or urinary complaints) for which appropriate evaluation uncovers no organic pathology (e.g., physical illness, disorder or injury); or if there is related organic pathology, the complaints are in excess of what would be expected from the physical findings.

Prevalence of Functional Somatization

Kellner (1990) suggests that bodily discomfort is a normal experience even in individuals with good physical health and that there are rarely those who do not experience any somatic distress at a given point in time. He reports 80% of healthy individuals in the general population to experience somatic symptoms for which no medical cause exists. In healthy individuals, functional somatic symptoms are more prevalent than emotional ones, with over 4% of people having multiple chronic functional somatic symptoms (Kellner, 1990). The severity and incidence of functional somatic symptoms range from the common, mild and transient to the chronic, extremely distressing, and incapacitating. Kirmayer and Robbins (1991) report a 16.6% prevalence of functional somatization among primary care patients. Kirmayer, Groleau, Looper and Dao (2004) report prevalence rates of medically unexplainable symptoms varying from

15% to 30% of medical consultations. These rates depend on whether the definition of medically unexplained symptoms is based on assessment of current symptoms by the physician or lifetime history of multiple symptoms. The authors report 10.5% prevalence of at least one unexplained symptom in a community sample taken from a culturally diverse inner-city neighborhood.

Escobar (2004) suggests that the way functional somatization is reported and measured is greatly shaped by culture. Culture shapes illness and determines the ways one conceives of illness. Even in similar countries such as those of the Western hemisphere (e.g., European countries, North America) there are significant differences in the way patients present symptoms, medical tests are interpreted, and treatment is formulated. This makes measurement and detection of functional somatization across cultures difficult. Escobar (2004) argues that the transformation of personal and social distress into somatic complaints is the norm in most cultures, and that patients tend to develop symptoms that physicians expect and understand. Somatic symptoms are socially less scrutinized because they are less stigmatizing in comparison to psychological disorders. Stigmatization has an effect on whether or not individuals from the general population report functional somatic symptoms, which in turn affects the prevalence rates of functional somatization.

Theories Explaining Functional Somatization

Genetics

Although the relationship between functional somatization and genetics is not clear, evidence from adoption studies suggests that the genetic factors may play just as important role in functional somatization, as the early developmental environment of the

individual. Mental illness in both the biological and the adoptive parent has been associated with functional somatic complaints (eg., headache, backache, abdominal distress) in twins separated at adoption. The biological fathers of female individuals with severe somatic complaints had often committed violent crimes, whereas the adoptive fathers of female individuals with various somatic complaints were more often alcoholics (Kellner, 1990). Mai (2004) reports that parents of adoptees with somatoform disorders show significant criminal or psychotic behavior. The author argues that although some twin studies provide evidence for a genetic component, others do not. Thus, although genetic factors may play a role in functional somatization, the effect appears to be limited (Mai, 2004).

Psychophysiology

Although it has not yet been possible to provide a definitive disturbance in physiology that would explain most functional somatic symptoms, research provides limited evidence of the effect of physiological mechanisms on manifest somatic symptoms. Dantzer (2005) writes about the role of the brain cytokine system as a new avenue for understanding the mechanisms behind perception and representation of symptoms. This system in the brain organizes the subjective, behavioral and metabolic components of an organism's response to danger. It also plays a key role in the experience of pain associated with danger. When repeatedly stimulated or exposed to environmental stressors, this system can undergo sensitization. A sensitized brain cytokine system is less likely to turn off when danger to the organism is over and is more likely to be triggered by external stimuli (Dantzer, 2005). The work of this system only taps into the possible explanation of why some individuals are more prone to

experiencing and expressing pain and discomfort with only minor physiological changes or no changes in their organism.

Kirmayer et al. (2004) suggest that many somatic symptoms reflect normal responses to stress. Such symptoms may be increased muscle tension or autonomic arousal, and are related to the activation of the hypothalamic-pituitary-adrenocortical axis activation. Chronic or intense activation of the neuroendocrine and autonomic nervous system may have subtle damaging effects in the organism which may be hard to detect clinically. Common physiological disregulation that stems from every-day stress, as well as the effects of aging add to the experience and reporting of functional somatic symptoms (Kirmayer et al., 2004). Mai (2004) reports an association between functional somatization and elevated 24-hour cortisol levels, as well as systolic blood pressure. Such association is nonetheless nonspecific, and more research is required in the area of physiological dysfunction and its effect on functional somatization.

Somatic Expression of Distress

Kirmayer et al. (2004) argue that in most cultures, illness attributed to physical causes is more acceptable than illness attributed to psychological distress. While physical illness tends to be viewed as outside of the individual's control, psychological distress is viewed as controllable by the individual experiencing it. Thus, physical illness evokes more compassion, while psychological distress may be stigmatizing. An individual with physical illness is more likely not to be perceived to have contributed to the illness, while an individual with psychological problems may be perceived to be more responsible for his/her own distress. Such prescription of responsibility places pressure on individuals who suffer from psychological distress and can not help themselves. In order to alleviate

the distress and avoid being stigmatized, individuals may report physical symptoms and seek help from the medical community. Medical personnel often fail to find physiological etiology for these symptoms, and fail to treat the symptoms and the associated distress.

Mai (2004) argues that seeking medical help for medically unexplained symptoms, as a form of illness behavior, is learned through experience. In the process of growing up, most individuals are reinforced by their parents when clearly vocalizing somatic distress. They get the attention of the parents and the medical community, or may obtain certain accommodations. This reinforces help-seeking for physical distress in comparison to help-seeking for psychological distress.

Because of the prevalent mind-body dualism in many societies, physicians stray away from offering psychological explanations to individuals reporting medically unexplained bodily symptoms. Often individuals themselves have difficulty accepting psychological explanations, and seek a physiological explanation and a quick fix for the distress. Individuals with functional somatic symptoms often pressure medical doctors to conduct more tests and search for evidence that would confirm the hypothesis for a biological origin of the symptoms (Kirmayer et al., 2004).

Somatization as Manifestation of Mental Disorders

Numerous authors have written about individuals who report functional somatic complaints and simultaneously suffer from an anxiety or mood disorder. More specifically, Major Depressive Disorder and Panic Disorder have been frequently associated with Somatization Disorder, Histrionic, Borderline and Antisocial Personality Disorder have also been associated with Somatization Disorder (DSM-IV-TR, 2000).

There is no conclusive research evidence for a direct relationship between heightened anxiety or depression and functional somatic discomfort. Some patients who experience depression may reveal their somatic symptoms, but not their depressive or anxious feelings. In some individuals, functional somatic complaints may occur after tremendous losses and stressful life events. While highly anxious individuals may more likely experience symptoms such as chest pain or difficulty swallowing, highly depressed individuals are more likely to experience chronic fatigue. Evidence suggests that both individuals with anxiety and depression are more likely to experience gastrointestinal symptoms (eg. nausea, diarrhea) (Kellner, 1990; Hendryx et al., 1991) There may be individual differences in emotional states that lead to various functional somatic complaints. However, no evidence suggests specific symptoms as characteristic of either one of the above mentioned disorders (Kellner, 1990).

Cognition

Cognitive scientists have studied the cognitive styles of individuals more prone to functional somatization. Barsky (1992) suggests that functional somatizers have a heightened ability for *somatosensory amplification*-an increased attention to unpleasant bodily sensations, a tendency to select and focus on certain weak or infrequent sensations, and a tendency to appraise somatic sensations as abnormal and indicative of illness. Barsky (1992) hypothesizes that somatosensory amplification may play a large role in the experience of functional somatization in conditions such as irritable bowl syndrome, chronic fatigue syndrome, or chronic pain. There is no conclusive evidence, however, to support Barsky's hypothesis that somatosensory amplification shapes the experience of most functional somatic symptoms. Rief, Hiller and Margraf (1998)

propose that individuals with high somatization catastrophize the interpretation of their bodily perceptions. Individuals with a catastrophizing cognitive style have a self-concept of being physically weak and intolerant of pain. More importantly, such cognitive styles may interact with the physiological arousal of individuals with high somatization (Rief et al., 1998).

Lim and Kim (2005) administered three different cognitive tasks to patients with Major Depressive and Panic Disorder, and to healthy participants. The authors suggest that there is a different cognitive style between individuals with high somatization in comparison to individuals with an anxiety disorder. Although both individuals with high somatization and individuals with Panic Disorder may experience similar somatic complaints, the underlying cognitive processes of individuals with high somatization are largely shaped by amplification of bodily sensation and catastrophic misinterpretation of symptoms (Lim & Kim, 2005). Cognition plays a tremendously important role in their experience of functional somatic complaints.

Sharpe, Peveler and Mayou (1992) propose a cognitive-behavioral model of the etiology of functional somatic symptoms. Central to this model is the way a person thinks about bodily sensations. If benign bodily sensations are regarded by the individual as being symptomatic of disease, first, the individual will experience emotional distress. Second, the individual will develop increased attention to the bodily sensations. Third, they will engage in dysfunctional behaviors which exacerbate rather than relieve the somatic symptoms. According to their model, the treatment acts by modifying the dysfunctional cognitions of individuals with many functional somatic complaints. The authors argue that it is unclear as to how cognitive-behavioral therapy produces change.

They suggest that this approach reduces disability and number of somatic symptoms, however, does not fully eliminate all functional somatic symptoms (Sharpe et al., 1992).

Repressive Coping Style

Researchers write about a personality construct that has primarily been related to outcome studies on treatment of individuals suffering from chronic pain, and may be significantly related to other functional somatic complaints. This personality construct is known as repressive coping style, and has been defined as a dispositional style of denying the experience of negative emotions (Cutler, Larsen & Bunce, 1996). Individuals with repressive coping style have a tendency to disassociate between actual physiological arousal and self-reported arousal in anxiety-provoking situations, therefore, their way of coping is self-deceptive. They do not attempt to impress others, but rather tend to maintain a great optimistic bias of personal mental and physical health-an illusion of invulnerability (Myers, 2000).

Although individuals with repressive coping style report low levels of mental and physical distress, they exhibit high levels of physiological arousal. It is likely that such physiological arousal contributes to occurrence of functional somatic distress. Cutler et al. (1996) suggest that individuals using a repressive coping style may have higher health risks, and may take longer to heal in medical and psychological treatment of functional somatic complaints. More importantly, individuals with this coping style may avoid processing negative information about self. Therefore, although they may be experiencing functional somatic discomfort, they may not report or be fully aware of having it (Cutler et al., 1996).

Although alexithymia and repressive coping style share similarities, it is important to note that literature distinguishes between alexithymia-lack of emotional expressiveness, and repressive coping style-emotional suppression, as two separate constructs. Both involve problems with expressing emotions, and both are related to functional somatization. What differentiates these two constructs is evidence that suggests that individuals with repressive coping style report low alexithymia. This is most likely because of their tendency to respond to self-report alexithymia measures in a fashion that keeps their positive self-image intact (Myers, 2000).

Significance

Individuals diagnosed with somatization disorder are relatively rare in the community and primary care populations, and are far outnumbered by individuals with fewer medically unexplained somatic symptoms. Functional somatization in primary care and the community is often accompanied by symptoms of depression and anxiety. Individuals with more than four functional somatic complaints tend to have significantly higher rates of lifetime panic disorder and lifetime disthymic disorder, and tend to experience more severe chronic physical illness (Katon et al., 1991).

Escobar et al. (1987) tested the hypotheses that functional somatization would be associated with the preferential use of medical over mental health services, and with disability. The authors used structured interview data from 3,132 randomly selected community respondents. Escobar et al. (1987) provide support for the relationship between functional somatization and disability, frequent use of health services, and preferential use of medical over mental health services. Chioqueta and Stiles (2004) assessed suicide risk in psychiatric patients with and without somatization disorder. A

sample of 120 psychiatric outpatients was used in the study, 29 of whom met the diagnostic criteria for somatization disorder after completing the Structured Clinical Interview for DSM-III-R (SCID-I). Chiqueta and Stiles (2004) indicate that individuals with somatization disorder report significantly more history of suicide attempts. The risk for suicide exacerbates when individuals with several functional somatic complaints suffer from depression or dysthymia, or have a personality disorder. The authors report that 50% of individuals with intense functional somatic discomfort have a history of suicide attempt and that the risk increases with increase in number of somatic symptoms and severity/chronicity of the discomfort.

To examine the relationship between personality disorders and functional somatization, Noyes et al. (2001) administered the Structured Interview for DSM-IV Personality (SIDP) and the NEO Five-Factor Inventory to patients with and without functional somatic symptoms in a medical clinic. The authors confirm the finding that functional somatization is related to depression. Namely, in their findings, 59% of individuals with high somatic discomfort were diagnosed with depression. In their sample, approximately one half of patients who presented with functional somatization, anxiety and depressive disorders also met criteria for a personality disorder. One explanation of this finding is that individuals with a personality disorder are more vulnerable to depression and anxiety, and express their psychological distress via somatization. Another explanation is that individuals with personality disorders are more prone to treatment-seeking behaviors and therefore easily detectable among individuals with high somatization (Noyes et al., 2001). Noyes et al. (2001) specify obsessive-compulsive personality disorder to be common among individuals with high functional

somatization. They explain that individuals with this disorder are concerned about maintaining control over their physical and mental functioning and are consequently threatened by unexplained symptoms (Noyes et al., 2001).

Individuals with high functional somatization have a self-defeating, depressive and negativistic approach to life. Such traits contribute to care-seeking and difficult doctor-patient relationships. Thus, they may feel mistreated, a feeling further exacerbated by the medical inexplicability of certain somatic symptoms. On the other hand, individuals with high functional somatization have less positive attitudes toward mental illness, are less introspective and more suspicious (Noyes et al., 2001). These findings are in support of the conclusion that individuals with many somatic complaints are difficult to treat, particularly because of their lack of regard for the health professional, and their proneness to seeking medical help for psychological distress.

Measuring Somatization

The Symptom Checklist-90-Revised (SCL-90-R) has been used as one measure of somatization. The SCL-90-R is a 90-item self-report symptom inventory designed by Leonard D. Derogatis in 1979, primarily to reflect the psychological symptom patterns of psychiatric and medical patients. The instrument has been normed on: adult psychiatric inpatients and outpatients, adult nonpatients and adolescent nonpatients. The reliability of the SCL-90-R is reported for internal consistency and test-retest, with satisfactory results in both instances. Internal consistency coefficients range from a low of .77 for Psychotocism to a high of .90 for Depression (Derogatis, 1994). Test-retest reliability coefficients range between .80 and .90, which is an appropriate level for measures of symptom construct. The lowest test-retest coefficients reported is .68 for Somatization

and the highest test-retest coefficient reported is .83 for Paranoid Ideation (Derogatis, 1994). The SCL-90-R has highly acceptable levels of convergent-discriminant validity. Its dimensions have highest correlations with like MMPI constructs, and the dimensions of the Crown-Crisp Experiential Index. The SCL-90-R has well established concurrent validity. The Depression dimension of the scale has high correlations with the Center for Epidemiologic Studies Depression Scale (CES-D) and the Hamilton Rating Scale of Depression (Derogatis, 1994). Its global scores have high correlations with the total scores of the Social Adjustment Scale-Self-Report (SAS-SR). The SCL-90-R consists of 90 symptoms, each described briefly and simply. Subjects are asked to report how much discomfort each symptom has caused them within the last week by rating them on a 5-point scale from 0 (not at all) to 4 (extremely). Scores on this instrument are obtained on nine factors: Somatization (12 items), Obsessive-Compulsive (10 items), Interpersonal Sensitivity (9 items), Depression (13 items), Anxiety (10 items), Hostility (6 items), Phobic Anxiety (7 items), Paranoid Ideation (6 items) and Psychoticism (10 items). Items for each factor are scored only on that factor. Three global scores (indices) can be also obtained (Derogatis, 1994).

The Brief Symptom Inventory (BSI) is another measure of functional somatization. The BSI was first developed by Leonard D. Derogatis in 1982. It contains 53 items rated on a 5-point scale (0 = not at all, 1 = a little bit, 2 = moderately, 3 = quite a bit, 4 = extremely) to reflect respondents' distress during the previous week. Forty-nine of the items have been designed to measure nine specific types of problems: somatization, obsessive-compulsive problems, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, paranoid ideation, and psychoticism. The remaining

four items contribute to three global indices of distress. The somatization factor refers to sensations of tension, weakness, spasms, dizziness, upset stomach, tremors and shivers. These symptoms are mainly included in somatization disorders of the DSM-IV-TR (Ruiperez, Ibanez, Lorente, Moro & Ortet, 2001). The test-retest reliability for the nine scales and the three global subscales ranges high (Hayes, 1997). However, the BSI has a poor discriminant and convergent validity (Boulett & Boss, 1991). Boulett and Boss (1991) suggest that little reliance should be placed on the subscale scores, while a single global score may be a used as an index of psychopathology.

Hayes (1997) administered the BSI to clients from college and university counseling centers. The results suggest that for clients seeking services at college and university counseling centers, the BSI does not seem to measure the nine specific types of psychopathology. For the college student population, a confirmatory factor analysis reflected only marginal support for a nine-factor solution. An exploratory factor analysis revealed six factors, meaning, that the BSI may accurately measure six types of problems in university counseling center clients: depression, somatization, hostility, social comfort, obsessiveness-compulsiveness and phobic anxiety (Hayes, 1997).

The Bradford Somatic Inventory (BSI) is a multi-ethnic inventory of somatic symptoms. The inventory has been developed to measure somatization in anxious and depressed patients, particularly in non-Western societies. The instrument has been normed on individuals from south India and Nepal, and Pakistan. Nine domains of somatic symptoms have been isolated: those affecting the head, chest, abdomen, limbs, back, eyes, ears, genitourinary system and whole body. The BSI holds an eight-factor solution, with four factors (somatic discomfort in the head, chest, abdomen and

experience of fatigue) being similar in the Indian and Pakistani populations (Mumford, 1991). Although used among the populations mentioned above, this instrument has not been normed or used in individuals from the Western hemisphere.

Alexithymia

Kirmayer et al. (1994) acknowledge that studying the interaction of developmental, cognitive, socio-cultural, and personality factors creates a fertile ground for a better understanding of functional somatization in the general population. Specifically, these and other authors (Hendryx et al., 1991; Larsen, 1992) have looked at several characteristics of personality that are highly stable and heritable, and have been linked to the tendency of some individuals to experience functional somatic complaints. One such personality characteristic is alexithymia.

Defining Alexithymia

Lack of emotional expression is one personality characteristic that has been linked to functional somatization. The term alexithymia describes a trait common in individuals with functional somatization. The word alexithymia comes from Greek: a = *lack*, lexis = *word*, thymos = *emotions*, and was created by Sifneos in 1972 (Hendryx et al., 1991). The literal translation of alexithymia is "lacking words for feelings" (Lumley, Gustavson, Partridge & Labouvie-Vief, 2005). Individuals with alexithymia have difficulties in expressing emotions in words, they do not have fantasies expressive of feelings, and their thought content is dominated by details of events in their environment (Kellner, 1990). As cited in Lumley et al. (2005), individuals with alexithymia have a restricted fantasy

life, poor imagination, limited dreaming, and preference for externally focused thoughts rather than psychological introspection.

Lumley (2004) views alexithymia as a deficit rather than a psychological defense. Hendryx et al. (1991) use the term *Alexithymia* to describe the lack of emotional expressiveness in individuals with many somatic complaints. They define this construct as consisting of four features: difficulty identifying and describing feelings, difficulty distinguishing feelings from bodily sensations, lack of imaginative ability and symbolic thinking, and a tendency to think and problem solve in concrete terms. In their study, they investigate the multidimensionality of alexithymia in freshman medical students. To measure alexithymia, the authors used the Toronto Alexithymia Scale (TAS), a 26 self-report questionnaire. Respondents used a five-point Likert scale ranging from strongly agree (1) to strongly disagree (5) to rate each of the statements. Scores on this scale that were above 74 denoted someone who had alexithymia. Scores which were 62 or below denoted someone who did not have alexithymia (Hendryx et al., 1991). A principal component factor analysis of the TAS resulted in four factors: an inability to identify feelings and distinguish them from bodily sensations (Identify Feelings factor), an impoverished fantasy life (Daydreaming factor), an externally oriented cognitive style (External Thinking) and an inability to communicate feelings (Communicate Feelings).

State vs. Trait Alexithymia

Alexithymia has various roots. Kellner (1990) suggests that in some individuals, alexithymia may be a manifestation of a state. An example of that would be a patient who in the midst of having a severe headache may complain to the physician about the physical distress and refrain from introspection about the emotions behind the distress.

Kellner (1990) also suggests that in some individuals, alexithymia may be a cognitive style. People with this trait would focus on and give great meaning to their bodily sensations rather than their psychological processes.

Hendryx et al. (1991) differentiate between state and trait alexithymia. State alexithymia may occur in response to perceived stress and generalized anxiety, and may be transitory. In their study, state alexithymia appeared to be a specific response to generalized anxiety and psychological distress in freshman medical students. Students from this study would develop a feeling-specific alexithymia in order to protect themselves from continuous experience of distress in anxiety-provoking situations (Hendryx et al., 1991).

Lumley (2000) refers to state alexithymia as secondary alexithymia-a defense or strategy to cope with emotional pain, aversive memories, and physiological arousal. The author suggests that alexithymia often serves as a strategy to cope with distress, particularly among individuals who have experienced trauma. The author also argues that while with time the distress in individuals who suffered trauma may decrease, their alexithymia may not, thus supporting the hypothesis that alexithymia may be more pervasive and stable (Lumley, 2000). Most research studies have looked at alexithymia as a general, stable, non-transitory personality characteristic that may influence the individual's tendency to attribute somatic sensations to somatic illness rather than to emotional or interpersonal conflict.

Prevalence of Alexithymia

Information on prevalence of alexithymia is limited to studies which have investigated the presence of this trait among European and Canadian populations.

Salminen, Saarijarvi, Aarela, Toikka and Kauhanen (1999) examined the prevalence of alexithymia and its association with sociodemographic variables on a sample representing the general population in Finland. They administered the 20-Item Toronto Alexithymia Scale (TAS-20) to 1,285 subjects. The overall prevalence of alexithymia in their sample was 12.8%, with prevalence of 16.6% among men and 9.6% among women. The authors suggest that alexithymia may be present in healthy and unhealthy individuals, and that it should be treated as a dimensional construct rather than a categorical variable. In a nonclinical sample of Finnish individuals, the authors report low prevalence of high alexithymia (4.1%) and slightly higher prevalence of moderate alexithymia (21%). The results also reveal a significant association between alexithymia and the following sociodemographic variables: male gender, low educational level, low socioeconomic status, and advanced age (Salminen et al., 1999).

As cited in Le, Berenbaum and Raghavan (2002) alexithymia is normally distributed throughout the population. Cross-cultural studies are necessary for determining the generalizability of alexithymia across cultures. Dion (1996) questions whether alexithymia is an emic construct and applies to only one culture, or an etic construct and applies universally to all cultures. He emphasizes the necessity of standardization of measures of alexithymia in multiple languages and in various cultures so that this construct can be compared cross-culturally.

Mason et al. (2005) examined the presence and correlates of alexithymia among undergraduate students. The authors report a prevalence of 17.1% in France, 18.8% in Canada and 13% in Finland, assessed using the cutoff score of 61 on the 20-Item Toronto Alexithymia Scale (TAS-20). In their study, they examined the difference in presence of

alexithymia among male and female students in the arts and natural sciences majors. The prevalence of alexithymia among their sample of students was 18%, with highest prevalence among female students in the natural sciences (Mason et al., 2005). In their study of children and their primary caregivers, Mason et al. (2005) find that low caregiver's care is linked with high alexithymia in the child. The authors argue that the caregiver's capacity for reflective self-awareness and ability to accurately identify the infant's emotional and mental states and respond appropriately could be linked with the child's capacity to reflect and make sense of their own and other people's feelings (Mason et al., 2005).

Dion (1996) examined the potential variations in scores on the TAS-20 with respect to its four dimensions among university men and women from different ethnic backgrounds in Toronto, Canada. The author specifically studied alexithymia in native English speakers and non-native English speakers. The results of this study reveal two contrasts. Among native English speakers, women scored higher on difficulty identifying feelings than did men. Among men, non-native English speakers reported greater difficulty in identifying feelings than did native English speakers (Dion, 1996). Native Chinese language speakers scored higher than native English or native European language speakers on all four dimensions of alexithymia. Native English speakers scored higher on the overall TAS-20 score and the impoverished fantasy life dimension than native speakers of European languages. Native English speakers did not differ from native speakers of European languages on inability to identify feelings and externally oriented thinking dimensions (Dion, 1996).

Dion (1996) offers a socio-cultural explanation for the high alexithymia among Chinese-speaking students. He suggests that the personality trait of alexithymia is fostered among ethnic Chinese because the Chinese culture strongly encourages somatic expression and description of emotional states. Psychological mindedness is a product of the Western-European segments of the Canadian and North-American cultures. Dion (1996) does not exclude the possibility of lower emotionality and emotional lability in ethnic Chinese in comparison to Caucasians.

Le et al. (2002) conducted two studies examining the relationship between culture and alexithymia. They focused on two cultures, Western (European Americans) and Eastern (Asians in the United States and Asians from Malaysia). They studied the link between alexithymia and parental socialization of emotions, the processes by which parents socialize children about the experience and expression of emotions, among the above-listed cultural groups. To measure alexithymia in all of its dimensions, the authors used the TAS-20. To measure parental socialization of emotion, they used an interview specifically designed for their study. The interview was to measure physical affection, avoidance and verbalization of emotions of both parents of respondents.

Le et al. (2002) confirm the hypothesis that culture relates to the ability to identify and communicate emotions. In their study, Asian Americans and Malaysians scored higher on alexithymia in comparison to European Americans (Le et al., 2002). The authors also suggest that culture and gender do not have a strong direct effect on alexithymia, but rather have an indirect effect via shaping parental socialization of emotion. Namely, Asian American parents were less likely than European American parents to display physical affection and verbalize positive emotion. Men in this sample

were more likely than women to report that their parents displayed less physical affection. Parental socialization of emotions was indirectly associated with alexithymia. Alexithymia is associated with social and family environments that do not encourage the ability to identify and communicate emotions (Le et al., 2002).

Alexithymia and Human Development

Alexithymia has been used to describe the psychology of emotions and the distinction between emotional processing and meta-emotional processing. Most research has thus far focused on how we process events physiologically, behaviorally and cognitively (Lundh, Johnsson, Sundqvist & Olsson, 2002). Meta-emotional processing involves identifying, labeling, and describing emotions; remembering emotions; reasoning about emotions that one may feel in various hypothetical situations; analyzing the emotional consequences of various kinds of behaviors; empathizing with others' emotional experiences, etc. (Lundh et al., 2002). The Toronto Alexithymia Scale (TAS-20) has specifically been used to measure deficits in meta-emotional functioning.

To confirm the hypothesis that individuals with high alexithymia scores have deficits in meta-emotional functioning, Lundh et al. (2002) studied the association between TAS-20 and other measures of meta-emotional functioning such as: Beck Depression Inventory (BDI), Karolinska Scales of Personality (KSP), Anxiety and Social Desirability Scales, and the Autobiographical Memory Test. The authors argue that alexithymia should involve an impaired capacity to remember emotions, because to the extent an individual has difficulty identifying and describing emotions, he or she is likely to use few emotional concepts when encoding emotional episodes in memory. The more alexithymic an individual, the more difficult it will be for him or her to retrieve memories

of situations where various emotions were experienced, and the longer it will take to retrieve such memories. The results of their study do not support this conceptualization. The findings of this study suggest that TAS-20 measures people's self-evaluation of meta-emotional functioning, rather than meta-emotional functioning (Lundh et al., 2002).

We can tie the understanding of alexithymia as emotional deficit to the significance of the developmental function of emotions. The Differential Emotional Theory (DET) has been widely used to explain the functions of emotions during the course of individual development (Abe & Izard, 1999). Its core principle is that emotions serve developmentally adaptive functioning during the course of individual development, such that certain emotions become more prominent in a particular period of life to facilitate progress in the developmental task of that period. Emotions stimulate social-cognitive advances in numerous ways. Emotions prompt social interactions and reevaluation of one's expectations or behaviors. Emotions also stimulate emotion representations and knowledge (Abe & Izard, 1999).

The emotion system represents a set of adaptive characteristics that facilitate responses to adaptive challenges. There are a limited number of basic human emotions, each of which has distinct neurophysiological, phenomenological, and motivational properties. The emotional system is developmentally plastic such that its components contribute to change as well as constancy across the life span. As emotional regulation is acquired in humans, the linkages between emotion, cognition and behavior emerge. The expression of emotions is modified and the emotion system becomes more complex (Magai, Consedine, Krivoshekova, Kudadije-Gyamfi & McPherson, 2006). With cognitive maturation and the development of more elaborate cognitive networks during

adulthood, one might expect age-related improvements in the ability to anticipate the emotional responses of self and others. Older adults, for example, may be more skilled in social expression of emotions than younger adults. Knowing that alexithymia is characterized by difficulty in expressing and identifying feelings in self and others, we may argue that from a DET perspective, it is psychologically adaptive that individuals have less alexithymia and less meta-emotional deficit. From a DET perspective, low alexithymia could be very important for the psychological wellbeing, emotional regulation and emotional expressiveness.

Identifying and expressing emotions is a process which starts at birth, and continues and intensifies in late adolescence and early adulthood. University students, who are the target population of this study, go through the formal operational stage of cognitive development (Piaget, 1988). A university student in the formal operational stage of cognitive development encounters many college-related experiences that foster thinking abstractly, recognizing own emotions and emotions of others, and reflecting on own emotions. College experiences foster the development of formal operational thinking, and therefore, the development of ability to identify and express feelings as well as development of internally (reflective thinking) rather than externally oriented thinking. The psychosocial theorist Arthur Chickering identifies seven vectors of development in university students: achieving competence, managing emotions, moving through autonomy toward interdependence, developing mature interpersonal relationships, establishing identity, developing purpose, and developing integrity (Pascarella & Terenzini, 2005). The managing emotions vector or developmental task can be directly related to the development and refinement of the ability to identify and express emotions.

Managing emotions is about learning to control impulses, respond to emotions appropriately, and handling intense emotional states. It is about recognizing and dealing with negative emotions such as anger, fear, anxiety, depression, guilt, or shame; as well as developing an increased capacity to experience feelings such as sympathy, relief, caring, and optimism (Pascarella & Terenzini, 2005). In the process of learning how to manage emotions, individuals have potential to learn how to identify own feelings and express them verbally. Adult role models such as parents, university counselors, academic advisors, mentors, and professors serve an important role in helping university students reach this developmental task, expressing emotional conflict verbally and recognizing own emotional states. The cognitive and psychosocial processes which occur in college-age individuals are significant in contributing to the development or prevention of alexithymia.

Measuring Alexithymia

The 26-item Toronto Alexithymia Scale (TAS) was developed in 1985 as the first reliable and valid self-report measure of the alexithymia construct. It was modified in 1992 to develop a revised and improved twenty-item version called the 20-Item Toronto Alexithymia Scale (TAS-20). The TAS-20 has become the most widely used measure of the alexithymia construct (Taylor, 2006, personal website). The TAS-20 was developed using a combined empirical and rational method of scale construction with the items written to reflect the theoretical dimensions of alexithymia. It is a self-report scale comprised of 20 items. Each item is rated on a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The TAS-20 yields three factors: *difficulty identifying feelings (DIF), difficulty describing feelings (DDF),* and *externally oriented*

thinking (EOT). The first factor consists of seven items assessing the ability to identify feelings and distinguish them from the somatic sensations that accompany emotional arousal. The second factor consists of five items assessing the ability to describe feelings to other people. The third factor consists of eight items assessing externally oriented thinking. Items assessing fantasy and imaginal thinking, which are decreased in individuals with alexithymia, were eliminated during the development of the TAS-20 primarily because of their high correlations with measures of social desirability. Thus, reduced fantasy and imaginal activity are assessed indirectly by the externally oriented thinking factor (Parker, Taylor & Bagby, 2003).

Swift, Stephenson and Royce (2006) used the TAS-20 among physiotherapy outpatients to confirm the three-factor structure of the measure. The authors used a cutoff score of 61 on this measure to differentiate between individuals with and individuals without alexithymia. Although their study supports the three-factor structure of the TAS-20, the authors argue for the careful application of this scale as a total measure of alexithymia. Waller and Scheidt (2003) argue that it is paradoxical to ask individuals with alexithymia who are characterized by a diminished affective insight to give an accurate estimation of their affective disturbances. They speculate that the TAS-20 identifies two groups of individuals with alexithymia that vary along two dimensions: an affective and a cognitive-attentional. The affective dimension portrays the absence of affect, while the cognitive-attentional dimension portrays the absence of structure for regulating affect (Waller & Scheid, 2003).

In their study, Waller and Scheid (2003) assessed alexithymia in patients diagnosed with somatization disorder. The authors used the TAS-20 and two other non-

self-report measures: the Affect Consciousness Interview (ACI) and the Levels of Emotional Awareness Scale (LEAS). The ACI operationalizes affect consciousness in degrees of awareness, tolerance, emotional and conceptual expression across nine basic affect categories. It is a semi-structured interview designed to assess a person's capacity to consciously be aware of, tolerate and express feelings across the following affect categories: interest, joy, fear, anger, rage, shame, sadness, envy, guilt and tenderness. Affect consciousness has four affect dimensions: the capacity to be aware of one's own emotions, the capacity to tolerate feelings, the capacity to nonverbally express feelings, and the capacity to conceptually express inner emotional states (Waller & Scheid, 2003).

The LEAS consists of 20 emotion-evoking scenarios, each involving two people. Two questions are asked: "How would you feel?"(self) and "How would the other person feel?"(other). Emotion words relating to self and other are scored separately for each scene on a five-point scale. The LEAS is based on Piaget's theory of cognitive development, symbolization and language development. The Levels of Emotional Awareness model postulates five levels of emotional organization ranging from globally organized somatic levels to increasingly differentiated organized symbolic levels (Waller & Scheid, 2003).

Lumley et al.(2005) discuss another non-self-report method to assess alexithymia-the Beth Israel Hospital Psychosomatic Questionnaire (BIQ). The BIQ is a 12-item questionnaire that assesses the affective and cognitive facets of alexithymia. The questionnaire has mainly been used to validate other alexithymia measures. It provides a total alexithymia score and scores on two 6-item subscales: affect awareness and operatory thinking. Items are rated from 1 (not true) to 7 (very true), and are summed for

each subscale and for the total scale, with higher scores indicating greater alexithymia (Lumley et al., 2005).

Authors have argued that the TAS-20 does not completely capture the dimensions of alexithymia. Such arguments have resulted from lack of consensus as to how alexithymia is defined and conceptualized (Morera, Culhane, Watson & Skewes, 2004). As result, the Bermond-Vorst Alexithymia Questionnaire (BVAQ-40) was developed. The BVAQ-40 is a 40-item questionnaire that consists of five subscales: analyzing, verbalizing, identifying, emotionalizing and fantasizing. The emotionalizing subscale measures the degree to which a person is aroused by emotional events. The fantasizing subscale measures the tendency for a person to engage in fantasies, daydreams or other imaginative thoughts. The identifying subscale measures the person's ability to define his or her emotional arousal states. The analyzing subscale measures the person's interest in seeking out explanations for his or her emotional reactions. Finally, the verbalizing subscale measures the person's inclination to describe or communicate emotions. All items on the BVAQ-40 are five-point Likert-type items, ranging from "this definitely applies to me" to "this in no way applies to me" (Morera et al., 2004).

Bagby and Taylor (1991) examined the Minnesota Multiphasic Personality Inventory Alexithymia Scale (MMPI-2-Alexithymia) which originates from the MMPI-2. The MMPI-2 is a 567-item personality inventory that consists of: seven validity indicators, 10 clinical scales, 15 supplementary scales, two post-traumatic stress disorder scales, 15 content scales, three Si subscales and 28 Harris-Lingoes subscales (Butcher et al., 1989). The MMPI-2-Alexithymia scale consists of 22 items. Bagby and Taylor (1991) extracted the MMPI-2-Alexithymia items from a computerized MMPI data bank which

included separate samples of psychiatric inpatients and outpatients. Factor analysis produced factors that were poorly related to the theoretical domains of the alexithymia construct. The authors found no support for validity of the scale because patients with alexithymia did not differ from patients without alexithymia on several theoretically relevant scales. The authors question the value of the MMPI-2-Alexithymia in measuring the alexithymia construct (Bagby & Taylor, 1991).

Lastly, another measure of alexithymia that has proven to be valid and reliable, but has not been used in Canada and the U.S. is the Amsterdam Alexithymia Scale (AAS). The AAS is a 20-item self-report scale that has a stable five-factor structure. It measures five defining features of alexithymia: difficulty in experiencing emotions, difficulty in fantasizing, difficulty in analyzing emotions, difficulty in differentiating between emotions and difficulty in verbalizing emotions. Bermond, Vorst, Vingerhoets and Gerittsen (1999) find support for the reliability and validity of this scale. Namely, their factor analysis confirms that alexithymia is associated with a neglect of own needs and impulses, a reduced capability to understand social situations, tendency to stick to rules rigidly, social isolation, submissiveness, avoidance of commitment, and lack of personal meaning in life (Bermond et al., 1999).

Alexithymia and Psychopathology

Alexithymia has also been linked to mental well-being and mental illness. Hendryx et al. (1991) hypothesize that as a multidimensional construct, alexithymia may be state-dependent, particularly in individuals with depression and anxiety. The authors investigated the multidimensionality of alexithymia in freshman medical students and examined the relationship of its four dimensions to depression and anxiety. All

participants of this study completed the TAS and measures of anxiety and depression. According to their findings, depression and anxiety are particularly related to difficulty with identifying and communicating feelings. The authors argue that alexithymia may not be a response to depression, but rather a response to generalized anxiety and stress from which depression may result. Thus, alexithymia in an individual with depression and generalized anxiety may develop as a defense mechanism, a protection from specific stress-inducing emotions. An individual could have depression, anxiety and alexithymia, and has blocked awareness of specific stress-related emotional states. Alexithymia in individuals with depression and anxiety may be transitory (Hendryx et al., 1991).

Bach, Bach, Bohmer and Nutzinger (1994) studied the presence of alexithymia in hospitalized individuals with comorbidity of functional somatization and other mental illnesses. More specifically, the findings of their study reveal a relationship between alexithymia and obsessive compulsiveness in female participants who had functional somatic symptoms. To measure alexithymia, Bach et al. (1994) used the TAS. To measure functional somatization and obsessive compulsive tendencies, the authors used the Hopkins Symptom Checklist 90-Revised version (SCL-90R). Forty two percent of participants with functional somatization scored high on alexithymia. Individuals with obsessive compulsive tendencies were more likely to be rigid, with externally oriented thinking and restricted affect. They scored high on the external thinking dimension of alexithymia (Bach et al., 1994). The study also confirms a relationship between alexithymia and depression, eating disorders and post-traumatic stress disorder. Presence of alexithymia in individuals with impaired social assertiveness and interpersonal dependency suggests a relationship between this construct with many other mental illness

diagnoses: personality disorders, social phobia, etc. Bach et al. (1994) also argue the presence of "secondary" alexithymia in individuals with mental illness as a coping response to severe distress.

Bankier et al. (2001) did a comparative evaluation of alexithymia in hospitalized individuals with somatoform disorder, panic disorder, obsessive compulsive disorder and depression, while accounting for the multidimensionality of this construct. To measure alexithymia, the authors used the TAS-20. To measure symptoms identifying the above-liested disorders, they used the Structured Clinical Interview (SCID-I). In individuals with somatoform (pain disorder) disorder, the difficulty in identifying feelings and distinguishing them from bodily sensations dimension of alexithymia strongly related to somatoform disorder. The difficulty in expressing feelings dimension did not relate to somatoform disorder. The results of their study also suggest that all components of alexithymia are strongly related with panic disorder, while only the externally oriented thinking dimension of alexithymia related to obsessive compulsive disorder. Depression was significantly related with the difficulty in expressing feelings dimension of alexithymia (Bankier et al., 2001).

Kauhanen et al. (1996) studied the association between alexithymia and risk of death from all causes, in a general population sample of Finish men. The authors found a strong association between high levels of alexithymia and the risk of death in their sample of middle-aged men. The risk of death from external causes, such as injury, suicide, and homicide was increased in men with high alexithymia in comparison to men with low alexithymia. The authors also report men with high alexithymia from their

sample to be more socially isolated. Thus, social isolation could mediate the relationship between high alexithymia and mortality (Kauhanen et al., 1996).

Lumley et al. (1996) also argue that individuals with high alexithymia have more difficulties with establishing stable interpersonal relationships, have decreased social support, which in turn leads to physical and mental illness. The findings of their study confirm that alexithymia, specifically the difficulty in identifying and communicating feelings, is associated with less perceived social support and small social networks. Individuals who had difficulty communicating their feelings had fewer intimate relationships. Such individuals lacked social skills, which in turn interfered with forming close relationships. Individuals who had difficulty identifying feelings perceived themselves as not receiving social support. These findings support the relationship between facets of alexithymia, and social isolation and perceived lack of social support (Lumley et al., 1996).

Alexithymia and Somatization

Suppression of emotional expression and the inability to cognitively elaborate emotional conflict have been linked to functional somatization and psychosomatic illness. Gross and Levenson (1993) describe suppression of emotional expression as a conscious act of inhibition of an emotionally expressive behavior in the presence of physiological arousal. The authors argue that overt expression of an emotional experience is just as important as the subjective experience of an emotion or the physiological arousal that comes with it. In the absence of overt emotional expressiveness, changes in physiological arousal may occur. Long-term changes in physiological arousal due to lack of emotional

expressiveness may lead to physiological changes or somatic sensations that the individual interprets as discomfort or pain (Gross & Levenson, 1993). This supports the connectedness between the body (physiological arousal and changes) and psychological processes (overt emotional expressiveness).

Kelley et al. (1997) examined the effects of emotional disclosure of stressful events on the pain, physical and psychological health of patients with rheumatoid arthritis. Patients in their study were randomly assigned to talk privately about stressful events or about trivial topics for four consecutive days. Disclosure resulted in immediate increases in negative mood. At three months of disclosure, however, patients had less psychological disturbance and better physical health (Kelley et al., 1997). The authors argue that the physical complaints of people may be either caused or exacerbated by somatization. They view functional somatization as the experience and communication of emotional distress in somatic language. Their findings suggest that patients who are given the opportunity to disclose and process stressful life events for a prolonged period of time, report better physical functioning and positive emotional states (Kelley et al. 1997).

Lumley et al. (1996) discuss the relationship between the subjective report of physical symptoms (illness behavior) and alexithymia. They suggest that functional somatic experiences such as headaches or irritable bowl syndrome are manifested as illness behavior that is disproportionate in comparison to an actual somatic dysfunction. The authors propose a model which depicts cognitive and social pathways through which alexithymia may influence reports of physical symptoms in individuals with functional somatization. The authors suggest that people with alexithymia may be excessively attuned to their bodies and amplify bodily sensations. They argue that individuals with

alexithymia may have the disposition for negative affectivity which in turn leads to complaints about negative physical experiences and excessive symptom reporting. Lumley et al. (1996) also argue that alexithymia can be linked to reduced social support and impaired interpersonal relationships. Thus, disturbed social relationships directly influence illness behavior, by promoting complaints and seeking health care. Alexithymia is related more to illness behavior, such as symptom reports, pain, and mood problems than it is to organic change (Lumley et al., 1996).

In their meta-analytical review, De Gucht and Heiser (2003) report that the impaired emotional processes underlying alexithymia may lead to: misinterpretation of somatic sensations as caused by a somatic condition rather than psychological distress, experience of negative emotional states and general dissatisfaction, and heightened physiological responses that lead to either psychosomatic illness or greater reporting of somatic discomfort. The analysis of multiple studies reveals a small to moderate relationship between alexithymia and somatic symptom reporting. Specifically, in most studies, high levels of alexithymia related to high rates of reporting functional somatic symptoms. The difficulty identifying feelings dimension of alexithymia had the strongest association with number of somatic symptoms reported, suggesting that this dimension may be a better predictor of functional somatization than general alexithymia (De Gucht & Heiser, 2002).

Cohen, Auld and Brooker (1994) go further into elaborating the relationship between alexithymia and functional somatization. Their research sought to examine the relationship among alexithymia, psychosomatic disease and expression of physical signs and symptoms in in-patients with high functional somatization, psychiatric outpatients,

and a comparison group of dental patients. Inpatients with high functional somatization complained of bodily symptoms that could not be explained by organic pathology. The majority of individuals with high functional somatization suffered from some form of chronic pain. To measure alexithymia, the authors used the TAS. They measured somatization via the Somatic Complaints subscale of the Minnesota Multiphasic Personality Inventory (MMPI) Hysteria scale. Findings revealed a significant relationship between alexithymia and the tendency to experience and report physical signs and symptoms. Cohen et al. (1994) suggest that although functional somatization is symptomatic of alexithymia, psychosomatic illness may not be. The authors argue that alexithymia is not the cause or effect of physical illness, but rather a pattern that includes the tendency to report and experience physical signs and symptoms.

De Gucht, Fischler and Heiser (2003) investigated the presence of alexithymia and functional somatization among nurses working in a university hospital. They measured general somatization and three functional somatic syndromes: functional dyspepsia-chronic and recurrent upper abdominal complaints, irritable bowl syndrome-chronic and recurrent lower abdominal complaints, and chronic fatigue using self-report symptom questionnaire based on DSM symptoms for somatization disorder. The authors measured alexithymia using the TAS-20. The results of their study suggest the difficulty identifying feelings dimension of alexithymia to be a better predictor of a consistent presence of a high number of medically unexplained symptoms in comparison to general alexithymia. The authors suggest that the difficulty identifying feelings dimension of alexithymia predisposes people to the development of more severe and more enduring forms of functional somatization (De Gucht et al., 2003).

Lundh and Simonsson-Sarnecki (2001) distinguish between a stronger and a weaker hypothesis about the relationship between alexithymia and functional somatization. According to the stronger hypothesis, alexithymia should correlate with somatic complaints rather than emotional complaints. According to the weaker hypothesis, alexithymia should relate to somatic complaints when emotional distress is controlled for, meaning that emotional distress mediates the relationship between alexithymia and functional somatization. In their study, the authors measured the relationship between alexithymia and functional somatization in the general population, using the TAS-20, the Body Consciousness Scale (BCS), the Somatosensory Amplification Scale (SAS) and the Illness Attitude Scale (IAS). The results of their study revealed no evidence of an association between alexithymia and functional somatization, particularly when controlling for negative affective states were controlled for. Lundh and Simonsson-Sarnecki (2001) suggest that somatic complaints should not be interpreted as coming from the individual expressing distress in somatic rather than emotional terms. They argue that the relationship between alexithymia and functional somatization is mediated by negative affect. One explanation of no direct relationship between functional somatization and alexithymia is the difficulty of measuring alexithymia via self-report. Namely, individuals who have alexithymia may be unaware of their inability to describe and understand their emotions, and may not be able to report that deficit (Lundt & Simonsson-Sarnecki, 2001). The above-summarized results suggest that there is a discrepancy in findings regarding the relationship between alexithymia and functional somatization.

Summary

Studies of the relationship between alexithymia and functional somatization are inconsistent with regards to the following: the magnitude of the relationship between the two constructs and whether the relationship between the two constructs is mediated by other biopsychosocial variables. The above-summarized evidence suggests a relationship between alexithymia and functional somatization in community samples and among individuals diagnosed with mental disorders. Considering the multidimensionality of alexithymia, there is more evidence supporting a strong relationship between the difficulty identifying feelings dimension of alexithymia with functional somatization. There is limited evidence for the magnitude and direction of the relationship between functional somatization and the difficulty expressing feelings and externally oriented thinking dimensions of alexithymia. Thus, this research study investigated the relationship between each of the dimensions of alexithymia and functional somatization.

III. METHOD

Participants

The 105 participants in this study were obtained from a mid-size state university situated in a mid-western state of the United States. Participants enrolled in undergraduate courses offered by the Department of Counseling Psychology and Guidance Services (CPSY) at this university were representative sample from this institution. Students enrolled in undergraduate CPSY courses came from all majors and different departments; therefore, they were appropriate representatives of the undergraduate student body at this university.

A total of 107 participants decided to take part in this study. Two participants did not complete the SCL-90-R in their research packet; therefore, they were excluded from the final data entry and analysis. The final sample for data analysis and interpretation consisted of 105 participants. Of those, 68.6% (n = 72) were female and 31.4% (n = 33) were male. The mean age for participants was 21.13, with the youngest participants being 18 years of age, and the oldest participant being of 35 years of age. A large majority of participants (n = 40) were 21 years of age. In terms of ethnicity, of the 105 participants, 86.7% (n = 91) identified as White, 8.6% (n = 9) as Black, 2.9% (n = 3) as Other and 1.9% (n = 2) as Hispanic. In the category Other, one participant identified as Puerto Rican, another as Biracial/White and Black, and the third as Arabic.

Procedure

The primary investigator collected the data while completing a predoctoral internship in Psychology at Ball State University Counseling Center. The CPSY department head gave consent to use the departmental subject pool system for recruitment of participants. Proposal protocols were submitted to the Institutional Review Boards at Auburn University and Ball State University. Once the protocols for the study were approved by the two IRBs, the primary investigator posted sign-up sheets at the CPSY department office for students enrolled in the department's courses to sign up for participation (see Appendix A). Participants were informed of the time, date and room of data collection through the sign-up sheet. Participants below the age 18 were provided the option to obtain and have a Parental Permission/Child Assent form (see Appendix D) signed in order to participate in the study. Participants were also informed that they would earn one research credit hour for participation in the study through the sign-up sheet.

Data collection occurred on the Ball State University campus, at the building Teachers College, in a classroom reserved for data collection. The approximate time needed for filling out the entire packet was thirty-five minutes. At the time and date of participation, participants received a questionnaire packet containing the following: an information letter the participant would keep after completing the packet (see Appendix B); a Demographic Form (see Appendix C); the Twenty-Item Toronto Alexithymia Scale (TAS-20) (see Appendix E); and the Symptom Checklist-90-Revised (SCL-90-R) (see Appendix F). At the time of participation, participants were orally reminded not to include any identifying information on any of the questionnaires in their research packet.

Each participant obtained a packet with the measures arranged in random order. Participants did not receive a consent form in the packet because the study was anonymous. Upon completion, participants were informed to keep the information letter and were also given debriefing information about the study. When completed packets were returned, all measures in the packet were assigned a digit code for the purposes of data entry and analysis.

Measures

The measures that were used in this study are the Demographic Form, the Symptom Checklist-90-Revised (SCL-90-R) (Derogatis, 1979), and the 20-item Toronto Alexithymia Scale (TAS) (Taylor, Bagby & Parker, 1992).

Demographic Form

The primary investigator used a simple demographic form (see Appendix C) asking participants to report their gender, age and race/ethnicity. Participants were asked to identify their name. Rather then selecting from provided options for identifying their ethnicity, participants were given the opportunity to write down the ethnic origin they identify with.

Symptom Checklist-90-Revised (SCL-90-R)

The Symptom Checklist-90-Revised (SCL-90-R) has most commonly been used in studies investigating functional somatization among populations in the U.S. There is no existing measure standardized for populations in the U.S., which measures functional somatization alone. The SCL-90-R is a 90-item self-report symptom inventory designed by Leonard D. Derogatis in 1979, and it is a measure of current, point-in-time,

psychological symptom status (Derogatis, 1994). Instructions ask the participant to indicate for each problem and complaint "how much discomfort that problem has caused you" during the indicated period of time; there is a box next to each item for writing in a number from 0 to 4, indicating respectively, not at all, a little bit, moderately, quite a bit, and extremely. The manual of the checklist gives the standard time set as the "past seven days including today"; however, a time window of up to 14 days does not seem to significantly affect the clinical profile. According to the manual, it takes 12-15 minutes to respond to the 90 items, under usual circumstances (Derogatis, 1994).

The SCL-90-R has been normed on: adult psychiatric inpatients and outpatients, adult nonpatients and adolescent nonpatients. The reliability of the SCL-90-R is reported for internal consistency and test-retest, with satisfactory results in both instances. Internal consistency coefficients range from a low of .77 for Psychoticism to a high of .90 for Depression (Derogatis, 1994). Test-retest reliability coefficients range between .80 and .90, which is an appropriate level for measures of symptom construct. The lowest test-retest coefficients reported is .68 for Somatization and the highest test-retest coefficient reported is .83 for Paranoid Ideation (Derogatis, 1994). The SCL-90-R has highly acceptable levels of convergent-discriminant validity. Its dimensions have highest correlations with like MMPI constructs, and the dimensions of the Crown-Crisp Experiential Index. The SCL-90-R has well established concurrent validity. The Depression dimension of the scale has high correlations with the Center for Epidemiologic Studies Depression Scale (CES-D) and the Hamilton Rating Scale of Depression (Derogatis, 1994). Its global scores have high correlations with the total scores of the Social Adjustment Scale-Self-Report (SAS-SR). The convergent validity of

the somatization scale of the SCL-90-R has been confirmed. The 36 intercorrelations among the nine SCL-90-R scales range from .41 to .74, with an average of .58 (Derogatis, 1994).

The SCL-90-R consists of 90 symptoms, each described briefly and simply (e.g., "Pain in heart or chest", "Blaming yourself for things"). Subjects are asked to report how much discomfort each symptom has caused them within the last week by rating them on a 5-point scale from 0 (not at all) to 4 (extremely). Scores on this instrument are obtained on nine factors: Somatization (12 items), Obsessive-Compulsive (10 items), Interpersonal Sensitivity (9 items), Depression (13 items), Anxiety (10 items), Hostility (6 items), Phobic Anxiety (7 items), Paranoid Ideation (6 items) and Psychoticism (10 items). Items for each factor are scored only on that factor. Three global scores (indices) can be also obtained. The Global Severity Index (GSI) is the average rating given to all 90 items. The Positive Symptom Total (PST) is the number of symptoms reported. The Positive Symptom Distress Index is the average rating, from 1 to 4, given to those symptoms which are reported. The following are symptoms of the Somatization dimension on the SCL-90-R: headaches, faintness or dizziness, pains in heart or chest, pains in lower back, nausea or upset stomach, soreness of your muscles, trouble getting your breath, hot or cold spells, numbness or tingling in parts of your body, a lump in your throat, feeling weak in parts of your body, and heavy feelings in your arms or legs (Derogatis, 1994).

Twenty-Item Toronto Alexithymia Scale (TAS-20)

The 26-item Toronto Alexithymia Scale (TAS) was developed in 1985 as the first reliable and valid self-report measure of the alexithymia construct. It was modified in 1992 to develop a revised and improved twenty-item version called the 20-Item Toronto

Alexithymia Scale (TAS-20). The TAS-20 has become the most widely used measure of the alexithymia construct (Taylor, 2006, personal website). The TAS-20 was developed using a combined empirical and rational method of scale construction with the items written to reflect the theoretical dimensions of alexithymia. It is a self-report scale comprised of 20 items. Each item is rated on a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree).

The TAS-20 yields three factors: *difficulty identifying feelings (DIF), difficulty describing feelings (DDF) and externally oriented thinking (EOT).* The first factor consists of seven items assessing the capacity to identify feelings and distinguish them from the bodily sensations that accompany emotional arousal. Factor 1 accounted for 12.60% of the total variance and 40.6% of the common variance. The second factor consists of five items assessing the ability to describe and communicate feelings to other people. Factor 2 accounted for 9.63% of the total variance and 31.1% of the common variance. The third factor consists of eight items assessing externally oriented thinking. Factor 3 accounted for 8.75% of the total variance and 28.2% of the common variance. Items assessing fantasy and imaginal thinking, which are decreased in individuals with alexithymia, were eliminated during the development of the TAS-20 primarily because of their high correlations with measures of social desirability. Thus, reduced fantasy and imaginal activity are assessed indirectly by the externally oriented thinking factor (Bagby et al., 1994; Parker, et al., 2003).

The TAS-20 demonstrates acceptable internal consistency (Cronbach's alpha = 0.81). The test retest reliability of the instrument is 0.77. Bagby et al. (1994) report that the three-factor structure of the TAS-20 is stable and replicable across clinical and

nonclinical populations. Factor 1 correlates strongly with Factor 2, which is to be expected since the ability to communicate feelings is contingent on the ability to recognize one's own feelings. Similarly, Factor 2 and 3 are correlated, and reflect a cognitive style that shows a preference for the external details of everyday life rather than thought content related to feelings, fantasies and other aspects of a person's inner experience.

Swift et al. (2006) used the TAS-20 among physiotherapy outpatients to confirm the three-factor structure of the measure. The authors used a cutoff score of 61 on this measure to differentiate between individuals with and individuals without alexithymia. Although their study supports the three-factor structure of the TAS-20, the authors argue for the careful application of this scale as a total measure of alexithymia. Waller and Scheidt (2003) argue that it is paradoxical to ask individuals with alexithymia, who are characterized by a diminished affective insight, to give an accurate estimation of their affective disturbances. They speculate that the TAS-20 identifies two groups of individuals with alexithymia that vary along two dimensions: an affective and a cognitive-attentional. The affective dimension portrays the absence of affect, while the cognitive-attentional dimension portrays the absence of structure for regulating affect (Waller & Scheid, 2003).

IV. RESULTS

Variables and Statistical Analyses

The variables of interest in this study were functional somatization and alexithymia with its three dimensions: difficulty identifying feelings, difficulty describing feelings and externally oriented thinking. Functional somatization was defined through scores on the Somatization subscale of the Symptom Checklist-90-Revised (SCL-90-R). Alexithymia was defined through a total score on the 20-Item Toronto Alexithymia Scale (TAS-20). The difficulty identifying feelings dimension of alexithymia was defined through a total score obtained on the seven items measuring this dimension. The difficulty describing feelings dimension of alexithymia was defined through a total score obtained on the five items measuring this dimension. The externally oriented thinking dimension of alexithymia was defined through a total score obtained on the eight items measuring this dimension. The independent variable of this study was Alexithymia. The dependent variable of this study was Somatization. Alexithymia, its three dimensions, and functional somatization were measured as continuous variables.

The desired research method for this study was correlational. More specifically, the Pearson correlation coefficient (r) allowed for comparison of the magnitude and direction of the relationship between alexithymia and somatization, as well as the magnitude and direction of the relationship between each of the three dimensions of

alexithymia and somatization. To determine which of the three dimensions of alexithymia contributed most and which of the three dimensions contributed least to functional somatization, the principal investigator used partial correlation (r_p) analysis. Partial correlation allowed for investigating the linear relationship between somatization and each of the three dimensions of alexithymia, while partialling out the effects of the other two dimensions of alexithymia.

To obtain necessary power and effect size, according to Cohen's conventions for effect size and power estimations (as cited in Howell, 1997), for the purposes of this study, the investigator needed a minimum of 80 participants and a maximum of 100 participants. Thus, data from a total of 105 participants was obtained in this study. Although the SCL-90-R is frequently used as a screening measure for psychiatric disorders of nonpsychiatric populations (Derogatis, 1994), scores on Somatization, Anxeity, Depression and Global Severity Index obtained from this study, were not used for diagnostic purposes. In the correlation and partial correlation analyses, no cut off scores differentiating between presence and absence of Alexithymia and Somatization were used. Rather, Alexithymia and Somatization were studied as continuous variables.

Bivariate Correlations

To test the first four hypotheses of this study, correlation coefficients were computed between the following: Somatization and Difficulty Identifying Feelings, Somatization and Diffculty Describing Feelings, Somatization and Externally Oriented Thinking, and lastly, Somatization and Alexithymia. The Pearson *r* correlation coefficient, direction of relationship and strength of relationship (effect size) of *r* are reported below. Correlation coefficients of .10, .30 and .50 irrespective of sign, were by

convention interpreted as small, medium and large coefficients, respectively (Green & Salkind, 2003). The bivariate correlation coefficients are reported in Table 1 (see Appendix G).

To avoid a Type I error, the Boneferroni approach was used to divide the significance *p* level of .05 by 4 (number of correlations in this analysis). Thus, a correlation coefficient would not be considered significant unless its *p* value is less than .013 to be declared significant.

Results confirmed the first hypothesis of this study, H1: People who score high on alexithymia are significantly more likely to report experiencing functional somatic distress. The correlation between Somatization (S) and Alexithymia (A) was significant and of medium size, $r(S, A) = .402$, $p < .013$. The Pearson *r* coefficient indicated a positive relationship of medium strength between S and A. Approximately 16% of the variance of S was accounted for by its linear relationship with A. The results indicated that as participants' scores on Alexithymia increased, their scores on Somatization also increased. Thus, people who scored high on alexithymia, were significantly more likely to report experiencing symptoms of somatization.

Results also confirmed the second hypothesis, H2: People who score high of difficulty identifying feelings are significantly more likely to report experiencing functional somatic distress. The correlation between Somatization (S) and Diffculty Identifying Feelings (DIF) was significant and of medium size, $r(S, DIF) = .421$, $p < .013$. The Pearson *r* coefficient indicated a positive relationship of medium strength between S and DIF. Approximately 18% of the variance of S was accounted for by its linear relationship with DIF. The results indicated that as participants' scores on

Difficulty Identifying Feelings increased, their scores on Somatization also increased. Thus, people who scored high on difficulty identifying feelings were significantly more likely to report experiencing symptoms of somatization.

Results confirmed the third hypothesis, H3: People who score high on difficulty describing feelings are significantly more likely to experience functional somatic distress. The correlation between Somatization (S) and Difficulty Describing Feelings (DDF) was significant and of medium size, r(S, DDF) = .364, $p < .013$. The Pearson r coefficient indicated a positive relationship of medium strength between S and DDF. Approximately 13% of the variance of S was accounted for by its linear relationship with DDF. The results indicated that as participants' scores on Difficulty Describing Feelings increased, their scores on Somatization also increased. Thus, people who scored high on difficulty describing feelings were significantly more likely to report experiencing symptoms of somatization.

Results did not confirm the fourth hypothesis, H4: People who score high on externally oriented thinking are significantly more likely to experience functional somatic distress. The correlation between Somatization (S) and Externally Oriented Thinking (EOT) was not significant r(S, EOT) = .138, $p = .162$. The Pearson r coefficient indicated a positive relationship of small strength between S and EOT. Approximately 2% of the variance of S was accounted for by its linear relationship with EOT, which indicated a very small effect size. People who scored high on externally oriented thinking were not significantly more likely to experience symptoms of somatization.

Partial Correlations

To test the fifth hypothesis of the study, H: The difficulty identifying feelings dimension of alexithymia will contribute a significant amount of unique variance to functional somatization in comparison to the difficulty describing feelings and externally oriented thinking dimensions of alexithymia, a partial correlation analysis was computed. The partial correlation coefficients are reported in Tables 3, 4 and 5 (see Appendix H). A *p* value of less than .017 (Bonferroni correction of significance level of .05 divided by 3-number of partial correlations in this analysis) was required for significance. First, a partial correlation coefficient was computed among Difficulty Identifying Feelings (DIF) and Somatization (S), while partialling out Difficulty Describing Feelings (DDF) and Externally Oriented Thinking (EOT). The partial correlation coefficient was significant when controlling for the two variables, r_p (DIF, S) = .270, $p < .017$. This coefficient indicated a small, positive relationship between DIF and S, while partialling out DDF and EOT.

A partial correlation was also computed among Difficulty Describing Feelings (DDF) and Somatization (S), while partialling out Difficulty Identifying Feelings (DIF) and Externally Oriented Thinking (EOT). The partial correlation coefficient was not significant when controlling for the two variables, r_p (DDF, S) = .142, $p = .152$. The coefficient indicated a small, non-significant relationship. Although Externally Oriented Thinking did not have a significant bivariate relationship with Somatization, a partial correlation was computed among Externally Oriented Thinking (EOT) and Somatization (S), while partialling out Difficulty Describing Feelings (DDF) and Difficulty Identifying Feelings (DIF). The partial correlation coefficient was not significant when controlling

for the two variables, r_p (EOT, S) = .007, p = 994. The coefficient indicated a non-significant, almost nonexistent relationship.

The partial correlational analyses confirmed the fifth hypothesis, and indicated that from the three dimensions of alexithymia, diffculty identifying feelings contributed a significant amount of unique variance to experience of symptoms of somatization, both when the effects of the other two dimensions were and were not partialled out.

Additional Analyses

To enrich the understanding of how Somatization and Alexithymia relate to general emotional distress, Anxiety and Depression, bivariate correlational analyses were computed between these variables to investigate the magnitude and direction of the relationships between these variables. Participants' scores on the SCL-90-R scales indicating Depression and Anxiety lent themselves to computing additional correlation coefficients. The bivariate correlation coefficients are reported in Table 2 (see Appendix G). A corrected significance level of .013 was required for a bivariate correlation coefficient to be declared significant (Bonferroni correction) to avoid Type I error. This significance level was obtained by dividing a significance level of .05 with 4 (total number of correlations in this analysis).

Results also confirmed that people who endorse anxiety symptoms are significantly more likely to experience functional somatic distress and alexithymia. The correlation between Somatization (S) and Anxiety (ANX) was significant and of large size, r(S, ANX) = .719, $p < .013$. The Pearson r coefficient indicated a large positive relationship between S and ANX. Approximately 52% of the variance of S was accounted for by its linear relationship with ANX. The results indicated that as

participants' scores on Anxiety increased, their scores on Somatization also increased. The correlation between Alexithymia (A) and Anxiety (ANX) was also significant and of large size, r(A, ANX) = .527, p < .013. The Pearson r coefficient indicated a large positive relationship between A and ANX. Approximately 28% of the variance of A was accounted for by its linear relationship with ANX. As participants' scores on Anxiety scores increased, their scores on Alexithymia also increased. Thus, people who endorsed anxiety symptoms were significantly more likely to experience alexithymia and symptoms of somatization.

Results also confirmed that people who endorse depressive symptoms are significantly more likely to experience functional somatic distress and alexithymia. The correlation between Somatization (S) and Depression (DEP) was significant and of large size, r(S, DEP) = .594, p < .013. The Pearson r coefficient indicated a large positive relationship between S and DEP. Approximately 35% of the variance of S was accounted for by its linear relationship with DEP. The results indicated that as participants' scores on Depression increased, their scores on Somatization also increased. The correlation between Alexithymia (A) and Depression (DEP) was also significant and of large size, r(A, DEP) = .519, p < .013. The Pearson r coefficient indicated a large positive relationship between A and DEP. Approximately 27% of the variance of A was accounted for by its linear relationship with DEP. As participants' scores on Depression scores increased, their scores on Alexithymia also increased. Thus, people who endorsed symptoms of depression were significantly more likely to experience alexithymia and symptoms of somatization.

Contribution of Depression and Anxiety

To assess whether symptoms of depression and anxiety contribute a significant amount of unique variance to alexithymia and functional somatic distress; two partial correlation analyses were performed. These analyses allowed for determining how each of the two variables (depression and anxiety) contributed to the relationship between alexithymia and somatization. Results confirmed that depression and anxiety contributed a significant amount of unique variance to alexithymia and somatization. The partial correlation coefficients are reported in Table 6 (see Appendix I). A *p* value of less than .025 was required for significance (corrected *p* value with Bonferroni approach).

First, a partial correlation coefficient was computed between Alexithymia (A) and Somatization (S), while holding Depression (DEP) constant. The partial correlation coefficient was not significant when controlling for D, r_p (A, S) = .130, p = .188. A partial correlation coefficient was computed between Alexithymia (A) and Somatization (S), holding Anxiety (ANX) constant. The partial correlation coefficient was not significant when controlling for ANX, r_p (A, S) = .049, p = .623.

Prevalence of Alexithymia, Somatization, Anxiety and Depression

While all variables in this study were analyzed as continuous, for the purpose of reporting prevalence of alexithymia, somatization, depression, anxiety, and general emotional distress in this sample, cut-off scores were used for calculating the percentage of participants who met the criteria for clinical significance of their reported symptoms of somatization, depression and anxiety; as well as their reported alexithymia and general emotional distress.

Taylor (personal website, January 30, 2007) uses the cut-off score of 51 (≤ 51) for identifying low alexithymia and the cut-off score of 61 (≥ 61) for identifying high alexithymia on the TAS-20. In the sample of this study, the mean score on Alexithymia was (M = 41.95). Of 105 participants, 7.6% had Low Alexithymia and 7.6% had High Alexithymia. Thus, 15.2% had a total score above or equal to 51.

Derogatis (1994) uses the T score of 63 for identifying a clinically significant level of distress on all of the SCL-90-R scales. Of 105 participants, 34.3% had a clinically significant level of Somatization, 31.4% had a clinically significant level of Anxiety, and 41% had a clinically significant level of Depression. The mean scores are the following: Somatization (M = 58.57), Anxiety (M = 57.23) and Depression (M = 60.96).

Internal Consistency of Measures

To assess the reliability of subscales of the TAS-20 and SCL-90-R, internal consistency estimates of reliability were performed. Coefficient alpha, which assesses consistency in scores among equivalent items, was computed for each subscale (DIF, DDF, EOT, SOM, ANX, and DEP) included in the correlational analyses. The greater the consistency in responses among items, the higher this coefficient would be. For coefficient alpha, every item on a subscale is assumed to be equivalent to every other item, meaning, all items on that subscale should measure the same underlying dimension (Green & Salkind, 2003).

The Cronbach's Alpha coefficient of internal consistency for items on DIF is .84, for items on DDF is .76, and for items on EOT is .68, The Cronbach's Alpha coefficient of internal consistency for SOM items is .87, for DEP items is .91, and for ANX items is

.88. All coefficients with exception to Cronbach's Alpha for EOT are high and indicate satisfactory reliability. The low Cronbach's Alpha coefficient for EOT indicates that in this study, the items representing the EOT construct produced unreliable responses.

V. DISCUSSION

Few studies (Hendryx et al., 1991; Mason et al., 2005; Dion, 1996) have investigated the relationship between alexithymia and functional somatization among college-age students. This dissertation study investigated the magnitude and direction of the relationship between the two constructs in university students in the U.S. The investigator wanted to contribute to expanding the literature on the relatedness of alexithymia and functional somatization among individuals who are at a point in their psychosocial development where they can learn how to identify and express own emotional states. Information on the prevalence of alexithymia has been limited to non-student populations, generally outside of the U.S. (Dion, 1996; Le et al., 2002; Mason et al., 2005; Salminen et al., 1999). This study demonstrated the prevalence of alexithymia and somatization in a small sample of undergraduate students from a medium-size university in the U.S., and thus contributed to a better understanding of the prevalence of the two constructs among college-age students in the U.S.

Analyses of multiple studies have revealed a small to moderate relationship between alexithymia and reported symptoms of somatization (Cohen et al., 1994; De Gucht & Heiser, 2003). The results of this study confirmed previous findings. The relationship between obtained scores of alexithymia and obtained scores of somatization was positive and of medium strength. These results support the existing body of literature

that argues for a relationship between the two constructs that should not be undermined. Similarly, few studies have looked further into how each of the three dimensions of alexithymia (difficulty identifying feelings, difficulty describing feelings and externally oriented thinking) relate to alexithymia (De Gucht et al., 2003; De Gucht & Heiser, 2003). The results of this study confirm and expand on previous findings. Specifically, the difficulty identifying feelings and difficulty describing feelings dimensions had a positive relationship of medium strength with somatization. The more a student had a difficulty identifying and differentiating own feelings, the more likely he or she experienced somatization. However, the externally oriented thinking dimension did not relate to somatization. Very few authors have discussed that not all dimensions of alexithymia equally contribute to the occurrence of somatization (De Gucht & Heiser, 2003). To this date, there is no theoretically sound explanation as to why only two alexithymia dimensions relate to functional somatization. The answer may be related to how different cognitive-emotional processes occurring when one identifies and describes feelings, and thinks reflectively, contribute to one's ability to cope with emotional distress in ways other than somatization. This study also investigated which of the three dimensions of alexithymia contributed most to the relationship between alexithymia and somatization. The results confirmed previous findings (De Gucht & Heiser, 2003; De Gucht et al., 2003). The diffculty identifying feelings dimension of alexithymia contributed uniquely and significantly to somatization, and was a significant determinant of somatization.

Although, there are few studies investigating the relationship between alexithymia and functional somatization, the findings of this study demonstrate that students who

participated in this study are similar to students who have been studies previously, with respect to their experiences of alexithymia and functional somatization (Hendryx et al., 1991; Dion et al., 1996; Mason et al., 2005). Students from this study are also similar to nonpsychiatric adults from previous studies, with respect to their experiences of alexithymia and functional somatization. For the college-age students in this study, absence of identifying, describing and expressing emotional states is just as likely to lead to changes in their physiological arousal on day-to-day basis. Long-term changes in physiological arousal due to alexithymia are just as likely to lead to discomforting somatic sensations or significant somatic distress (Gross & Levenson, 1993). Thus, it is very important that college-age students are encouraged to identify their emotional states and also that they are given the opportunity to verbally communicate emotions of a wide range of intensity, in order to maintain better physical functioning and experience less somatization (Kelley et al., 1997).

Although depression and anxiety were not the primary focus of this study, their relationship with alexithymia and somatization was also investigated. Previous studies have suggested that both alexithymia and somatization are related to negative affect, both occurring in individuals experiencing depression and anxiety (Bach et al., 1994; Bankier et al., 2001; Hendryx et al., 1991; Kauhanen et al., 1996; Kellner, 1990). The results of this study confirm previous findings. Specifically, somatization had a large positive relationship with depression and alexithymia. Also, alexithymia had a large positive relationship with depression and anxiety. Very few authors have argued that both alexithymia and somatization are related to negative affect (Lundh & Simonnson-Sarnecki, 1973). This study investigated whether symptoms of anxiety and depression

occur in individuals who report functional somatic distress and alexithymia. Results indeed confirmed that the variables are related. Students reporting alexithymia and symptoms of somatization were more likely to report symptoms of depression and anxiety. Students, who reported a difficulty with identifying and verbally describing their feelings, did not only experience somatic distress, but also anxiety, or depressive mood along with somatization. Thus, students would not only benefit from exploring, identifying and talking about various emotional states, but also verbally communicating higher emotional distress. They would benefit from addressing their symptoms of anxiety and depression with a mental health professional, in order to reduce their symptoms of somatization, along with their symptoms of anxiety and depression. This emphasizes the role of the mental health professional in not only treating symptoms of depression and anxiety, but also reducing functional somatic distress though helping college-age students develop meta-emotional processing (Lundh et al., 2002).

The implications of the findings go beyond helping college-age students achieve meta-emotional processing and reduce their emotional distress so that they experience less functional somatic distress. As indicated in previous studies, individuals who experience depression and/or anxiety, and functional somatic distress, are more likely to have suicidal ideation (Chioqueta & Stiles, 2004). Thus, it is necessary that college-age students, who report somatic discomfort and symptoms of depression to their primary physician or a mental health professional, are assessed and helped for suicidality.

Students' functional somatic distress and symptoms of depression and anxiety, may not only related to suicide attempts and suicidal ideation, but also self-defeating and negativistic approach to life, negative attitudes toward mental health, and frequent use of

medical over mental health services (Escobar et al, 1987; Noyes et al., 2001). Thus, students with functional somatic distress, emotional distress and symptoms of depression and/or anxiety are more likely to be seen by and seek help from their primary physician. It is important that primary physicians in or outside of university medical clinics assess for both emotional and somatic distress and refer students to mental health professionals in the community or at university counseling centers. It is also important, that university medical clinics have a sound liaison relationship with university counseling centers.

Alexithymia in students experiencing symptoms of depression and anxiety may also serve as a coping mechanism, a way to avoid stress-inducing emotional states (Hendryx et al., 1991). However, alexithymia in students who also experience emotional and functional somatic distress may lead to social isolation, lack of social support and diffculty establishing stable interpersonal relationships. This in turn may lead to development or exacerbation of mental and physicals illness (Bach et al., 1994; Kauhanen et al., 1996; Lumley et al., 1996). Knowing that one of the important developmental tasks of college-age students is achieving interpersonal maturity and intimacy (Pascarella & Terenzini, 1991), we can say that the combined effect of alexithymia, emotional distress and functional somatic distress hinders and impairs the psychosocial development of college-age students. It also impairs the ability and opportunity of college-age students to achieve a satisfactory college-life experience that includes both academic achievement and rich interpersonal life.

In summary, the results of this study support results from previous studies. More specifically, results form this study indicated a positive relationship of medium magnitude between alexithymia and functional somatization. These findings do not

indicate that alexithymia "causes" functional somatization, but rather, that the two contructs are related and that their relationship is of a statistically significant magnitude. Of the three dimensions of alexithymia, externally oriented thinking did not relate to functional somatization. The dimension difficulty identifying feelings was the single best predictor of the experience of functional somatic symptoms, when controlling for the effect of difficulty describing feelings and externally oriented thinking dimensions of alexithymia. The findings of this study also contribute to a better understanding of how symptoms of anxiety and depression relate to the two main constructs studied in this dissertation. The findings indicate that college-age students, who reported alexithymia and functional somatic symptoms, also reported experiencing anxiety and depression. Thus, alexithymia and functional somatization are related to other variables indicative of psychological distress and negative affect.

Limitations

As with other studies, this study is not isolated from limitations. When interpreting the results of this study, several considerations need to be addressed. As results indicate, it would be difficult to understand the relationship between alexithymia and functional somatization without taking into consideration depression and anxiety. The findings indicate that somatization is significantly correlated with both anxiety and depression, and that it is difficult to study the relationship between alexithymia and functional somatization without considering how negative affect relates to the two.

Of all existing measures of functional somatization, the SCL-90-R has been the most commonly used measure (Derogatis, 1994). One limitation of this instrument, in its

use of identifying functional somatization, is that it does not assess whether repondents' somatic symptoms have or do not have a medically explainable origin. This fact addresses a larger concern-a need for a measure of functional somatization which clearly differentiates functional somatic symptoms from bodily discomfort with an organic origin, and has been normed in this culture.

With respect to measuring alexithymia, most existing measures, including the TAS-20, are self-report measures. Some authors suggest that it is difficult to measure alexithymia via self-report measures (Lundh & Simonsson-Sarnecki, 2001). This may explain why in the sample of this study, the prevalence of high alexithymia was fairly small in comparison to the prevalence of somatization. It may also explain why there was a strong mediating effect of depression, anxiety, and general emotional distress on the relationship between alexithymia and somatization (Lundh & Simonsson-Sarnecki, 2001). More research is necessary to confirm that alexithymia is best measured by approaches other than self-report measures.

As described in the literature review of this dissertation, the relationship between alexithymia and functional somatization has been studied through correlational analyses. As with other psychological constructs, it is difficult to study such complex relationships with the help of inferential analyses. One of the limitations of this study is that we can only discuss about and interpret the nature and magnitude of relationships between variables, meaning, the relationship between alexithymia and functional somatization, and the relationship between functional somatization and depression and anxiety.

When discussing limitations, it is important to emphasize that although the demographic characteristics of this sample are similar to those of the student body of the

university where this sample was recruited, they may not represent the student population at other universities across the U.S in terms of ethnic affiliation of students. Of 105 participants, 86.7% identified as being White. Thus, results would be generalized across university populations with caution. With respect to gender, a greater number of participants in this study identified as female (68.6%). In terms of gender distribution, this sample is a more accurate representative of the general student body across universities and colleges in the U.S. Nonetheless, we must not assume that the studied constructs are more likely to occur in female than male participants. The gender ratio in this study may be a product of the higher likelihood of female students being enrolled in courses offered by the CPSY Department. It also may be a product of more female students signing up to participate in a study related to emotional expressiveness and physical distress, and male students consciously deciding not to sign up for participation.

An important limitation to consider is that the definition and understanding of functional somatization is culture-bound. Functional somatization was examined as a Western phenomenon in this study, and it was studied among college students primarily influenced by the Western culture. Somatization in this study was measured though the SCL-90-R, a measure based on the DSM-IV-TR diagnostic criteria for Somatoform Disorders. Both the SCL-90-R and the DSM-IV-TR are predominantly used by clinicians in the U.S. and for the population in the U.S. Also, while individuals in the Western culture may be more familiar with and use the nomenclature for physical complaints known to this culture (eg. migraines, irritable bowl, lump in throat, fatigue, etc.), individuals from other cultures in the world may describe and name discomforting somatic experiences quite differently. Thus, results form this study should be interpreted

within the cultural context in which the alexithymia and functional somatization phenomena were examined in this particular study.

Lastly, the low internal consistency realibility coefficient Cronbach's alpha for Externally Oriented Thinking (EOT) may explain why in this study, results did not demonstrate a significant contribution of this construct to alexithymia, as well as low and insignificant correlation between this construct and somatization. Low Cronbach's alpha coeffiecient may be a product of ambiguous items that produce unreliable responses in participants. Existing literature has thus far neither reported evidence of low internal consistency of the EOT items of the TAS-20 across studies, nor has it provided evidence that the EOT items cause ambiguity in responding in certain populations. However, we also have to remember that the study of alexithymia and administration of the TAS-20 among college students in the U.S. has been rare. The TAS-20 demonstrates acceptable internal consistency (Cronbach's alpha = 0.81). Bagby et al. (1994) report that the three-factor structure of the TAS-20 is stable and replicable across clinical and nonclinical populations. More evidence coming from research with this population is necessary to determine what contributed to the low Cronbach's alpha coefficient for the EOT items of the TAS-20 in this study.

Implications for Mental Health Professionals in College and University Counseling Centers

Mental health professionals in college and university counseling centers work with students with emotional distress ranging form mild to severe on daily bases. Researchers in the field of student affairs at college and university campuses, suggest that one of the major forces of change that has continuously influenced higher education has

been about changes in student characteristics (Sandeen & Barr, 2006). One significant change has been reflected in students' psychological wellbeing and mental health. The number of students seen by college and university counseling centers with severe and urgent problems has dramatically increased in the last decade. Sandeen and Barr (2006) differentiate between disturbing and disturbed students. Disturbing students engage in behaviors that are disruptive to others, and have traditionally been dealt with by offices other than counseling centers. Disturbed students, however, struggle with emotional distress and hold the potential to bring harm to self or others. It is the disturbed students that mental health professionals work with in counseling centers (Sandeen and Barr, 2006).

The findings on prevalence of alexithymia, functional somatization and the three variables of psychological distress (depression, anxiety and general emotional distress) from this study, contribute to the scarce already-existing reports of prevalence of these variables in college-age students in the U.S. The prevalence rates for somatization, anxiety, depression and general emotional distress, in this study, indicate that approximately one third of participants had experienced significantly high levels of psychological distress. This finding coincides with the national trend that for the last decade, college-age students across campuses in the U.S. have been experiencing increasingly more severe psychological distress (Sandeen & Barr, 2006). Students experiencing significant psychological distress may or may not seek help from mental health professionals and medical providers. They may or may not be seen by mental health professionals at university counseling centers and physicians at university medical clinics. It is important that students are reached by individuals and various segments of

the university community so that if they are not seeking help, they are encouraged to in a non-threatening and supportive manner.

There is no clear consensus as to how responsible universities and colleges should be for the lives and well-being of students, considering that students spend the majority of an academic year away from their caregivers and families of origin (Sandeen & Barr, 2006). Each college and university has limitations as to what the institution can do for students in high psychological distress or what the institution can do to prevent significant levels of psychological distress. While the debate that the educational institution can be all things to all students is ongoing, the results of this study emphasize the importance of recognizing, reaching and helping students with high levels of psychological distress through: collaboration between counseling centers and health centers, collaboration between counseling centers and community mental health agencies, and collaboration between mental health professionals at counseling centers and staff/faculty who interact with students on daily basis. The results also emphasize the importance of mental health professionals on university and college campuses to help students, faculty, parents and administrators become more educated about and aware of the severity of psychological distress among college-age students.

With increased severity of problems brought by students, mental health professionals have had to acquire a wide range of skills to not only address developmentally appropriate experiences of students, but also more severe mental health concerns. It is not new that the comorbidity of mental health and physical health concerns is high (Hendryx et al., 1991; Kellner, 1990; Kirmayer et al., 2004). The findings of this study exemplify the need for mental health professionals to pay attention to both

students' emotional and physical distress, and also collaborate with other health professionals in ruling out medical explanations of somatic distress. One small step for mental health professionals in attending to somatic distress is assessing for the presence of somatization symptoms during intake interviewing and throughout the psychotherapy process. Mental health professionals also serve students outside of their office, through outreach programming and workshops. Outreach presentations and workshops can serve as effective psychoeducational tools to engage students into learning about the importance of identifying, describing and verbally expressing emotions for achieving mental and physical well-being, and also engaging in reflective and introspective exercises to enhance their meta-emotional processing.

Application of Integrative Mind-Body Psychotherapy Approaches

There are challenges in differentiating between medically explainable and medically unexplainable somatic distress. Some of the challenges result from the cost of health care and financial difficulties in accessing medical providers who would rule out physical illness. Also, medically unexplainable somatic distress is difficult to assess. The line between bodily discomfort originating from a medically explainable cause and bodily discomfort falling in the functional somatization category is theoretically not firm and clear. To rule out a medically explainable cause for somatic discomfort, both mental health and medical professionals have to rely on modern medical diagnostics. The findings of this study confirm the argument that there is no one specific explanation of how the mind and the body communicate, and also that psychological distress is one mediator in the relationship between emotional processes and functional somatic distress.

As researchers continue to focus on clarifying what factors contribute most to individuals experiencing symptoms of somatization, we ought to not forget that the findings of this study demonstrate that whether direct or indirect, there is a relationship between lack of emotional expresiveness, emotional distress and symptoms of somatization. This relationship was investigated and confirmed in a sample of college-age students attending a medium-size university in the U.S. Mental health professionals working in college and university counseling centers have a professional obligation to help students who seek help for somatic and emotional distress. Developmental theorists argue that students experience a wide range of developmentally appropriate changes after they enter college (Pascarella & Terenzini, 1991). Mental health professionals can utilize and foster these changes to help students become more aware and expressive of their emotional processes and feel more empowered about managing their somatization symptoms.

Pascarella and Terenzini (1991) summarize evidence for significant continuous improvement of communication skills once freshmen start college. They also suggest that although there is an expectation that entering college students would start college with formal operational reasoning skills, only half of them are functioning at this stage of cognitive development. The authors also suggest that the most significant and rapid growth in formal operational reasoning occurs in the first year of college (Pascarella & Terenzini, 1991). Evidence also suggests that there is a continuous growth in complex and abstract cognitive processes, with significant growth in complex and abstract thinking occurring in the first year of college. Although there are many environmental factors that shape the psychosocial change of college-age students, evidence also suggests

that in the first two years of college, students tend to experience personal integration, healthy emotional expression and psychological wellbeing (Pascarella & Terenzini, 1991). Because of these developmental growths, mental health professionals at college and university counseling centers are in the best position to help students in distress to learn skills on how to identify, describe and express their emotions; understand the complex connectedness between psychological distress and somatic complaints, and also learn to control physiological changes which contribute to somatic discomfort. As students work on reducing their emotional distress in individual counseling, with the help of their counselor, they could explore their emotional states and learn to reduce their emotional distress through recognition and expression of emotional states, rather than through somatization.

Both past and present trends in counseling and psychotherapy involve the therapist and client communicating to one another both verbally and non-verbally. While some approaches are predominantly focused on awareness of and change in the client's cognition; other approaches are predominantly focused on emotional awareness and expressiveness, and yet, other approaches integrate both, the client's cognitive and affective processes (Ivey, D'Andrea, Bradford-Ivey, & Simek-Morgan, 2007). Regardless of what theoretical approach counselors and psychologists operate from, much of the counseling process has historically been directed toward the client achieving some ability to recognize what specific emotional states lay behind their presenting problem (Ivey et al., 2007). Beginning counseling trainees are frequently encouraged by their clinical supervisors to use basic therapeutic skills such as empathy and reflection, and ask their clients how they feel. Therapists use handouts with listed words for complex emotions

and drawings of faces nonverbally displaying emotional states. When working with clients, it is often that therapists notice that some clients have difficulties with recognizing, naming or expressing their emotional states. Sometimes clients seek counseling to improve their awareness and expressiveness of emotions, not even being aware that such a difficulty may be explained by alexithymia. Other times, clients seek counseling for symptoms of depression or anxiety, not being concerned about their ability to recognize and express own emotions. Nonetheless, other than to symptom reduction, psychotherapy and counseling have traditionally been linked to the client revealing and understanding own emotions (Ivey et al., 2007).

It is recently that new psychotherapy trends have also started focusing on integrating the client's emotional development with physical health and holistic wellbeing. The need for awareness and respect for holistic views of well being has also become more evident as mental health professionals have been working with an increasing number of students from different cultural backgrounds (Ballou & Brown, 2002, chap. 6). Sandeen and Barr (2006) suggest that another trend in the student body on college and university campuses has been the increasing cultural diversity of students. This diversity has also shaped the needs and wants of enrolled students (Sandeen & Barr, 2006). The diverse needs of college-age students and the findings of this study emphasize the importance of mental health professionals in using approaches that integrate psychological and physical wellbeing.

As cited in Ivey et al. (2007), one integrative approach is known as Wellness Counseling. Wellness Counseling is a life-span model that describes the dynamic nature of human growth and personal health. It is integrative in that it emphasizes the need for

people to learn ways of effectively addressing and balancing several dimensions of wellness to realize their highest level of health and well-being. These dimensions are: essential (self-care, cultural and gender identity, spirituality); social (friendship and love); coping (leisure, stress management, self-worth, realistic beliefs); creative (thinking, emotions, control, work, humor); and physical (exercise and nutrition) (Ivey et al., 2007). This model emphasizes the importance of being in touch with what one feels for achieving positive mental health. It also emphasizes the importance of a healthy mind existing within a healthy body.

Another integrative approach is known as Mindfulness Training. Mindfulness is a way of paying attention that originated in Eastern meditation practices. It has been defined as "paying attention to the present experience on a moment-to-moment basis, on purpose and nonjudgmentally" (Baer, 2003). Mindfulness literature describes numerous meditation exercises which help individuals attend to the internal experiences occurring in each moment, including bodily sensations and emotions, and not judge them as good or bad, healthy or sick, or important or trivial (Baer, 2003). Empirical literature supports the usefulness of mindfulness in reducing functional somatization, and symptoms of depression and anxiety. Roemer and Orsillo (2003) suggest that mindfulness is very useful for emotional regulation in that it emotional improves distress tolerance. According to these authors, mindfulness helps the individual accept the emotional response or somatic discomfort rather than avoid it, and not assign any value to the somatization symptoms of discomforting emotional states. This nonjudgmental acceptance of discomfort may not lead to immediate reduced distress, but it leads to increased tolerance to emotional and somatic distress. In a society where quick fix of

symptoms and avoidance of pain is greatly appreciated, individuals rely on medication for relief of any discomfort; mindfulness training has been difficult to accept by consumers of mental health (Roemer & Orsillo, 2003).

Lastly, another integrative approach is known as Biofeedback. Biofeedback is a process that makes one aware of very subtle changes in physiological states in the hope of bringing those processes under conscious control. It involves the use of sensitive instruments to measure, process, and indicate the ongoing activity of various body processes of which the individual is usually unaware (Schawrtz, 1987). Biofeedback has traditionally been used to help individuals achieve better control over their physiological processes and thus manage chronic health conditions, emotional distress and functional somatization (Schwartz & Associates, 1987). The focus of this approach is to empower clients to gain a conscious awareness of their bodies and reduce somatic symptoms which generally lead to distress and discomfort.

While some integrative approaches such as biofeedback have been used by and known to counselors and psychologists for several decades, others need to enter into the repertoire of therapists' techniques and interventions as new evidence for the link between psychological processes, emotional distress and somatization emerges.

Implications for Future Research

The findings of this dissertation study, as well as existing literature on the relationship between alexithymia and functional somatization suggest that there are several implications for future research in this arena:

1. Lundh and Simonsson-Sarnecki (2001) argue that if alexithymia is a deficit, it is hard for those who experience it to be aware of this deficit,

and even harder to report it. This contributes to difficulties in using self-report measures of alexithymia, such as the TAS-20. A non-self-report measure of alexithymia may significantly contribute to future research, and may also change the way we operationalize alexithymia.

2. While the SCL-90-R has most commonly been used for assessing presence of functional somatization (Derogatis, 1994), as a measure, it lacks the property to help respondents identify whether their somatization symptoms have no medically explainable cause. Unlike the SCL-90-R, the Bradford Somatic Inventory (BSI) is a comprehensive measure of functional somatization, unfortunately not normed for use in the U.S. (Mumford, 1991). Researchers, mental health practitioners, and health providers would benefit from a comprehensive measure of functional somatization to be used with the U.S. population.

3. Few already-existing research findings (De Gucht & Heiser, 2003), as well as those of this dissertation study provide some evidence that the difficulty identifying feelings dimension of alexithymia contributes most to its relationship with somatization. More evidence is necessary to clarify the contribution of all dimensions of alexithymia to its relationship with somatization.

4. While there is evidence for a relationship between depression, anxiety and alexithymia (Hendryx et al., 1991; Bach et al., 1994; Kauhanen et al., 1996; Bankier et al., 2001); as well as depression, anxiety and functional somatization (Kellner, 1990; Hendryx et al., 1991), aside from the findings

of this dissertation study, there needs to be more research evidence to confirm a mediating effect of depression and anxiety on the relationship between alexithymia and somatization.

5. Lastly, alexithymia is one psychological construct related to emotional processing and expressiveness. Alexithymia denotes a deficit. Expression and identification of emotional states has been linked to functional somatization one-sidedly. We have yet to learn how one's well-developed ability to express and identify emotions can relate to reduction in functional somatic symptoms. Also, we have yet to learn, how constructs related to the experience and communication of emotions, such as assertiveness, may relate to functional somatization. Kirmayer et al., (2004); and Mai (2004) suggest that functional somatization may be manifested in individuals who can not assert their psychological distress because of shame, societal stigma, or oppression. More research is necessary to investigate the relationship between affect-related psychological processes and functional somtization.

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APPENDICES

APPENDIX A

SIGN-UP SHEET

Sign-Up Sheet for Participation in Research Study under Title:

The Relationship between Alexithymia and Functional Somatization in College Students in the United States

Principal Investigator:
Elena Petrova
eapetrova@bsu.edu
334-559-0653

Research credits earned from participation: one (1) hour
Participation duration: 15 minutes

Room: _____ Date: _____ Time: _____

Instructions: Please write your name on the line provided and attend the meeting at the above time and place.

If you are below 18 years of age, to participate in this study, you and your parent/legal guardian have to sign a parental permission/child assent form. Please pick up this form from the CPSY office-Teachers College 622, or contact the principal investigator to obtain the form. Please bring the signed form with you when you come at the above place and time of participation.

Name

1.

2.

3.

4.

5.

6.

7.

8.

9.

10.

11.

12.

13.

14.

15.

APPENDIX B

INFORMATION LETTER

(NOTE: DO NOT AGREE TO PARTICIPATE UNLESS AN IRB APPROVAL STAMP WITH CURRENT DATES HAS BEEN APPLIED TO THIS DOCUMENT.)

INFORMATION LETTER
For a Research Study entitled "The Relationship between Alexithymia and Functional Somatization in College Students in the U.S."

You are invited to participate in a research study that investigates the relationship between difficulty expressing emotions and the experience of bodily discomfort among college students. The study is being conducted by Elena Petrova, M. A., under direct supervision of Holly A Stadler, Ph. D., Professor and Head of the Department of Counselor Education, Counseling Psychology and School Psychology at Auburn University, Auburn, Alabama. You were selected as a possible participant because you are an undergraduate student at Ball State University.

You are asked to complete three questionnaires included in the questionnaire packet. Completion of all three questionnaires should take about thirty-five minutes. Please complete the questionnaires in the order that they are given to you in your packet. Upon completion, please put the questionnaires back in your packet and turn in the packet to the principal investigator. For your participation in this study, you will earn one research credit hour. Please do not put your name or any other identifying information on any of the questionnaires because your answers need to remain anonymous.

There is no risk associated to participating in this study. If you do experience any discomfort and anxiety from participating in this study, free counseling services are available to you through the Counseling Center at Ball State University, (765) 285-1736.

Your participation in this study will lead to collection of information which in turn will greatly increase our understanding as to how difficulty expressing emotions relates to bodily discomfort experienced by young, healthy individuals. Counselors at university counseling centers will benefit from the results of this study, because they are the ones who play a very important role in helping students learn how to recognize and express own emotions, and deal with stress.

Any information obtained in connection with this study will remain anonymous. Information collected through your participation will be used to fulfill the requirements for the degree Doctor in Philosophy for Elena Petrova. Also, the information may be published in a professional journal or book, and/or it may be presented at a professional meeting. You may withdraw from participation at any point while completing the questionnaires. After you have returned the completed questionnaires, you will be unable to withdraw your information because there will be no way to identify your information.

If you have any questions about this study or your participation in it, please ask now or contact Elena Petrova at (334) 559-0653, eapetrova@bsu.edu or Dr. Holly Stadler at (334) 844-5160, stadlha@auburn.edu. You may also contact Dr. Sharon Bowman-Head of Department of Counseling Psychology and Guidance Services at Ball State University at (765) 285-8040, sbowman@bsu.edu. Dr. Bowman supervises this study at Ball State University.

For information regarding your rights as a research participant, you may contact the Auburn University Office of Human Subjects Research or the Institutional Review Board by phone (334) 844-5966 or e-mail at hsubjec@auburn.edu or IRBChair@auburn.edu. You may also contact the Ball State University Institutional Review board by phone (765) 285-5070, or e-mail Melanie Morris at IRB@bsu.edu.

HAVING READ THE INFORMATION PROVIDED, YOU MUST DECIDE IF YOU WANT TO PARTICIPATE IN THIS RESEARCH PROJECT. IF YOU DECIDE TO PARTICPATE, THE DATA YOU PROVIDE WILL SERVE AS YOUR AGREEMENT TO DO SO. THIS LETTER IS YOURS TO KEEP.

Elena A Petrova

_____

Investigator's signature Date

APPENDIX C

DEMOGRAPHIC FORM

Demographic Form

Please circle or write the response that best describes you.
Please give one response per item.

1. What is your gender? _____

2. What is your race/ethnicity?

American Indian/Alaska Native

Hispanic

Asian/Pacific Islander

Black (non-Hispanic)

White (non-Hispanic)

Other (please describe) _____

3. What is your age? _____

APPENDIX D

PARENTAL PERMISSION/CHILD ASSENT

(NOTE: DO NOT AGREE TO PARTICIPATE UNLESS AN IRB APPROVAL STAMP WITH CURRENT DATES HAS BEEN APPLIED TO THIS DOCUMENT.)

PARENTAL PERMISSION/CHILD ASSENT
For a Research Study entitled "The Relationship between Alexithymia and Functional Somatization in College Students in the U.S."

Your child is invited to participate in a research study that investigates the relationship between difficulty expressing emotions and the experience of bodily discomfort among college students. The study is being conducted by Elena Petrova, M. A., under direct supervision of Holly A Stadler, Ph. D., Professor and Head of the Department of Counselor Education, Counseling Psychology and School Psychology at Auburn University, Auburn, Alabama. Your child was selected as a possible participant because he/she is an undergraduate student at Ball State University. Since your child is age 17 or younger, we must have your permission to include him/her in the study.

If you decide to allow your child to participate in this research study, your child will be asked to complete three questionnaires. Completion of all three questionnaires should take about thirty-five minutes. For your child's participation in this study, he/she will earn one research credit hour. Your child will be instructed to not put his/her name or any other identifying information on any of the questionnaires because his/her answers need to remain anonymous.

There is no risk associated to participating in this study. If your child does experience any discomfort and anxiety from participating in this study, free counseling services are available to him/her through the Counseling Center at Ball State University, (765) 285-1736.

Your child's participation in this study will lead to collection of information which in turn will greatly increase our understanding as to how difficulty expressing emotions relates to bodily discomfort experienced by young, healthy individuals. Counselors at university counseling centers will benefit from the results of this study, because they are the ones who play a very important role in helping students learn how to recognize and express own emotions, and deal with stress.

Parent/Guardian Initials_____

Participant Initials_____

Any information obtained in connection with this study will remain anonymous. Information collected through your child's participation will be used to fulfill the requirements for the degree Doctor in Philosophy for Elena Petrova. Also, the information may be published in a professional journal or book, and/or it may be presented at a professional meeting. Your child's participation is completely voluntary. Your decision to about whether or not to allow your child to participate will not jeopardize your child's future relations with Ball State University, the Department of Counseling Psychology and Guidance Services. You may withdraw your child from participation before he/she returns the completed questionnaires to the principal investigator. After your child has returned the completed questionnaires, you will be unable to withdraw your child's information because there will be no way to identify the information.

If you or your child have any questions about this study, please contact Elena Petrova at (334) 559-0653, eapetrova@bsu.edu or Dr. Holly Stadler at (334) 844 5160, stadlha@auburn.edu. You may also contact Dr. Sharon Bowman-Head of Department of Counseling Psychology and Guidance Services at Ball State University at (765) 285-8040, sbowman@bsu.edu. Dr. Bowman supervises this study at Ball State University.

For information regarding your child's rights as a research participant, you may contact the Auburn University Office of Human Subjects Research or the Institutional Review Board by phone (334) 844-5966 or e-mail at hsubjec@auburn.edu or IRBChair@auburn.edu. You may also contact the Ball State University Institutional Review board by phone (765) 285-5070, or e-mail Melanie Morris at IRB@bsu.edu.

HAVING READ THE INFORMATION PROVIDED, YOU MUST DECIDE WHETHER OR NOT YOU WISH FOR YOUR CHILD TO PARTICIPATE IN THIS RESEARCH STUDY. YOUR SIGNATURE INDICATES YOUR WILLINGNESS TO ALLOW YOUR CHILD TO PARTICIPATE. YOUR CHILD'S SIGNATURE INDICATES HIS/HER WILLINGNESS TO PARTICIPATE.

_____

Participant's Signature Date

_____

Printed Name

_____

Parent/Guardian Signature Date

_____

Printed Name

_____

Investigator obtaining consent Date

Elena A Petrova

APPENDIX E

TAS-20

Sex: M / F **Age:** **Date:** **ID #:**

T A S – 20

Using the scale provided as a guide, indicate how much you agree or disagree with each of the following statements by circling the corresponding number. Give only one answer for each statement.

Circle 1 if you STRONGLY DISAGREE
Circle 2 if you MODERATELY DISAGREE
Circle 3 if you NEITHER DISAGREE NOR AGREE
Circle 4 if you MODERATELY AGREE
Circle 5 if you STRONGLY AGREE

		Strongly Disagree	Moderately Disagree	Neither Disagree Nor Agree	Moderately Agree	Strongly Agree
1.	I am often confused about what emotion I am feeling.	1	2	3	4	5
2.	It is difficult for me to find the right words for my feelings.	1	2	3	4	5
3.	I have physical sensations that even doctors don't understand.	1	2	3	4	5
4.	I am able to describe my feelings easily.	1	2	3	4	5
5.	I prefer to analyze problems rather than just describe them.	1	2	3	4	5
6.	When I am upset, I don't know if I am sad, frightened, or angry.	1	2	3	4	5
7.	I am often puzzled by sensations in my body.	1	2	3	4	5
8.	I prefer to just let things happen rather than to understand why they turned out that way.	1	2	3	4	5
9.	I have feelings that I can't quite identify.	1	2	3	4	5
10.	Being in touch with emotions is essential.	1	2	3	4	5

Date: **ID #:**

T A S – 20

	Strongly Disagree	Moderately Disagree	Neither Disagree Nor Agree	Moderately Agree	Strongly Agree
11. I find it hard to describe how I feel about people.	1	2	3	4	5
12. People tell me to describe my feelings more.	1	2	3	4	5
13. I don't know what's going on inside me.	1	2	3	4	5
14. I often don't know why I am angry.	1	2	3	4	5
15. I prefer talking to people about their daily activities rather than their feelings.	1	2	3	4	5
16. I prefer to watch "light" entertainment shows rather than psychological dramas	1	2	3	4	5
17. It is difficult for me to reveal my innermost feelings, even to close friends.	1	2	3	4	5
18. I can feel close to someone, even in moments of silence.	1	2	3	4	5
19. I find examination of my feelings useful in solving personal problems.	1	2	3	4	5
20. Looking for hidden meanings in movies or plays distracts from their enjoyment.	1	2	3	4	5

APPENDIX F

TABLE 1 AND TABLE 2

Table 1

Bivariate Correlations between Alexithymia, Dimensions of Alexithymia and Somatization (N = 105)

	DIF	DDF	EOT	A
S	.42**	.36**	.14	.40**

** p < .01

Note. DIF = Difficulty Identifying Feelings, DDF = Difficulty Describing Feelings, EOT = Externally Oriented Thinking, A = Alexithymia, S = Somatization

Table 2

Bivariate Correlations between Somatization, Alexithymia, Anxiety and Depression (N = 105)

	DEP	ANX
Somatization	.59**	.72**
Alexithymia	.53**	.52**

**p < .01

DEP = Depression, ANX = Anxiety

APPENDIX G

TABLE 3, TABLE 4, AND TABLE 5

Table 3

Partial Correlation Controlling Difficulty Describing Feelings and Externally Oriented Thinking

	Difficulty Identifying Feelings
Somatization	.27*

*p < .05

Table 4

Partial Correlation Controlling Difficulty Identifying Feelings and Externally Oriented Thinking

	Difficulty Describing Feelings
Somatization	.14

*p < .05

Table 5

Partial Correlation Controlling Difficulty Describing Feelings and Difficulty Identifying Feelings

	Externally Oriented Thinking
Somatization	.01

*p < .05

APPENDIX H

TABLE 6

Table 6

Partial Correlations between Somatization and Alexithymia

Alexithymia	Somatization
Partialling out DEP	.13
Partialling out ANX	.05

*p < .05

DEP = Depression, ANX = Anxiety