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Attachment Style and Somatization: A Multimethod Approach to Measuring the Effect of
Emotional Awareness

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ABSTRACT OF THE DISSERTATION

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The effect of attachment style on emotional awareness and somatization was examined using both self-report and implicit measures of negative affect. Attachment style and alexithymia were found play important roles in predicting the severity of somatic complaints independent of other indicators of negative affect. The significant interaction between alexithymia and attachment style indicated that alexithymics with a preoccupied attachment style are at the greatest risk of suffering from somatization.

Follow up studies were conducted to measure the differential impact of attachment style on emotional awareness, a construct that has been previously linked to somatization. An anxiety-anger Implicit Association Test (IAT) was designed as a way to measure these negative emotions implicitly. Correlational analyses of both self-report and IAT responses of anxiety and anger grouped by attachment style revealed that the preoccupied attachment style is associated with the highest levels of emotional self-awareness while the dismissive attachment style is associated with the lowest levels. The effect of attachment style on emotional self-awareness was also revealed to be much greater in the presence of a stressor.

In the final study, preliminary evidence of construct validity for the anxiety-anger IAT was established using a multi-trait multi-method correlational analysis. There was much greater convergent validity for implicit measures of anxiety compared to anger. In addition, an empirically derived construct labeled Emotional Unawareness and Evaluative Concern (EUEC) was shown to be an important moderator of anxiety when predicting somatization, with EUEC leading to greater levels of somatic complaints only under conditions of high anxiety. Implications for these findings leading to possible alternative treatments for somatization are discussed.

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This thesis plans to investigate the role that attachment style and emotional awareness play in the perpetuation of somatization. Somatization is a distressing syndrome characterized by the reoccurrence of physical complaints over a period of several years eventually leading to significant impairment in social, occupational, and other areas of functioning (DSM IV-TR, 2000). Patients with somatization often fail to respond to traditional treatment and take countless medical tests which cost them a great deal of time and money.

Patients with somatization overburden the health care system leading to much higher costs, physician costs, and lab and medical procedure costs compared to non-somatizing patients (Barsky et al, 2001). Independent of medical co-morbidity, the average annual medical care costs for a patient with somatization is \$6354 compared to \$2762 for a non-somatizer. All totaled an estimated 256 billion dollars annually in medical care costs is attributed to somatization alone.

Somatoform disorders are frustrating to treat for both physicians and therapists (Waldinger et al, 2006). It has been estimated that as many as 30-60 percent of patients in primary care settings complain of symptoms that have no physical basis. Co-morbidity between somatization and anxiety disorders is common and may make treatment more difficult. Well established therapeutic techniques, such as Cognitive Behavioral Therapy (CBT) which is very effective for treating anxiety and depression has not been as effective in treating functional somatic complaints. Kroenke and Swindle (2000) have indicated mixed results when traditional cognitive behavioral therapy (CBT) was used alone to treat somatization. Allen et al (2002) have

described psychosocial interventions and CBT as ineffective in treating functional somatic symptoms. There is much room for improvement in treating this complex disorder.

In order to develop more effective treatments for somatization, we must further explore the psychological constructs associated with it. Attachment style and emotional awareness are two constructs hypothesized to play an important role in the etiology of somatization. Attachment style is a social-developmental perspective concerning the manner in which people relate to each other and the world around them (Bowlby, 1969). It has long been tied to proper emotion regulation, which refers to why people have the emotions that they have and how they experience and express these emotions (Gross, 1998). Emotional self-awareness is an important first step of the emotional regulation process (Mayer, 2001). Difficulties with emotion regulation have been linked to the development of somatization (Waller et al., 2004; Bagby & Taylor, 1997; Weardon et al, 2003).

With a focus on these social-developmental constructs, a series of studies has been designed to assess the interpersonal and emotional deficits in emotional self-awareness that may significantly contribute to somatization. In study 1, attachment style is shown to moderate the effect of emotional awareness on the perpetuation of somatization. Studies 2 and 3 further explore the psychological dynamics behind the attachment-somatization link by looking at the differences in emotional self-awareness between the four attachment styles under stressful and non-stressful conditions. Attachment style is shown to play an important role in emotional self-

awareness, but only under conditions of high psychological stress. The evidence for this link is established by a novel adaptation of the Implicit Association Test (IAT) in identifying discrepancies between subjects' explicit and implicit emotional states. Finally, study 4 returns directly to the assessment of somatization using the explicit and implicit measures of emotion developed in Study 2, along with a newly developed construct of emotional unawareness and evaluative concern as clinical predictors.

The thesis will begin with a general review of somatization disorder and attachment style before transitioning into the impact of attachment style on affect regulation, specifically focusing on the importance of emotional self-awareness. The two primary negative emotional reactions to a stressor, anxiety and anger will be discussed. Following this discussion, previous research linking attachment style and somatization will be reviewed. I will conclude this introductory chapter with a conceptual and methodological consideration of important measurement issues concerning both the assessment of attachment style and the novel adaptation of the IAT to assess implicit emotional states.

Somatization

Somatization disorder primarily consists of pain, gastrointestinal, sexual, or pseudo-neurological symptoms beginning before the age of 30 that have no appropriate organic basis (DSM-IV-TR, 2000). It has been widely theorized that somatization is a process by which psychological distress is unable to be adequately resolved and therefore gets expressed in bodily symptoms (Lipowski, 1988). When

compared with non-somatizing patients, somatizing patients are more often hospitalized, have more physician visits, take more medicine, and have a poor quality of life (Noyes et al, 2010). Clinicians may come to perceive these individuals as difficult because traditional Western medicine tends to not be very effective.

It has been suggested that somatization disorder represents the extreme of a somatization continuum (Katon et al, 1991). Individuals with symptoms but who do not meet the criteria for a diagnosis of somatization disorder have similar characteristics to clinical somatizers. Even individuals with a single somatic complaint such as chronic tension headaches can suffer a great deal.

The vast majority of sufferers of somatization disorder are females, having being diagnosed up to 10 times more frequently than males (Barsky et al 2001; Escobar et al, 1987). Across many studies and using a variety of measures, women have consistently reported more symptoms than men (Kroenke & Spitzer, 1998; Barsky et al, 2001). It may be that women are more willing/able to express themselves than men are and that society views men that disclose their problems as weak.

There is substantial co-morbidity between somatization and anxiety and depressive disorders. de Waal et al (2004) have indicated that more than half of individuals diagnosed as having an anxiety disorder or depression fulfilled the criteria for a co-morbid somatoform disorder which makes treatment considerably more difficult. Since women are diagnosed with anxiety and/or depression much more than men, this could partly explain why somatization is much more common among

women. The role of female hormones and dysregulation of the HPA-axis in response to stress may influence anxiety, depression, and somatization (Nolen-Hoeksema, 2001). Having provided a general background into somatization disorder and the difficulties it can bring, I now shift my focus to attachment style, an important construct that relates to somatization via its influence on emotional awareness and regulation.

Attachment Style

Attachment theory is a social-developmental perspective which plays an important role in the development of proper emotion regulation strategies. At an early age infants learn to either downplay or amplify their feelings of distress which can pave the way for future difficulties dealing with emotions. Since emotion regulation has been theorized to play a key role in somatization, attachment style is an important construct to examine.

The foundation for attachment theory derives from Bowlby (1973) and Ainsworth (1979) and their observations that the infant's relationship with his/her mother shapes how the child views relationships later in life. Bowlby (1973) claimed that the model of parents as responsive is inevitably associated with a complementary model of the self as effective, since the child is predictably effective at eliciting a parental response. By generalization, this pattern of responsiveness also leads to the idea that relationships may be a context in which needs are met. Thus there are implications for later efficacy, self-esteem, and involved social relationships.

Infants are endowed with an attachment behavioral system that ensures their proximity to a protective caregiver and thus their survival (Bowlby, 1973). The child then forms mental representations or internal working models (IWMs) based on the relationships with his or her attachment figures. These IWMs formed early in life influence future interpersonal relationships and cognitions regarding the self and others. Infants either learn to rely on sensitive and responsive caregivers or they become accustomed to a history of insensitivity or inconsistent responsiveness (Thompson, Flood, and Lundquist, 1990).

Ainsworth was able to empirically test Bowlby's ideas through the use of the Strange Situation. This is a 21 minute miniature drama with seven episodes (Bretherton, 1992). Mother and infant are allowed to interact normally in a laboratory playroom, where they are later joined by an unfamiliar woman (the confederate). The stranger then proceeds to engage the child in play while the mother leaves. After a brief time, the mother returns to the same room where the stranger is interacting with the child. A second separation then ensues during which the baby is completely alone. Finally, the stranger and then the mother return together.

On the basis of this procedure, infants are classified as either secure, ambivalent, or avoidant (Ainsworth 1978). Secure infants play with the toys, are distressed when their mothers leave, but are easily soothed when she returns. Avoidant infants play little with the toys, are minimally distressed when mother leaves, and appear indifferent to mother when she returns. Ambivalent infants are unable to leave their mothers and engage the toys and become very anxious when

their mother leaves, but interestingly are both happy and angry with her upon returning. According to attachment theory, it is these ambivalent and avoidant infants that tend to have problems with affect regulation later in life (Cassidy, 1994).

As internal working models become strengthened through repeated social interactions during development, attachment styles become more difficult to change (Kirkpatrick & Hazan, 1994). Adult attachment styles tend to reflect expectations about whether attachment figures are available under stressful situations (Hazan and Shaver, 1987). Secure adults consider themselves worthy of the care and affection of others, and more willingly trust others. Based on their early experiences, avoidant adults tend to deny their own emotional needs and perceive others as untrustworthy. Ambivalent adults have negative working models of themselves and positive views of others and are overly worried about being abandoned due to the inconsistent care of their early attachment figures.

Bartholomew and Horowitz (1991) extended the traditional three category model of attachment style to a four category model of attachment style in adulthood. They utilized self-report measures of adult romantic relationships in order to classify people on two dimensions. The first dimension consisted of model of self while the second dimension consisted of model of other. They then dichotomized each of these two dimensions into positive and negative valences to derive the four categories. An individual with a positive view of self and a positive view of other was classified as securely attached. Someone with a negative view of self and a positive view of other was classified as preoccupied. A positive view of self and a negative view of other

led to being classified as dismissively attached. Finally, a negative view of self and a negative view of other were characteristic of a fearfully attached individual. This four category model of attachment is now predominantly used in attachment research involving adults.

Having reviewed the basics of attachment style, I next provide a brief review of emotional awareness and its role in emotion regulation, focusing on the appraisal and regulation of anger and anxiety. After this, I consider the role of attachment style in the development of proper emotion regulation strategies. This will lay the groundwork for the link between attachment style and somatization that follows.

The Role of Attachment Style in Emotional Awareness and Regulation

When faced with a moderate to severe amount of stress, a specialized cognitive-affective mechanism organizing the fight or flight response is initiated. High levels of anxiety are associated with the flight response, while increased anger represents mobilization of the fight response (Osterman et al., 1999). These emotional responses are seen as primary reactions to a stressor and as core components of the survival instinct in humans. They help people cope with life's adversities by providing us with increased energy required for ameliorative actions (Chemtob et al., 1997). However, chronic activation of these two emotional states can become problematic.

According to Eisenberg & Spinrad (2004), emotion regulation can be considered the process of initiating, avoiding, and/or maintaining of internal physiological states, attentional processes, and motivational states in order to achieve

social adaptation or individual goals. In response to a stressor, some individuals show primarily an anxiety response while others primarily an anger response (Osterman et al., 1999). Chronic failure to cope with these emotional reactions can eventually lead to affect dysregulation (Potter et al., 2000).

Stress may serve to exacerbate problems with emotional responses through dysregulation of the Hypothalamic-Pituitary-Adrenal (HPA) axis, the neuroendocrine stress response system (Laurent & Powers, 2007). In the case of anger, HPA activation leads to an increase in metabolic activity that would help an individual take action and engage in confrontational behavior (Moons et al, 2010). Individuals who react with anxiety to a stressor are thought to misinterpret normal physiological responses resulting from HPA activation as being an inappropriate reaction of the autonomic nervous system (Kirmayer & Young, 1998). Attention is then shifted to the physical sensations and catastrophizing may occur, which in turn may further amplify the symptoms. The body may become sensitized to these sensations/symptoms such that even the smallest deviation from normal may seem troublesome or painful and eventually an anxiety disorder may begin to emerge.

Emotional self-awareness is a key initial component of proper emotion regulation (Thompson, 1994). In the case of anger, proper emotion regulation can consist of non-aggressive communication aimed at correcting any wrongdoing or dispute between two parties. However, if one is suffering from anxiety, even non-aggressive communication can exacerbate the anxiety reaction. When dealing with anxiety, proper emotion regulation focuses on cognitive restructuring, desensitization,

and interpreting the anxiety provoking situation in a non-threatening manner (Weber et al, 2004). Being able to accurately identify one's emotions will lead to more effective cognitive and behavioral intervention strategies aimed at reducing negative affect. Without proper emotional self-awareness, regulation will not be effective (Silva, 2002).

Attachment style plays an important role in emotion regulation via differences in self-awareness of emotion. Infants are unaware of their physiological state and emotions and therefore must rely on their primary attachment figure to effectively regulate. Attachment figures serve as regulators of biological functioning, and separation results in disruption of these regulatory functions (Shear, 1996). The mother provides a template for the infant to internalize a series of regulators, which culminates in an adulthood capacity for flexible responsiveness to a range of social interactions and optimal capacity to respond adaptively to a variety of stressors.

By the age of 4-5, children start to become capable of holding complex mental representations and perspectives of people (Rochat, 2003). They are beginning to be able to infer the emotional expressions of others and self-awareness of their own emotions takes on greater importance. As the child progresses through adolescence into adulthood and begins to slowly separate from their primary attachment figure, emotional self-awareness becomes a vital part of the emotion regulation process.

Gergely and Watson (1996) theorize that infants learn to become emotionally self-aware through a biofeedback process provided by the caregiver's reactions to the baby's emotional displays. Infants who are securely attached have responsive

caregivers and are more likely to become emotionally self-aware. Emotional self-awareness is necessary for the development of empathy, being able to identify with and share another person's feelings (Goleman, 1995). Children with secure histories are more empathic than those with avoidant histories (Kestenbaum et al., 1989). Those children with insecure attachment histories exhibit lower levels of emotional awareness and are more prone to the development of pathological anxiety and/or aggressive behavior (Sroufe, 1983; Warren et al., 1997).

Some evidence points to an ambivalent attachment style being a better predictor of future anxiety than an avoidant attachment style (Warren et al., 1997). Due to inconsistent caregiving, ambivalent children are never certain if their needs will be met by their attachment figures. A state of hypervigilance results and the infant begins to be alert to any signs that signal separation from their primary attachment figure. Under periods of stress, the attachment-behavioral system becomes activated and the clingy, dependent nature of these children emerges. Warren et al. (1997) conducted a longitudinal study in which attachment was assessed at 12 months and 17.5 years of age. Ambivalent attachment style assessed at age 12 months was found to predict anxiety disorders at 17.5 years above and beyond maternal anxiety and indices of temperament. Avoidant attachment style was not a significant predictor of the future prevalence of anxiety.

An insecure attachment style can also lead to the development of anger and aggression in children (Finzi et al, 2001). Physically abused children are predominately classified as avoidantly attached and this attachment style is strongly

correlated with assaultive behavior, aggression, antisocial behavior, and impulsiveness. There may be an intergenerational transfer of aggressive behavior passed between infant and caregiver.

As the child matures, problems with anger management may lead to interpersonal, occupational, and family conflicts, negative evaluations by others, negative self-concept, and low self esteem (Calamari & Pini, 2003). The experience of anger has also been shown to differ depending on gender and attachment style (Dutton & Aron, 1989). Calamari and Pini (2003) found that insecurely attached females scored higher on state anger than insecurely attached males. Also, ambivalent females reported more intense anger experiences while avoidant females were more likely to direct anger inwards. There may be societal pressures for females not to directly express anger (Sharkin, 1993). Women tend to inhibit the direct expression of anger due to intrapersonal fears about the “destructiveness” of their own anger. Strong affiliative needs and separation anxiety further contribute to the lack of direct anger expression in women.

Muris et al. (2004) also showed that attachment style in adolescence is also related to anger/hostility. In their sample of 441 non-clinical adolescents, those who were classified as ambivalently or avoidantly attached self-reported more anger than those classified as securely attached. Hostility may be the result of the distorted internal working models of ambivalent and avoidant attachment styles. No significant differences were found between avoidantly and ambivalently attached adolescents. Boys also displayed higher levels of physical aggression than girls which is consistent

with previous research (Bjorkqvist et al., 1992). The effect for attachment style in predicting hostility was significant even after parental rearing type was controlled for.

Mikulincer (1998) has further separated anger into two categories, functional and dysfunctional. Secure attachment experiences lead to expressions of anger that are instrumentally used to discourage others' negative behavior in the future, to overcome relational obstacles, and to maintain strong attachment bonds. Insecure attachment experiences lead to dysfunctional anger, in which the individual is subjected to constant threats of rejection and abandonment. These individuals experience overwhelming tantrums and destructive behavior that weaken relational bonds and alienate partners.

Overall, securely attached individuals showed lower levels of self-reported anger than insecurely attached individuals (Mikulincer, 1998). When they did show anger, they responded in a constructive way, maintaining a relationship with the anger instigator, engaging in problem-solving actions, and expressing anger outward in a controlled manner. They also believed that their anger episode would lead to a positive outcome. Secure people have what Mikulincer (1995) has termed differentiated defensiveness, having access to negative affect without being overwhelmed by negative emotions and cognitions. Having examined the role of attachment style in the awareness and regulation of emotion, I now direct my attention to the effect of attachment style on a major outcome of faulty emotion regulation, which is somatization.

Attachment Style Emotional Awareness and Somatization

While attachment style has been shown to have a clear bearing on how individuals are aware of and regulate their emotions, the relationship between attachment style and somatization as a clinical disorder, are necessarily more speculative. However, there are research studies that bear on this topic and that suggest that the relationship may be significant. Stuart and Noyes (1999) first theorized that internal schemas related to attachment to important people, particularly parental figures, link childhood trauma to adult somatization. Childhood trauma has been associated with chronic pain, headache, gastrointestinal symptoms, musculoskeletal complaints, and gynecological problems in women. It has been argued that trauma victims have their physical and/or emotional needs left unattended by caregivers, and therefore are vulnerable to concerns about body functioning and integrity later in life. Frewen et al. (2008) have shown that individuals with PTSD have lower levels of emotional self-awareness than controls. Insecure attachment style may play a major role in explaining why these victims exhibit such a large number of symptoms.

Ciechanowski et al. (2002) have also suggested that attachment style may play a significant role in somatization and symptom reporting. Individuals with a negative view of other (dismissing and fearful attachment styles) have learned that people are likely to reject their attempts to gain support and are less likely to focus on and report somatic symptoms compared to those with a positive view of others. Individuals with a negative model of self (preoccupied and fearful attachment styles) may generally be

more likely to report somatic symptoms as a consequence of their tendency to focus on negative affect (Ciechanowski et al., 2002). They found that individuals with a preoccupied or fearful attachment classification on Bartholomew and Horowitz's Relationship Questionnaire (RQ) (1991) reported more somatic symptoms than those with dismissing and secure attachment styles. Subjects with fearful, dismissing, or secure attachment styles all had significantly fewer visits to primary care doctors compared with preoccupied subjects. The fearful, dismissing, and secure subjects also spent significantly less on annual visits to primary care physicians (Ciechanowski et al., 2002).

Preoccupied individuals tend to report somatic symptoms very often and become high medical utilizers. In certain circumstances, they may even become dependent on their medical providers. If one doctor fails to acknowledge the severity of their physical symptoms, they will switch doctors until one provides them with validation of their illness. Preoccupied individuals are diagnosed with somatization more often than any other attachment style (Ciechanowski et al., 2002). This can be problematic because doctors may think all of the patients' symptoms are manifestations of psychological problems. When a real symptom occurs, such as chest pain signaling a heart attack, it may be downplayed and treatment for an emergency condition may be delayed.

It is also interesting to note that insecure patterns of attachment are much more prevalent in a group of patients suffering from somatoform disorder compared to a non-clinical population. Whereas 50-60 percent of non-clinical subjects self-

report a secure attachment type, Waller et. al. (2004) found only 25.7 percent of their somatizing patients were secure compared to 48.6 percent dismissive and 25.7 preoccupied. Insecure-dismissing attachment may involve the diverting of attention from internal feelings of distress. Among somatoform patients, insecure-dismissive attachment positively correlated with number of hospitalizations ($r = .41$) more strongly than visits to a general practitioner ($r = .23$). The dismissive individuals may have a great deal of symptoms but are reluctant to share with others. Many of these symptoms may be psychogenic in origin, but some may also be due to a general medical condition. The mentality of these patients may lead them to skip routine medical visits and allow treatable conditions to worsen.

The conclusions from these studies are that preoccupied individuals report more symptoms than securely attached individuals. However, these studies have not sufficiently studied dismissively attached individuals. In dismissively attached individuals, somatization might be the result of the failure to recognize and appropriately deal with negative affect. These individuals may be unaware of their underlying anxiety and/or anger and not have properly dealt with these emotions. These unresolved emotions may therefore get expressed in the form of unexplained physical symptoms. Just because these dismissive individuals don't report their symptoms doesn't mean that their symptoms are not troubling, as shown by Waller et al., (2004). In order to adequately assess the emotional conflicts of a dismissively attached individual, it may be necessary to utilize implicit measures of emotion, which will be a major component of the studies conducted in this thesis.

The studies discussed above have provided evidence that attachment style is associated with emotional awareness and somatization in a clinical population. However, these studies have not controlled for variables like depression, anxiety, and emotional awareness that have been shown to be related to somatization. As a result, the true impact of attachment style has not been adequately assessed. I now turn my focus to measures of attachment style and to the topic of implicit measures of emotion that will be addressed in several of the studies that follow.

Measures of Attachment Style

Although it is clear that attachment style is important in clarifying the link between affect regulation and somatization, any study which attempts to do so will need to deal with some important measurement issues. Perhaps the most important of these involves the measurement of attachment style itself. A brief review of this matter will make clear the importance of choosing an appropriate measure from a diverse set of attachment measures.

George, Kaplan, and Main (1985) developed the Adult Attachment Interview (AAI) to assess attachment style in adults. The AAI is a structured interview that probes for attachment-related autobiographical memories in childhood and codes for the thoughtfulness and coherence in which the individual is able to describe these past relationships. It is possible for an adult to describe problematic childhood experiences in a coherent fashion, allowing for an insecure attachment style in childhood and a secure attachment style as an adult. The AAI classifies adults into three main categories that parallel Ainsworth et al (1978) classification of infants. Secure adults

tend to value attachment relationships and see them as important, as well as being able to coherently describe their past experiences even if they were negative.

Dismissive adults tend to devalue attachment relationships and have lack of memories of their childhood experiences. Preoccupied adults are unable to describe their past relationships coherently and may even express anger when discussing their relationships with their parents (Bakermans-Kranenburg & van Ijzendoorn, 1993). Finally, adults showing unresolved responses to loss and problematic discourse of past events may receive the classification of Unresolved.

Preliminary studies assessing the reliability of the AAI have shown inter-rater reliability of 88% when two coders were asked to score 16 separate interviews (Bakermans-Kranenburg & van Ijzendoorn, 1993). When examining test-retest reliability, subjects were interviewed two months apart by different interviewers. Seventy-eight percent of subjects were classified into the same category two months after ($\kappa = .63$). To establish discriminant validity of the AAI, subjects were tested on a non-attachment related autobiographical memory task. Dismissives were able to perform well on the non-attachment memory task indicating that their lack of coherence about childhood memories is attachment-related and not a general memory deficit.

The major downside of the AAI is the prohibitive costs and training associated with it. To become certified to conduct and code interviews, an individual must complete 60 hours of formal training and an additional 16-24 months of scoring practice cases. The cost of the training is approximately \$2000-\$3000 and it can take

as long as two hours to conduct each interview (Sroufe, 2010). These sizeable disadvantages argued against using the AAI as a measure of attachment style in the current study. Previous research has not used the AAI to investigate the role of attachment style on somatization.

A second way of assessing attachment style is Bartholomew and Horowitz's (1991) Relationship Questionnaire (RQ), a widely used self-report measure. It contains descriptions of the four attachment prototypes (secure, dismissive, preoccupied, and fearful) and participants are asked to rate how accurately each prototype described their overall experiences in romantic relationships. It can be used as a categorical measure of attachment style in which each individual is classified according to the prototype that gets the highest score.

To examine the test-retest reliability of the RQ, Sibley et al (2005) ran models predicting RQ scores taken 3 weeks later from baseline RQ scores. Correlations between pre and post RQ measures averaged around .7 which indicates moderate reliability for this measure. The RQ may be prone to some measurement error, but it is considered a viable option to assess attachment style when time constraints and survey length are pressing concerns. Since the RQ is a relatively quick and accurate snapshot of attachment style, it is used throughout studies 1-4. The RQ has been previously linked to the study of somatization (Ciechanowski et al, 2002).

A second self-report measure used in attachment research is the Experiences in Close Relationships Scale (ECR). This is a 36-item measure that yields scores on two continuous dimensions of attachment style, anxiety and avoidance (Brennan et al,

1998). Attachment-related anxiety represents an individual's predisposition towards anxiety dealing with interpersonal rejection. Attachment-related avoidance corresponds to a reluctance to be dependent or close with others (Fraley and Shaver, 2000).

The ECR has demonstrated high reliability, with a cronbach alpha of .91 for the anxiety scale and .94 for the avoidance scale (Vogel & Wei, 2005). Sibely et al (2005) evaluated the validity of the ECR by having subjects keep a social interaction diary. The ECR measures of romantic attachment anxiety and avoidance predicted approximately 85% of the variance in anxiety and avoidance as revealed in the social interaction diary.

Having given a basic overview of attachment measures, I'd like to briefly mention how implicit measures can be used to assess emotional states and their advantages over self-report measures. Implicit measures of emotion are a major component of studies 2-4 that follow. Although there are legitimate issues surrounding the use of the implicit measures, decreasing the influence of social desirability outweighs these concerns.

Implicit Measures

Since the measurement of emotional states via self-report, is highly suspect (Lottridge and Chignell, 2009), the value of other approaches to measurement is a central concern of this thesis. One alternative approach to self-report is the use of implicit measurement. Implicit measurement has been an important development in social psychology over the last decade, particularly for measuring attitudes on

controversial and sensitive matters such as race and gender. I believe that the approach also has value for measuring emotional states. I begin with a brief review of the Implicit Association Test (IAT) and then conclude with a discussion of the merits of the approach for the current research

Implicit attitudes manifest as judgments or attitudes that are controlled by automatically activated evaluations without the performer's awareness of the causal mechanisms of these evaluations (Greenwald, McGhee, & Schwartz, 1998). The Implicit Association Test (IAT) was designed by Banaji & Greenwald (1995) and has traditionally been associated with measuring stereotyping. The basic format is that a pair of concepts are defined by a series of words and then pitted against each other. In the first step of the procedure, the target-concept discrimination, subjects are asked to classify each stimulus presented as belonging to either the first category or the second category. For example, subjects may be presented with the two categories, black and white. They are asked to classify names such as Meredith, Latonya, Heather, and Shavonn as belonging to either the black category or white category (Greenwald, McGhee, & Schwartz, 1998). A single stimulus word, e.g., Heather, is presented in the center of the screen and one category appears on the left side of the screen, while the other category appears on the right of the screen. If the stimulus belongs to the left category, the subject responds by hitting a marked key on the left side of the keyboard. If it belongs to the right category, a similarly marked button is pushed on the right side of the keyboard. This is necessary in order to validate that the subject

knows the meaning of each stimulus. Typically, subjects are allowed to remove stimuli that are either unfamiliar or they feel do not belong to either category.

The second step involves classifying the accompanying attribute dimension that is associated with the previous categories. In the case of looking at stereotyping behavior, the concepts of black and white are associated either with pleasantness or unpleasantness. In the second part of the task, subjects are asked to classify stimuli associated with pleasantness or unpleasantness. For example, the words lucky, honor, disaster, and hatred have to be classified. Once again, this is to ensure that the subject knows the meaning of the stimuli and allows for the subject to remove any stimulus that appears to be not a good indicator of either category (Greenwald, McGhee, and Schwartz, 1998).

The third step involves combining the target categories (White and Black) with the attribute dimensions (Pleasant and Unpleasant). In 50% of trials, Black would be paired with pleasant and White would be paired with unpleasant. A single stimulus belonging to either one of the four categories would be centrally presented. For example, Jasmine, lucky, Colleen, evil could be one possible sequence of stimuli to be presented. Reaction times and accuracy of classification is then recorded via computer. In the other 50% of the trials, Black would be paired with unpleasant and White with pleasant.

Step four involves reversing the pairing of the categories in step three. In this case, Black would be paired with unpleasant and White with pleasant or vice versa depending on what the pairing was on the previous trials. Also, to counterbalance the

effect of side of the screen, the categories are switched from left to right or from right to left (Greenwald, McGhee, and Schwartz, 1998). In order to classify implicit attitudes or bias, the reaction times are compared between steps three and four. If subjects respond faster classifying pleasant words when the category pleasant is paired with Black than when pleasant is paired with White, and are faster classifying unpleasant words when unpleasant is paired with White than when it is paired with Black, it indicates an implicit Black bias. Similarly, if subjects respond faster classifying pleasant stimuli when pleasant is paired with White than when pleasant is paired with Black, and are faster classifying unpleasant words when unpleasant is paired with Black than with white they are classified as showing an implicit White bias.

The majority of the literature on implicit measures focuses on stereotyping. One of the goals of this thesis is to investigate if the IAT can be used to measure emotional states. Previous research has indicated that this may be a possible use of the IAT. For instance, Karpinski (2004) developed a self-esteem IAT which measures the positive and negative associations a person has with the self and with others (Karpinski, 2004). For example, one first needs to classify stimuli related to self and to other. This can include personally relevant information such as name, city of residence, etc. Once these stimuli are categorized, each subject then needs to classify pleasant vs. unpleasant words. In the final stage, pleasant or unpleasant is paired with self or other stimuli and subjects need to classify each target stimulus. If a person has many positive associations and few negative associations with the self,

then the self + pleasant task will be very easy and reaction times should be very low. Also, reaction times to the self + unpleasant task should be very high (Karpinski, 2004). Karpinski (2004) also found that implicit and explicit self-esteem did not correlate. Once again, self-report bias may be in effect here with subjects unwilling to portray themselves in a negative light on the Rosenberg Self-Esteem Scale.

Another instance of applying the IAT to the measurement of emotions was the Egloff and Schmukle (2002) anxiety IAT. Following the self-esteem IAT paradigm of Greenwald and Farnham (2000), they had subjects make classifications of self vs. other and then had them make classifications of calmness vs. anxiety. Subjects classified items an average of 141 ms faster in the self + calm condition than in the self + anxiety condition. This result is similar to what Greenwald & Farnham (2000) found when they measured implicit self-esteem using the IAT. In the self + positive conditions, subjects categorized items an average of 323 ms faster than in the self + negative conditions. They observed the same positive bias when examining the self-report measures of self-esteem. It may be human nature to think positively about the self and this strong tendency may be resistant to more subtle ways to measure self-esteem, such as the IAT. The IAT traditionally operates by using polar opposite categories and the contrast between anxiety and calm may not have been great enough to overcome this “positivity” bias.

Capacity for emotion regulation has also been studied using the IAT. Automatic emotion regulation refers to unconscious, and effortless strategies that individuals engage in during emotional situations (Mauss, Evers, Wilhelm, & Gross,

2006). Repression would be an example of automatic emotion regulation, and it is motivated by an individual's need to remain unaware of emotions that are too painful or divergent from the ideal self (Freud, 1961). Since automatic emotion regulation strategies are outside the individuals' conscious awareness, self-reports of this construct are fairly useless. Since self-reports are unable to capture this process, an IAT was adapted to measure automatic emotion regulation.

In Egloff and Schmukle's study (2002), anger was induced in the subjects by forcing them to perform a tedious counting task. Individuals that showed a higher level of implicit emotion regulation, i.e., they had more positive implicit evaluation of emotion regulation, reported less anger and greater levels of relaxation following the anger inducing task. Subjects with high levels of implicit emotion regulation also had better cardiovascular reactivity, increased sympathetic activation and greater cardiac output (Mauss, Evers, Wilhelm, & Gross, 2006). This implies that emotion regulation may be strongly associated with a decrease in the risk factors predicting cardiovascular disease. Also, failure to regulate emotion does in fact contribute to problems with somatization. The failure to resolve anger issues in this scenario contributes to physical changes in the body. With continued failure to adequately regulate emotion, these physical symptoms that are psychogenic in origin may evolve into more serious health concerns.

These pioneer studies on using the IAT to study emotion-related phenomena pave the way for the anxiety-anger IAT that is developed in Study 2. However, it is

important to acknowledge some of the possible pitfalls associated with using the IAT. We start with some of the major challenges to the IAT.

Challenges to the IAT

One challenge to the IAT is that some investigators believe that attitudes are not being measured; instead it is the familiarity of the stimuli that is being assessed. Dasgupta, Greenwald, & Banaji (2003) examined this familiarity effect by replacing the names of Black and White individuals on the IAT with unfamiliar pictures of individuals. Similar results were obtained when pictures were used instead of names, thus providing evidence to rule out possible familiarity effects.

A second challenge to the IAT is that it reflects some purely cognitive mechanism and not a true affective judgment about a given category. Phelps et. al. (2000) showed that the magnitude of preference for Black vs. White faces on the IAT was directly related to differential activation of the amygdala. The amygdala is a sub-cortical structure implicated in emotional response as well as emotional learning and memory. Subjects that showed an implicit preference for white faces, showed greater amygdala activation when shown a series of six white faces and asked to classify a single black face while being scanned. Similar results were obtained for black faces when the subject's IAT indicated an implicit black bias. This study suggests that the IAT measures an emotional response to a stimulus.

However, the biggest challenge to the IAT has been put forth by Blanton and Jaccard (2006). They argue that the IAT operates using an arbitrary metric. An

arbitrary metric is when it is not known where a given score locates an individual on the underlying psychological dimension or how a one-unit change on an observed score reflects a change on the construct being operationally defined. In the case of the IAT, the difference in reaction times between compatible and incompatible trials determines the magnitude of the bias. For example, if a person is faster when white is paired with good and black with bad compared to when white is paired with bad and black with good; he or she is classified as being implicitly racially biased. The reaction time differences between these two pairings determine the magnitude of the bias (i.e., very strong bias, strong bias, moderate bias, or no bias). Blanton and Jaccard (2006) refer to this type of practice as meter reading. One cannot use differences in milliseconds to claim real attitudinal differences because there is not an established mapping between time in the IAT sense and observable differences in behavior in racial bias. Specific millisecond differences must be linked to observable events relevant to the psychological dimension of interest. They are basically saying that the IAT is an ordinal level of measurement, lacking a true zero point and not having equal intervals between points on the scale.

In response to these criticisms, Greenwald et al. (2006) claim that there is extensive predictive and convergent validity of the IAT when it comes to measuring discrimination, violence, and many other clinical constructs. Their use of strong, moderate, or no bias is more of a guide and not to be used as a sole indicator of the construct being measured. The criticisms offered by Blanton and Jaccard (2006) need to be taken seriously. However, they do not make the IAT an obsolete measure, just

one that needs to be taken in context. Throughout the series of studies that follow, the IAT will be used as one of several indicators of the constructs being measured. Labels such as strong, moderate, weak, etc. will not be used to describe any IAT related results as a valid meaning for these labels has not been established. Reaction time and errors on the IAT will be used as implicit measures, but never sole measures of a given construct.

This opening chapter has established the link between problems with emotional awareness, regulation, and the development of somatization. The role that attachment style plays in moderating this relationship is a topic that needs further investigation. The studies that follow attempt to examine the interpersonal deficits in emotional awareness that can contribute to the development of somatization. These studies will focus on the role of attachment style and the use of implicit methods to measure emotion. Implications and possible alternative treatments for this debilitating condition will be discussed.

Study 1- The Personality Correlates of Somatization

Somatization is a troublesome clinical disorder that has been linked to difficulties with emotional awareness and regulation (Lipowski, 1988). Most patients with somatization disorder experience their first symptoms before the age of 15 years, suffer with it for an average duration of 15 years, and experience long-term psychological impairment (Essau, 2007). As adolescents become older, there is also a tendency for somatic symptoms to increase (Eminsin, 2007).

Despite the prevalence of this disorder, it is challenging to adequately resolve. Relaxation and biofeedback may offer some improvement, but in many cases somatization does not respond effectively to standard treatment (Eminsin, 2007). There is some evidence that attachment focused therapy may be as effective, if not more effective, than cognitive behavioral therapy (CBT) in treating somatization (Waller et al., 2004).

Previous research has linked attachment style to somatization, but this has primarily involved clinical patients (Ciechanowski et al., 2002; Waller et al., 2004). In a large sample of health care users, those with preoccupied and fearful attachment styles had more doctors' visits and increased healthcare-related costs compared with securely attached individuals. Stroebe et. al. (2006) have indicated that insecurely attached individuals engage in inappropriate patterns of disclosure in the coping process. These individuals are unable to properly regulate their emotions and as a result have troublesome physical symptoms when under stress.

Another construct that may play an important role in somatization is emotional awareness. Emotional awareness can be measured via alexithymia, a multifaceted personality trait that involves a marked difficulty in identifying feelings and describing them to others (Bagby and Taylor, 1997). Individuals with this condition are often unaware of their emotions and are unable to manage them effectively.

Weardon et al. (2003) and Troisi et al. (2001) have shown that alexithymia is significantly associated with both a dismissive attachment style and symptom reporting. Somatic complaints and pain without a true organic cause have been extensively linked to the construct of alexithymia, and it has been estimated that up to 47 % of people attending pain clinics show alexithymic features (McDonald & Prkachin, 1990).

The goal of this first study is to examine the role of attachment style, emotional awareness, and several measures of negative affect in predicting somatization in a non-clinical, student population. Since somatization can be measured on a continuum, a non-clinical population should exhibit some degree of somatization, but most likely not as extreme as a clinical sample. State anxiety, depression, and fear of negative evaluation (an indicator of social anxiety) were all examined because they have been shown to exist co-morbidly and could contribute to somatization (Lowe et al, 2008).

The first hypothesis to be tested is that dismissively attached individuals will have the highest levels of somatization due to their inability to recognize and share

their negative emotions. The second hypothesis is that clinical alexithymics will report more symptoms due to their lack of emotional awareness compared to non-alexithymics. The third hypothesis to be tested is that gender and alexithymia will moderate the relationship between attachment style and somatization. Women tend to be more effective at recognizing and expressing their emotions (Larsen et al., 1996). Therefore, their levels of alexithymia may be lower, and their attachment style may play a more important role when dealing with their negative emotions. The fourth and final hypothesis to be investigated is that attachment style, independent of alexithymia, depression, health-related anxiety, and somatic amplification will predict somatization. This will allow for the unique contribution of attachment style in predicting anxiety to be assessed.

Method

Participants

One-hundred and twenty two (N=122) subjects were recruited from the Rutgers University subject pool. Seventy-six females and 46 males participated. Thirty-one participants classified themselves as Caucasian, 36 as African American, 25 as Asian, 12 as Hispanic, and 18 as Other. Thirty-six were classified as securely attached, 34 as dismissive, 27 as preoccupied, and 25 as fearful. Ninety-eight participants were classified as having normal levels of emotional awareness while the other 24 were classified as clinically alexithymic.

Materials and Procedure

To measure somatization, the Somatic Symptom Inventory (SSI) developed by Barsky and Wyshak (1990) was employed. The SSI is a 26 item self-report inventory of bodily sensations, symptoms, and subjective overall health (Hammad, Barsky, & Regestein, 2001). Responses are given on a five point Likert scale with 1=*Not at All* and 5=*A Great Deal* (See Appendix A for all measures used). It shows very high reliability, Cronbach's $\alpha=.943$, and convergent validity via its strong correlation with other health-related measures such as health anxiety and somatic amplification.

Attachment style was measured using the Relationship Questionnaire (RQ) developed by Bartholomew and Horowitz (1991) and the Experiences in Close Relationships Scale (ECR) developed by Brennan et al. (1998). To review, the RQ consists of four paragraphs, with each paragraph describing one of the four attachment styles. Each subject is instructed to place a check next to the paragraph that best describes him or her. After checking off the appropriate paragraph, subjects are asked to rate on a 7-point Likert scale how well each paragraph describes them. Thus the RQ provides both a categorical and a continuous measure of attachment style.

The ECR provides continuous measures of attachment anxiety and avoidance, which are two orthogonal dimensions making up attachment style. The ECR consists

of 36 items each measured on a 7-point Likert scale that asks how much one endorses each statement that captures various aspects of a romantic relationship.

The Fear of Negative Evaluation (FNE) scale developed by Watson and Friend (1969) is a 30 item true-false measure that assesses one's fear of being criticized. It shows very good reliability, Cronbach's $\alpha=.918$, and shows convergent validity with traditional tests of anxiety such as the Manifest Anxiety Scale.

The Somatic Amplification Scale (Barsky et al., 1990) is a short 10-item Likert scale that asks how aware and disturbed one is by various internal physiological sensations. It has moderate reliability with a Cronbach's $\alpha=.694$ and shows convergent validity by its moderate correlation with somatic symptoms.

Alexithymia was measured using the Toronto Alexithymia Scale (TAS), a 20-item Likert scale developed by Bagby, Taylor and Parker (1994). It exhibits good reliability with Cronbach's $\alpha=.868$, with good validity demonstrated via correspondence with clinical interview.

The Health Anxiety Inventory (Salkovskis et al., 2002) is an 18-item measure used to assess health anxiety and hypochondriasis. It exhibits very high reliability with Cronbach's $\alpha=.917$ and strong validity by being able to separate clinical patients from non-clinical patients on hypochondriasis.

The state anxiety component of the State Trait Anxiety Inventory (Spielberger et al., 1970) is a 20-item subscale used to assess state anxiety. It has very good

reliability with Cronbach's $\alpha=.921$ and good validity through its strong correlation with other measures of anxiety such as the Manifest Anxiety Scale.

The final measure used was the Beck Depression Inventory (Beck et al., 1961) which is a 21-item scale self-report scale used to assess depressive symptoms. It has high reliability, Cronbach's $\alpha=.899$, and strongly corresponds with psychiatric evaluations of patients. Each subject spent approximately 40 minutes completing this packet of questionnaires.

Results and Discussion

To examine hypothesis one, a One-way Analysis of Variance (ANOVA) was performed on somatization scores with attachment style as the independent variable. An overall significant difference in somatization scores grouped by attachment style was found, $F(3,119) = 9.189, p < .001$. A Tukey HSD test revealed that preoccupied individuals ($M = 2.2786, SD = .78361$) showed higher levels of somatization than secure ($M = 1.5630, SD = .34464$) and dismissive attachment styles ($M = 1.5362, SD = .46366$), but fearful participants ($M = 1.8082, SD = .89603$) did not differ from secures (see Figure 1). This result failed to support the hypothesis that dismissively attached individuals would have the highest levels of somatization. It is possible that dismissive individuals are less likely to self-report symptoms due to a general lack of sharing such information (Stroebe et al., 2005). Using only self-report measures, it is hard to determine if these individuals are failing to report these symptoms or they actually do not have the symptoms to report.

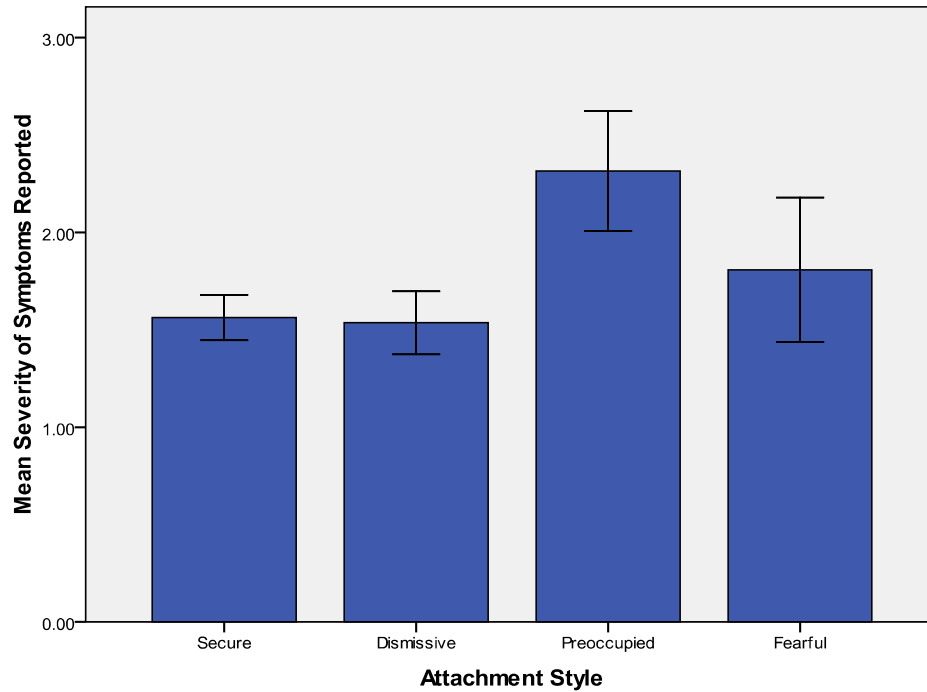


Figure 1: Severity of symptoms reported as a function of attachment style

The second hypothesis was that higher levels of alexithymia will be associated with an increase in somatic complaints. An independent groups t-test was used to examine the difference in somatization between subjects demonstrating clinical alexithymia and normal controls. Subjects scoring equal to or above a score of 54 on the Toronto Alexithymia Scale (TAS-20) were classified as clinically alexithymic according to criteria used by Bagby et al. (1994). A significant difference was found with clinical alexithymics ($M=2.1614$, $SD=.80481$) showing greater levels of somatic complaints compared to non-alexithymics ($M=1.6786$, $SD=.63471$), $t(121) = -3.207$, $p = .002$ (see Figure 2).

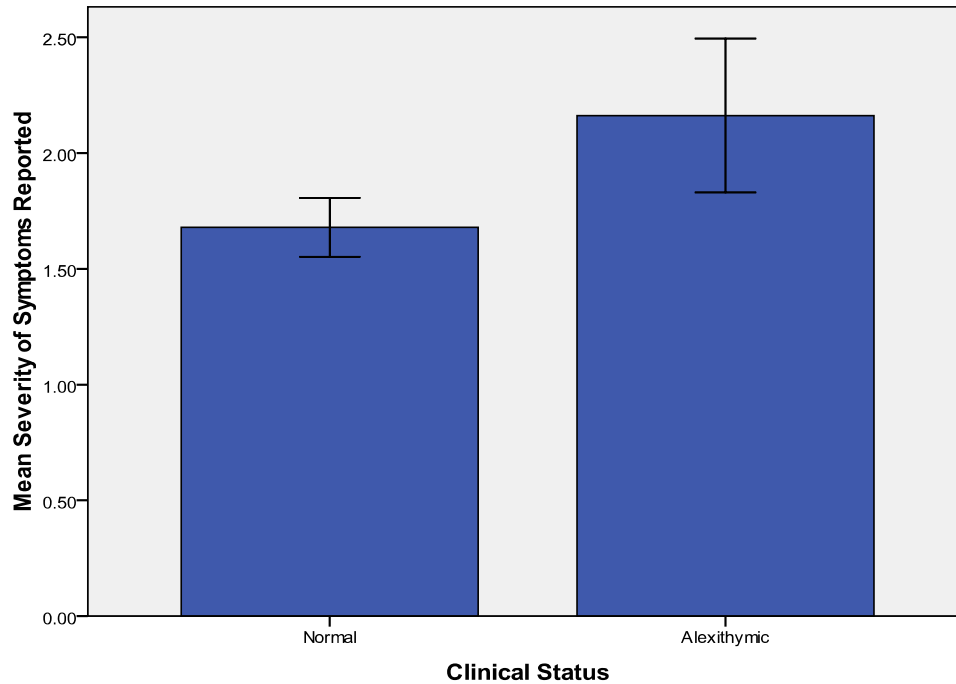


Figure 2: Severity of symptoms reported for clinical alexithymics and normal controls

The third hypothesis that was tested was that gender and alexithymia will moderate the relationship between attachment style and somatization. A three-way factorial ANOVA (2 x 2 x 4) was used to examine the role of alexithymia, attachment style, and gender on somatization. There was a significant main-effect for gender with females ($M=1.8729$, $SD=.72645$) reporting more symptoms than males ($M=1.5781$, $SD=.57061$), $t(120) = -2.333$, $p=.021$. There was also a significant main effect of alexithymia, with alexithymics ($M=2.1614$, $SD=.80481$) reporting more symptoms than normals ($M=1.6786$, $SD=.63471$), $t(120) = -3.207$, $p=.002$. A significant interaction between attachment style and alexithymia was discovered, $F(3, 107) = 2.729$, $p = .048$ (see Figure 3). There was no significant three-way

interaction between gender, attachment style, and alexithymia, $F(2,107) = 1.669$, $p = .193$.

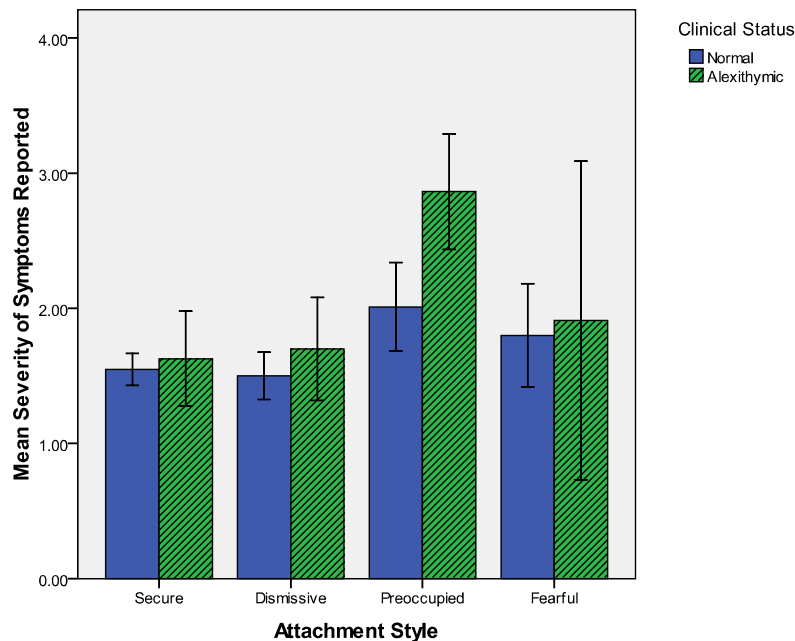


Figure 3: Severity of symptoms reported as a function of attachment style and alexithymia

This significant two way interaction shows that alexithymics who are preoccupied report the most symptoms. Alexithymics are unaware of their emotions and thus fail to effectively deal with their negative emotional states such as anxiety and anger. This may lead to an increase in the number and severity of functional somatic complaints. However, preoccupied individuals are aware that their coping mechanisms are faulty and are possibly afraid that their loved ones will leave them if they burden them with all of their troubles. Reporting their symptoms may be a way of reaching out for help or demanding attention in order to keep their attachment

figures close at hand. Alexithymics who are also preoccupied are suffering and telling their loved ones exactly how they feel and hoping that they get taken care of.

The fourth and final hypothesis examined the impact of attachment style above and beyond several other measures of negative affect that have been previously linked to somatization (Katon et al, 1982; Taylor et al, 1997; De Gucht and Heiser, 2003). To investigate this hypothesis, a multiple hierarchical regression analysis was used with somatization as the criterion. In the first model, fear of negative evaluation, somatic amplification, alexithymia, state anxiety, health anxiety, and depression were all entered simultaneously. Model 1 predicted 42% of the variance in somatization, which is a good fit. In the next step, or Model 2, attachment style was added to the previous model in the form of attachment anxiety and attachment avoidance. These are two continuous and orthogonal dimensions of attachment style. The fit of Model 2 significantly improved and accounted for now 46% of the variance in somatization

Table 1

Fit of regression models predicting somatization from indicators of negative affect and attachment style

Model	R	R Square	Adjusted R Square	R-Square Change	p
1	.651	.42	.39	.42	<.001
2	.679	.46	.42	.04	.02

Predictors Model 1: State Anxiety, Somatic Amplification, Alexithymia, Fear of Negative Evaluation, Health Anxiety, Depression

Predictors Model 2: State Anxiety, Somatic Amplification, Alexithymia, Fear of Negative Evaluation, Health Anxiety, Depression, Avoidance in Close Relationshi

Examining the R-Squared change from Model 1 to Model 2, there is a significant increase in the variance accounted for simply by adding avoidant and anxious attachment style as predictors, $F(2,112) = 3.92$, $p = .02$. Anxiety in Close relationships is primarily accounting for this increase; see Table 2 for a list of standardized coefficients.

Table 2
Regression coefficients of variables used to predict somatization

Model		Unstandardized		Standardized		
		Coefficients		Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	1.222	.507		2.412	.017
	Depression	.391	.195	.214	2.008	.047
	Health Anxiety	.252	.125	.186	2.021	.046
	Somatic Amplification	.280	.077	.317	3.626	.000
	Alexithymia	.047	.107	.038	.436	.664
	Fear of Negative Evaluation	.002	.007	.023	.269	.789
	State Anxiety	-.148	.123	-.119	-1.211	.228
2	(Constant)	.762	.725		1.051	.296
	Depression	.275	.195	.150	1.412	.161
	Health Anxiety	.234	.122	.173	1.918	.058
	Somatic Amplification	.226	.079	.256	2.853	.005
	Alexithymia	.050	.105	.041	.478	.633
	Fear of Negative Evaluation	.001	.007	.008	.092	.927
	State Anxiety	-.149	.123	-.120	-1.217	.226
	Anxiety in Close Relationships	.307	.116	.208	2.653	.009
	Avoidance in Close Relationships	-.100	.109	-.070	-.911	.364

From this analysis, it can be concluded that attachment style, as measured by the ECR's anxiety dimension of attachment is measuring somatization independent of all these other constructs. The avoidance dimension did not significantly contribute to the model. By entering attachment style last, we can conclude that at least some dimension of attachment style plays an important role in somatization beyond these other co-morbid measures of negative affect.

The current study established attachment style and emotional awareness/alexithymia as important constructs related to somatization. However, the regression model only accounted for 46% of the total variation in somatization, leaving more than half the variance unexplained. In order to further investigate the possible role of the various negative affective states related to somatization, an exploratory factor analysis with varimax rotation was carried out to see if some of these variables combine to represent underlying latent constructs that could provide better predictive power.

The results of the factor analysis yielded two orthogonal constructs (see Table 3). The first factor accounted for 30% of the variance in the data and was primarily composed of alexithymia and fear of negative evaluation. The second factor accounted for 27% additional variance and was composed of somatization (SSI), somatic amplification, and health anxiety. Depression loaded poorly ($< .30$) on both constructs and was not included in the final analysis.

Table 3
Factor Loadings of Emotional States that are Co-morbid with
Somatization

	Component	
	1	2
Somatic Amplification	.886	.034
Health Anxiety	.781	.264
Somatization	.713	.360
Alexithymia	.109	.759
State Anxiety	-.250	-.747
Fear of Negative Evaluation	.179	.735

The first factor clearly represents somatic complaints while the second factor was given the label, Emotional Unawareness and Evaluative Concern (EUEC). Individuals with high levels of this construct lack the ability to use emotion as information and therefore constantly fear that others may be thinking negatively about them. A one-way ANOVA with attachment style as the factor and Emotional Unawareness and Evaluative Concern as the dependent variable shows that there is a significant effect of attachment style, $F(3,117) = 17.309$, $p < .001$. The preoccupied style showed the highest levels ($M = .742$, $SD = .99$) and fearfuls the lowest levels of ($M = -.731$, $SD = .841$). Study 4 will reintroduce EUEC and further examine its possible role in somatization.

Somatization is just one aspect of affect dysregulation. Since attachment style played such an important role in predicting the severity of symptoms being reported, it is possible that it could also play a role in other aspects of affect dysregulation. The hierarchical regression model accounts for only approximately 42% of the variance. It may be that other variables associated with somatization are not being measured appropriately. A primary concern with the somatization study was that it consisted entirely of self-report data. Many researchers have pointed out the weaknesses of self-report data (Klesges et al., 1990; Sims et al., 1999; Schacter, 1999). It is also likely that individuals with dismissive and fearful attachment styles may not be able to adequately describe their affective state via self-report. Having both implicit and explicit measures of a construct might allow for stronger conclusions than those derived from the use of self-report only.

Stuart and Noyes (1999) and White and Farrell (2006) have claimed that negative affect following stressful events can precipitate and /or aggravate somatic complaints. Since stressful events activate the attachment-behavioral system, a moderate amount of stress may be needed for attachment style to have its maximal impact on somatization. Study one was limited in that stress was not induced, only one negative affective state was measured (anxiety), and no implicit measures were taken. Study two will attempt to address these concerns and examine the effect of attachment style on implicit measurement, a topic that has not been previously investigated. The differences in how individuals with each attachment styles regulate

their emotions may play a key role in determining how susceptible they are to developing somatic complaints.

Study 2-The Role of Attachment Style on Emotional Self-Awareness and Expression: Examining the Differences between Implicit and Explicit Measures of Negative Affect following a Stressor

Having shown in Study 1 that attachment style and alexithymia contribute to somatization, this next study aims to further explore the differences in emotional self-awareness and expression among attachment styles that may contribute to somatization. Alexithymia is an important clinical construct that encompasses emotional self-awareness, but it also captures how one reads emotions in others and how one attributes the bodily sensations they experience. Since we are interested in only emotional self-awareness and alexithymia is too broad a construct, a newly created emotion-based Implicit Association Test (IAT) was compared to self-report measures of negative affect.

Previous research has indicated that in certain situations, people are either unaware of or unwilling to share their attitudes or emotions with others (Greenwald & Banaji, 1995). In study 1, when individuals are asked to self-report their emotions and physical symptoms, some individuals are able to comply while others are not. This is important because the recognition and sharing of negative emotions is beneficial. In Pennebaker's (2001) research, subjects who were instructed to share emotions consistently rated the sharing as being more beneficial to them in general, relieved their negative emotions more, and helped them more cognitively and interpersonally than subjects who were not instructed to share emotions.

Emotional inhibition, especially under times of stress, may lead to chronic physiological arousal and in turn physical symptoms, abnormal immune responses,

and potentially disease (Pennebaker & Traue, 1993). If individuals inhibit emotion for long periods, there is a greater probability that illness may develop. Sanchez – Martin (2001) has discovered that young children with higher levels of arousal and behavioral inhibition are more susceptible to colds or other illnesses. Also, Cole et al. (1996) have shown that homosexual men who are not open about their sexual orientation and are HIV-positive die earlier from full blown AIDS than homosexuals who are open about their sexual orientation.

Kelly et al. (1997) examined the effect of emotional disclosure on joint pain in rheumatoid arthritis patients. Rheumatoid arthritis is an autoimmune disease leading to chronic widespread inflammation of the peripheral joints which can lead to marked disability. Stressful life events tend to precede the onset of the disease and are also highly correlated with flares of the disease. Three months after participating in the Pennebaker disclosure paradigm (Pennebaker, 1997), patients undergoing treatment showed better physical functioning than those not disclosing. Despite similar levels of inflammation of the affected joints, the patients with rheumatoid arthritis undergoing treatment showed a more positive mood and slightly less self-reported levels of pain.

Petrie, Booth, and Pennebaker (1998) have even shown that emotional suppression has direct detrimental effects on the immune system. Subjects were asked to either write about an important emotional experience (i.e., some personally relevant and distressing experience) or about what they did in the last 24 hours. Those subjects asked to write about a traumatic emotional event were then either asked to sit and reflect on what they had just written or to not think about what they

had just written about. Those in the emotional suppression condition had higher levels of tension three days following the manipulation compared to the control and non-suppression experimental groups.

Emotional suppression led to a lower level of free circulating lymphocytes in the blood. Specifically, there were lower levels of cytotoxic T-lymphocytes when subjects were asked to suppress their negative emotions. Suppression of negative thoughts over a long period of time may lead to impaired immune function (Petrie, Booth, & Pennebaker, 1998).

Previous research has not examined the role of attachment style and stress in the awareness and expression of negative affect. Stress may influence this relationship because it is able to fully activate the attachment behavioral system (Bowlby, 1978). Most of the stressors that have been traditionally employed in the attachment literature have been psychosocial in nature, revolving around some possible threat or loss. Mikulincer et al (2002) have demonstrated that even a superficial threat such as subliminally flashing the word “failure” on a screen can be enough to activate the attachment-behavioral system. Other stress-inducing procedures such as the cold-pressor task may produce a moderate amount of stress, but since the stress isn’t of an interpersonal nature, it is unlikely to fully activate the attachment-behavioral system.

An innovative method of identifying whether one is emotionally self-aware is to measure emotions both implicitly and explicitly. The Implicit Association Test (IAT) has been traditionally used to measure attitudes which people are not

consciously aware of or do not want to reveal to others (Greenwald & Banaji, 1995). The correspondence between IAT scores and self-reported emotions can be a way of assessing emotional self-awareness.

An Implicit Association Test (IAT) was designed to differentiate between the reaction of anger and anxiety after exposure to a stressor. The design of the IAT followed the basic principles set forth by Greenwald et al. (Greenwald & Banaji, 1995; Greenwald, McGhee, & Schwartz, 1998). The IAT generally consists of two contrasted target concept categories (i.e., self vs. other) and two contrasted attribute categories (i.e., pleasant vs. unpleasant) (Swanson et al., 2001). Anxiety and anger were chosen because they are typical short-term manifestations of emotional expression following a stressor (Osterman et al., 1999). Also, according to Plutchik's (2001) circumplex model of affect, anxiety and anger appear on opposite ends of the emotion spectrum. Opposite emotions were used instead of contrasting both anxiety and anger against a neutral category in order to maximize the effect of the IAT and avoid any positivity bias. Egloff and Schmukle (2002) found a positivity bias when developing an IAT used to measure anxiety. Subjects were much faster classifying a self-related word when it was paired with calm than a self-related word when it was paired with anxiety. It may be that social desirability is operating at an implicit level.

To address this concern, Egloff and Schmukel (2003) examined self-reported social-desirability and found it uncorrelated with self-report and implicit measures of anxiety. They then regressed IAT-anxiety, social desirability, and the interaction of IAT-anxiety and social desirability onto the State Trait Anxiety Inventory (STAI), an

explicit measure of anxiety. The interaction regression term was not significant leading them to the conclusion that social desirability is not a statistically significant moderator of implicit anxiety. However, it is difficult to draw this conclusion by using social desirability to predict an explicit measure that may also be influenced by social desirability. A pilot study that we conducted using anxiety vs. calm and anger vs. calm also exhibited this positivity bias. It is possibly due to social desirability, but also may be influenced by familiarity of the stimuli. Maybe calm-related words are just more familiar than anxiety and anger-related words and thus get classified much faster. There is some evidence for a recall bias and avoidance of possible threatening information (Foa and Kozak, 1986; Mogg et al, 1987).

On a related note, there could be the concern that the IAT is measuring self-image concerns rather than implicitly measuring emotions. Individuals may be actually feeling angry but may be able to avoid that implicit response because they see being angry as negatively affecting their self-image. Even though the two emotions show much overlap, there are subtle physiological differences that could be used to help determine whether an individual is behaving in a socially desirable way or experiencing a genuine emotion (Stemmler et al, 2001)

It was hypothesized that securely attached individuals would have a moderate correlation between implicit and explicit measures of anxiety and/or anger. Secure individuals are capable of integrating affective and cognitive processes even when they are exposed to stress (Crittenden, 1995). They are self-aware of their emotions but don't always share what they feel. They realize that in some cases it is good to

share your negative affect with others, and in other situations, it is better to keep the feelings inside. This healthy balance between sharing and withholding one's emotions may support the notion that securely attached individuals have a lower incidence of psychopathology compared with insecurely attached individuals (Mikulincer, 1998).

Dismissive individuals have a strong need for autonomy and most likely think that they can handle emotions on their own (Hazan & Shaver, 1987). They have learned to inhibit their negative affect and to steer away from situations that may be emotionally arousing (Crittenden, 1995). These dismissive individuals lack emotional self-awareness and have learned to distrust their emotions and their emotional schemata become segregated from verbalizable semantic knowledge (Liotti, 1995). There is an emphasis on cognitive processing over emotional awareness and expression. These individuals are hypothesized to report little to no negative affect, but implicit measures will reveal much higher levels of anxiety and/or anger. They should exhibit no correlation between implicit and explicit measures of anxiety and anger. These are the types of individuals who appear calm and in control at all times, but are suffering internally. Acting as if nothing is wrong in their lives does not resolve any stress that these individuals are dealing with.

Preoccupied individuals are hypothesized to self-report greater levels of anxiety and/or anger than measured implicitly because they desire proximity with their attachment figures. They should show a high correlation between implicit and explicit measures of anxiety and anger. They have learned to heighten the expression

of their distress in hopes of drawing attention which they desperately want (Crittenden, 1995). As adults, preoccupied individuals show predominately affective responses and minimize cognitive processing of emotion. They may overemphasize the amount of anxiety they feel and keep reminding their partner of their worries to keep their partner in close physical and emotional proximity. If their partner does not hear their cries for attention, they may react angrily as a last resort to possibly draw their partner's attention to them.

Finally, fearfully attached individuals are hypothesized to report moderate levels of anxiety and/or anger but show high levels of these emotions implicitly. They should exhibit a moderate correlation between self-reported and implicitly measured anxiety and anger.

Method

Participants

One hundred thirteen (N=113) subjects were run individually in one-hour long sessions. Five participants' data were removed; two due to excessive stress causing subjects requesting to end the study, and three for subjects committing an excessive number of errors (more than 50%) during the computerized IAT task.

Materials and Procedure

All subjects completed questionnaires assessing alexithymia, fear of negative evaluation (FNE), and attachment style using the Relationship Questionnaire (RQ) and the Experience in Close Relationships measure (ECR). Following this, subjects were given the stressor task. It consisted of performing difficult quantitative and verbal reasoning problems under extreme time pressure. Subjects were only given five minutes to complete 10 difficult algebra problems while being constantly reminded of the time remaining (see Appendix B for sample problems). They were then given three minutes to complete 10 difficult analogies. The order in which the subjects performed the quantitative and verbal problems was counterbalanced. After every minute the experimenter would comment, “You better keep moving, only four minutes remaining, three minutes, etc.” Warnings were also given at 30 seconds, and 10 seconds. These experimenter interruptions were designed to add to the collective stress of the task.

The stressor task was modeled after the Trier Social Stress Test (TSST), a widely used protocol for inducing psychosocial stress in a laboratory setting (Kirschbaum et al, 1993). The test typically consists of an evaluative component in which the subject is asked to assume the role of a job applicant interviewing for job in front of a panel of evaluators. In addition, there is also a numerical task in which the subject is interrupted by a member of the panel every time they make a mistake and asked to start over. In order to design an ecologically valid social stress task modeled on the TSST, undergraduates were exposed to familiar SAT type problems and told

that their performance would be evaluated by the faculty in the department. There was also both a math and verbal component as is the case with the TSST.

Following the stressor task, subjects were asked to complete the anxiety-anger IAT. This is a computer based categorization task in which subjects are first asked to answer some background questions. A list of words characteristic of “me” and “not me” is then generated based on their responses. A single word then appears in the middle of the screen and is categorized as either belonging with the word pair on the left of the screen or the word pair on the right of the screen. In the first condition of the IAT, anxiety is paired with a “not me” word, anger is paired with a “me” word, and an anger-related word needs to be categorized. In the second IAT condition, anxiety is paired with a “me” word, anger is paired with a “not me” word, and an anger-related word needs to be categorized. In the third IAT condition, anger is paired with a “me” word, anxiety is paired with a “not me” word, and an anxiety-related word needs to be categorized. In the fourth IAT condition, anger is paired with a “not me” word, anxiety is paired with a “me” word, and an anxiety-related word needs to be categorized. There were a total of 10 anxiety-related words and 10 anger-related words on the IAT.

After the IAT was completed, subjects were asked to complete self-report measures of anxiety and anger, as well as give ratings of their level of stress during the task. Since attachment is better activated under stress, in order to observe the maximum impact of attachment style on anxiety/anger, it was important that the subjects actually felt somewhat stressed during the task. Too little stress does not

activate the attachment-behavioral system adequately, while too much stress overtaxes the system and does not allow for subtle distinctions between insecure attachment groups (Ainsworth, 1978). A self reported level of stress was used as a manipulation check.

If subjects are faster classifying anxiety-related words on the IAT when anxiety is paired with a “me” word compared to when anxiety is paired with a “not me” word, this is classified as an implicit anxiety response. On the other hand, if subjects are faster classifying anger related words when anger is paired with a “me” word compared to when anger is paired with a “not me” word, then this is classified as an implicit anger response. The percentage of errors committed is analyzed in the exact same way. If subjects make fewer errors when classifying an anxiety word when anxiety is paired with a “me” word compared to when anxiety is paired with a “not me” word, this is classified as an anxiety response. If subjects make fewer errors when classifying an anger word when it is paired with a “me” word than compared with a “not me” word, this is classified as an anger response. Thus, each subject can be classified as exhibiting either an anxiety and/or an anger response. Magnitudes of these constructs could be assessed via differences in reaction time; however this was avoided due to Blanton & Jaccard’s (2006) criticisms of arbitrary metrics. The primary purpose of the following analysis was not classification of anxiety or anger responses via the IAT, but to test our hypotheses by examining the correspondence between implicit and explicit measures for the four attachment styles.

Results and Discussion

Sets of correlations grouped by attachment style were used to examine the correspondence between implicit and explicit measures. The bi-variate correlations were between self-reported anxiety (SR-ANX), self-reported anger (SR-ANG), reaction time for anxiety (RT-ANX), reaction time for anger (RT-ANG), errors for anxiety (ERR-ANX), and errors for anger (ERR-ANG). The latter four measures are all implicit measures derived from the anxiety-anger IAT.

As seen in Table 4, for securely attached individuals, there is a moderate relationship between self-reported negative affect and implicitly measured negative affect which supported the original hypothesis. The relationship is being carried mostly by RTANX which shows a moderate correlation with SRANX, $r=.402$, $p<.01$. There is no relationship between implicitly measured anger and self-report anger. As expected, the reaction time measures are strongly correlated and the error measures are strongly correlated indicating that these measures are operating in the same manner. The securely attached individuals show emotional awareness when dealing with anxiety, but the conclusions are less clear cut for anger. Securely attached individuals are able to disclose their problems and thus effectively deal with negative affect, but they know when to draw the line and not allow their anxiety and/or anger to spread out among their families, friends, and loved ones.

Table 4
Correlations among measures for a Secure attachment style

		SR-ANG	SR-ANX	RT-ANG	RT-ANX	ERR-ANG	ERR-ANX
SR-ANG	Pearson Correlation	1	.145	-.054	-.039	.150	.075
	Sig. (2-tailed)		.309	.709	.784	.292	.600
	N	51	51	51	51	51	51
SR-ANX	Pearson Correlation	.145	1	.308*	.402**	.038	.141
	Sig. (2-tailed)	.309		.028	.003	.790	.325
	N	51	51	51	51	51	51
RT-ANG	Pearson Correlation	-.054	.308*	1	.826**	.250	.179
	Sig. (2-tailed)	.709	.028		.000	.077	.210
	N	51	51	51	51	51	51
RT-ANX	Pearson Correlation	-.039	.402**	.826**	1	.119	.161
	Sig. (2-tailed)	.784	.003	.000		.405	.260
	N	51	51	51	51	51	51
ERR-ANG	Pearson Correlation	.150	.038	.250	.119	1	.772**
	Sig. (2-tailed)	.292	.790	.077	.405		.000
	N	51	51	51	51	51	51
ERR-ANX	Pearson Correlation	.075	.141	.179	.161	.772**	1
	Sig. (2-tailed)	.600	.325	.210	.260	.000	
	N	51	51	51	51	51	51

*. Correlation is significant at the 0.05 level (2-tailed).

** . Correlation is significant at the 0.01 level (2-tailed).

Table 5 depicts the relationships between variables for the dismissive attachment style. As can be seen there is no relationship between the reaction times for anxiety on the IAT and self-reported anxiety, $r = -.186$, $p = .474$. There is also no relation between errors on the implicit measure of anxiety on the IAT and self-

reported anxiety, $r=.090$, $p=.732$. There is also no relationship between implicit and explicit measures of anger. Although implicit reaction time for the anger measures moderately correlated with self-reported anger, $r=-.529$, $p=.029$, the error measure for anger, had no relationship with self-reported anger, $r=-.048$, $p=.854$. Taken together, these implicit measures of anger were not strongly associated with self-reported measures of anger which lends support to the hypothesis that there is a marked divergence between implicit and explicit measures of negative affect amongst the dismissively attached. It could be that these individuals are unaware of their emotions and therefore cannot adequately disclose their negative feelings to others. They value their independence and confiding their problems to others under stressful conditions is not seen as necessary or helpful. It is these individuals who have poor emotion management that may be prone to suffer from somatization.

Table 5
Correlations among measures for a Dismissive attachment style

		SR-ANG	SR-ANX	RT-ANG	RT-ANX	ERR-ANG	ERR-ANX
SR-ANG	Pearson Correlation	1	.315	-.529*	-.451	-.048	.010
	Sig. (2-tailed)		.219	.029	.069	.854	.970
	N	17	17	17	17	17	17
SR-ANX	Pearson Correlation	.315	1	-.231	-.186	.030	.090
	Sig. (2-tailed)	.219		.372	.474	.909	.732
	N	17	17	17	17	17	17
RT-ANG	Pearson Correlation	-.529*	-.231	1	.732**	.119	-.290
	Sig. (2-tailed)	.029	.372		.001	.651	.260
	N	17	17	17	17	17	17
RT-ANX	Pearson Correlation	-.451	-.186	.732**	1	.250	.217
	Sig. (2-tailed)	.069	.474	.001		.333	.402
	N	17	17	17	17	17	17
ERR-ANG	Pearson Correlation	-.048	.030	.119	.250	1	.386
	Sig. (2-tailed)	.854	.909	.651	.333		.126
	N	17	17	17	17	17	17
ERR-ANX	Pearson Correlation	.010	.090	-.290	.217	.386	1
	Sig. (2-tailed)	.970	.732	.260	.402	.126	
	N	17	17	17	17	17	17

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

The third hypothesis tested was that having a preoccupied attachment style would lead to a greater association between implicit and explicit reports of negative affect. These individuals have a negative view of self and a positive view of other and

therefore are very comfortable confiding in others about their problems. Table 6 shows the strong association between self-reported anxiety and errors on the IAT regarding anxiety, $r=.629$, $p=.028$.

Table 6
Correlations among measures for a Preoccupied attachment style

		SR-ANG	SR-ANX	RT-ANG	RT-ANX	ERR-ANG	ERR-ANX
SR-ANG	Pearson Correlation	1	-.015	.158	-.142	-.327	.028
	Sig. (2-tailed)		.964	.624	.660	.300	.932
	N	12	12	12	12	12	12
SR-ANX	Pearson Correlation	-.015	1	-.614*	-.287	.817**	.629*
	Sig. (2-tailed)	.964		.034	.365	.001	.028
	N	12	12	12	12	12	12
RT-ANG	Pearson Correlation	.158	-.614*	1	.813**	-.742**	-.430
	Sig. (2-tailed)	.624	.034		.001	.006	.163
	N	12	12	12	12	12	12
RT-ANX	Pearson Correlation	-.142	-.287	.813**	1	-.262	-.040
	Sig. (2-tailed)	.660	.365	.001		.410	.902
	N	12	12	12	12	12	12
ERR-ANG	Pearson Correlation	-.327	.817**	-.742**	-.262	1	.627*
	Sig. (2-tailed)	.300	.001	.006	.410		.029
	N	12	12	12	12	12	12
ERR-ANX	Pearson Correlation	.028	.629*	-.430	-.040	.627*	1
	Sig. (2-tailed)	.932	.028	.163	.902	.029	
	N	12	12	12	12	12	12

*. Correlation is significant at the 0.05 level (2-tailed).

** . Correlation is significant at the 0.01 level (2-tailed).

There is a weaker association between self-reported anger and errors on the anger measure ($r=-.327$, $p=.300$). Overall, though it does seem that implicit measures of emotion are corresponding to explicit measures of emotion, especially with regards to anxiety.

The last hypothesis tested in Study 2 is that fearfully attached individuals will report moderate levels of anxiety and/or anger but show high levels of these emotions implicitly. Table 7 shows the correspondence between explicit and implicit measures of negative affect for the fearful attachment style. There were very modest relationships between errors on the IAT anxiety measure and self-reported anxiety, $r=.366$, $p=.148$, and between reaction time on the IAT anxiety measure and self-reported anxiety, $r=-.151$, $p=.563$.

Surprisingly, there was a very strong relationship between self-reported anger and errors on the IAT, $r=.593$, $p=.012$. Fearfully attached individuals may start out disclosing negative feelings but pull away really fast in fear that no one wants to hear their plight. They may also feel angry because they believe that the world is indifferent to their feelings and it seems that they are expressing this anger.

Overall, there was a significant difference between the explicit and implicit measures of anxiety with regards to errors on the IAT between the preoccupied and securely attached groups, $z=1.65$, $p=.049$. Errors made for the anxiety words on the IAT highly correlated with self-reports of anxiety in the preoccupied attachment style, $r=.629$, but did not in the securely attached group, $r=.141$. There was a difference

trending towards significance between the same correlations in the dismissively attached group, $r=.090$ and the preoccupied group, $r=.629$, $z=1.52$, $p=.064$.

Table 7
Correlations among measures for a Fearful attachment style

		SR-ANG	SR-ANX	RT-ANG	RT-ANX	ERR-ANG	ERR-ANX
SR-ANG	Pearson Correlation	1	.258	-.209	-.333	.593*	.368
	Sig. (2-tailed)		.318	.420	.191	.012	.147
	N	17	17	17	17	17	17
SR-ANX	Pearson Correlation	.258	1	.036	-.151	.157	.366
	Sig. (2-tailed)	.318		.892	.563	.549	.148
	N	17	17	17	17	17	17
RT-ANG	Pearson Correlation	-.209	.036	1	.890**	-.231	.140
	Sig. (2-tailed)	.420	.892		.000	.372	.592
	N	17	17	17	17	17	17
RT-ANX	Pearson Correlation	-.333	-.151	.890**	1	-.344	.093
	Sig. (2-tailed)	.191	.563	.000		.177	.723
	N	17	17	17	17	17	17
ERR-ANG	Pearson Correlation	.593*	.157	-.231	-.344	1	.660**
	Sig. (2-tailed)	.012	.549	.372	.177		.004
	N	17	17	17	17	17	17
ERR-ANX	Pearson Correlation	.368	.366	.140	.093	.660**	1
	Sig. (2-tailed)	.147	.148	.592	.723	.004	
	N	17	17	17	17	17	17

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

This difference shows that preoccupied individuals are more emotionally self-aware and report anxiety to a greater degree than dismissively attached individuals. People who have a preoccupied attachment style also report more anxiety than secures because of their need to have their attachment figures nearby.

Study 3-The Role of Attachment Style on Emotional Self-Awareness and Expression: Examining the Differences between Implicit and Explicit Measures of Negative Affect in the Absence of a Stressor

Study 2 examined the role of attachment on negative affect following a stressor task. Attachment style did play a role in the expression of negative affect, mainly with the preoccupied and secure individuals showing emotional self-awareness and the dismissive individuals failing to do so. Since stress activates the attachment behavioral system, it is important to measure negative emotion in the absence of a stressor task in order to assess the full role that attachment style plays in emotional awareness and expression.

Any event that is perceived as psychologically threatening heightens the accessibility of attachment-related cognitions and leads to coping behaviors that vary by attachment style (Mikulincer and Shaver, 2003). Even internal threats caused by events that are not proximal such as death anxiety in a healthy individual can activate the attachment behavioral system. These threats need not be consciously perceived, as subliminal presentation of death stimuli can still activate the attachment-behavioral system (Mikulincer and Florian, 2000).

By removing the stressor task, the attachment-behavioral system will not be activated and attachment style should play no role in the differential expression of negative affect. If differences between explicit and implicit measurements are found, it will be due to the measurement error and not attachment style. Study 3 follows the same procedure as study 2 without the stressor task and thus serves as a quasi-control

condition. It is hypothesized that there will be no difference between implicit and explicit expression of negative affect across the four attachment styles.

Method

Participants

One hundred thirteen (N=113) subjects were run individually in one-hour long sessions. Two participants' data were removed for committing a large number of errors (greater than 50%) during the computerized IAT task.

Materials and Procedure

All subjects completed questionnaires assessing alexithymia, fear of negative evaluation (FNE), and attachment style using the Relationship Questionnaire (RQ) and the Experience in Close Relationships measure (ECR). Subjects were not asked to solve the difficult verbal and quantitative reasoning problems under time pressure. They were then asked to complete the same anxiety-anger IAT task that was used in Study 2. After the IAT was completed, subjects were asked to complete self-report measures of anxiety and anger, as well as give ratings of their level of stress during the task.

To examine this hypothesis that attachment style will not influence emotional awareness and expression, correlations between the six measures (self-reported anxiety, self-reported anger, reaction time for anxiety words on the IAT, reaction time for anger words on the IAT, errors committed classifying anxiety words on the IAT,

and errors committed classifying anger words on the IAT) will be calculated for each of the four attachment styles. Z-transformations of correlations will be used to test the differences in the correlations between the attachment styles.

Results and Discussion

Table 8 shows the correlations for the secure attachment style in the absence of a stressor. For the securely attached individuals, there is a small correlation between reaction time measures of anxiety and self-report measures of anxiety, $r=.254$, $p=.062$. There is also a small, non-significant correlation between errors committed on the IAT measuring anxiety and self-reported measures of anxiety, $r=.077$, $p=.578$. In addition, the correlation between self-reported measures of anger and implicit measures is very small as well.

Table 9 displays the correlations among measures for the dismissive attachment style. The pattern of correlations for the Dismissive attachment style is much different in the absence of a stressor than as seen in Study 2. The correlation between self-reported anxiety and errors committed on the anxiety words of the IAT is $-.249$, $p=.353$. Interestingly, the correlation between reaction time on the IAT for anxiety words and self-reported anxiety is much greater than in Study 2, $r=-.359$, $p=.172$. In addition, there is a strong correlation between self-reported anger and errors committed on the anger words of the IAT, $r=-.458$, $p=.075$, which was not present in the stressor condition.

Table 8
Correlations among measures for a Secure attachment style

		SR-ANG	SR-ANX	RT-ANX	ERR-ANX	RT-ANG	ERR-ANG
SR-ANG	Pearson Correlation	1	-.056	-.067	-.135	-.100	-.059
	Sig. (2-tailed)		.686	.622	.320	.464	.664
	N	56	55	56	56	56	56
SR-ANX	Pearson Correlation	-.056	1	.254	.077	.315*	.166
	Sig. (2-tailed)	.686		.062	.578	.019	.227
	N	55	55	55	55	55	55
RT-ANX	Pearson Correlation	-.067	.254	1	-.103	.792**	-.042
	Sig. (2-tailed)	.622	.062		.451	.000	.761
	N	56	55	56	56	56	56
ERR-ANX	Pearson Correlation	-.135	.077	-.103	1	-.138	.788**
	Sig. (2-tailed)	.320	.578	.451		.310	.000
	N	56	55	56	56	56	56
RT-ANG	Pearson Correlation	-.100	.315*	.792**	-.138	1	.013
	Sig. (2-tailed)	.464	.019	.000	.310		.924
	N	56	55	56	56	56	56
ERR-ANG	Pearson Correlation	-.059	.166	-.042	.788**	.013	1
	Sig. (2-tailed)	.664	.227	.761	.000	.924	
	N	56	55	56	56	56	56

*. Correlation is significant at the 0.05 level (2-tailed).

** . Correlation is significant at the 0.01 level (2-tailed).

Table 9
Correlations among measures for a Dismissive attachment style

		SR-ANG	SR-ANX	RT-ANX	ERR-ANX	RT-ANG	ERR-ANG
SR-ANG	Pearson Correlation	1	-.321	-.175	-.471	.094	-.458
	Sig. (2-tailed)		.226	.517	.065	.730	.075
	N	16	16	16	16	16	16
SR-ANX	Pearson Correlation	-.321	1	-.359	-.249	-.244	-.068
	Sig. (2-tailed)	.226		.172	.353	.363	.801
	N	16	16	16	16	16	16
RT-ANX	Pearson Correlation	-.175	-.359	1	.092	.870**	-.207
	Sig. (2-tailed)	.517	.172		.735	.000	.443
	N	16	16	16	16	16	16
ERR-ANX	Pearson Correlation	-.471	-.249	.092	1	-.078	.811**
	Sig. (2-tailed)	.065	.353	.735		.774	.000
	N	16	16	16	16	16	16
RT-ANG	Pearson Correlation	.094	-.244	.870**	-.078	1	-.266
	Sig. (2-tailed)	.730	.363	.000	.774		.319
	N	16	16	16	16	16	16
ERR-ANG	Pearson Correlation	-.458	-.068	-.207	.811**	-.266	1
	Sig. (2-tailed)	.075	.801	.443	.000	.319	
	N	16	16	16	16	16	16

** . Correlation is significant at the 0.01 level (2-tailed).

Table 10 displays the correlations between variables for the preoccupied attachment style in the absence of a stressor. As is the case with the dismissive attachment style, the correlations between explicit and implicit measures of negative affect are different than what was observed in Study 2. The correlation between

Self-reported anxiety and errors committed on the anxiety IAT is much lower than in Study 2, $r=-.058$, $p=.850$. There is a small correlation between self-reported anxiety and reaction time on the IAT for anxiety words, $r=-.351$, $p=.240$. The correspondence between implicit and explicit anger measures is also very small.

Table 10
Correlations among measures for a Preoccupied attachment style

		SR-ANG	SR-ANX	RT-ANX	ERR-ANX	RT-ANG	ERR-ANG
SR-ANG	Pearson Correlation	1	-.120	-.416	-.440	-.198	-.333
	Sig. (2-tailed)		.697	.157	.132	.516	.266
	N	13	13	13	13	13	13
SR-ANX	Pearson Correlation	-.120	1	-.351	-.058	-.530	-.308
	Sig. (2-tailed)	.697		.240	.850	.063	.306
	N	13	13	13	13	13	13
RT-ANX	Pearson Correlation	-.416	-.351	1	.228	.689**	-.008
	Sig. (2-tailed)	.157	.240		.454	.009	.980
	N	13	13	13	13	13	13
ERR-ANX	Pearson Correlation	-.440	-.058	.228	1	-.207	.596*
	Sig. (2-tailed)	.132	.850	.454		.498	.031
	N	13	13	13	13	13	13
RT-ANG	Pearson Correlation	-.198	-.530	.689**	-.207	1	.036
	Sig. (2-tailed)	.516	.063	.009	.498		.907
	N	13	13	13	13	13	13
ERR-ANG	Pearson Correlation	-.333	-.308	-.008	.596*	.036	1
	Sig. (2-tailed)	.266	.306	.980	.031	.907	
	N	13	13	13	13	13	13

** . Correlation is significant at the 0.01 level (2-tailed).

* . Correlation is significant at the 0.05 level (2-tailed).

Table 11 displays correlations for the fearful attachment style in the absence of a stressor. The correlations between self-reported anxiety and anger and implicitly measures anxiety and anger are similar to the small-moderate correlations observed in Study 2.

Table 11
Correlations among measures for a Fearful attachment style

		SR-ANG	SR-ANX	RT-ANX	ERR-ANX	RT-ANG	ERR-ANG
SR-ANG	Pearson Correlation	1	.232	.380	.156	.309	.127
	Sig. (2-tailed)		.354	.132	.550	.228	.627
	N	18	18	17	17	17	17
SR-ANX	Pearson Correlation	.232	1	-.104	.203	-.179	.237
	Sig. (2-tailed)	.354		.691	.434	.492	.360
	N	18	18	17	17	17	17
RT-ANX	Pearson Correlation	.380	-.104	1	.245	.770**	-.229
	Sig. (2-tailed)	.132	.691		.342	.000	.376
	N	17	17	17	17	17	17
ERR-ANX	Pearson Correlation	.156	.203	.245	1	.164	.557*
	Sig. (2-tailed)	.550	.434	.342		.529	.020
	N	17	17	17	17	17	17
RT-ANG	Pearson Correlation	.309	-.179	.770**	.164	1	-.022
	Sig. (2-tailed)	.228	.492	.000	.529		.934
	N	17	17	17	17	17	17
ERR-ANG	Pearson Correlation	.127	.237	-.229	.557*	-.022	1
	Sig. (2-tailed)	.627	.360	.376	.020	.934	
	N	17	17	17	17	17	17

** . Correlation is significant at the 0.01 level (2-tailed).

* . Correlation is significant at the 0.05 level (2-tailed).

The correlation between self-reported anxiety and errors on the anxiety IAT is small, $r=.203$, $p=.434$. The correlation between self-reported anxiety and reaction time on the IAT for anxiety is also small, $r=-.104$, $p=.691$. Also the correspondence between implicit and explicit measures of anger is minimal.

Overall, the correlation between self-reported anxiety and errors on the anxiety words of the IAT was $.077$ for the securely attached individuals and $-.058$ for the preoccupied attached individuals. These correlations are not significantly different from each other, $z=.3916$, $p=.3477$, as they were in Study 2 in the presence of a stressor. There was also no significant difference between the same correlation pairings comparing the preoccupied style to the dismissive style, $z=-.467$, $p=.32$, which also differs from Study 2.

Both the dismissive and preoccupied attachment styles are not having their full effect on the expression of negative emotion when the stressor task is eliminated. In contrast, a secure attachment style is associated with less vulnerability to stress and therefore it is not surprising that there was no difference in the pattern of correlations between implicit and explicit measures of negative effect in the securely attached group.

Study 3 supports the hypothesis that stress has an effect on the awareness and expression of negative effect. However, in order to be confident that attachment style is truly having an influence on the discrepancy between implicit and explicit measures of affect, the validity of the newly created Anxiety-Anger Implicit Association Test (IAT) has to be established. Additionally, in order to quantify the

importance of implicit measures of affect in predicting somatization, further steps need to be taken. With the knowledge gained from Studies 2 & 3, Study 4 aims to validate the anxiety-anger IAT, examine whether implicit measures of negative affect can successfully be used to predict one's level of somatization, and further explore the impact of the newly developed construct, Emotional Unawareness and Evaluative Concern, that was first introduced in Study 1.

Study 4-The Role of Negative Affect on Somatization

Study 4 returns to the direct assessment of somatization and incorporates constructs established in Study 1 with the implicit measures developed in Studies 2 and 3. There are several objectives of Study 4, with the first being to establish some preliminary validity of the anxiety-anger IAT. The second objective is to use both self-report measures and implicit measures of negative affect to predict somatization. The third and final objective is to examine the role of Emotional Unawareness and Evaluative Concern as a moderator in predicting somatization.

Preliminary validation of the IAT will be carried out via a Multi-Trait Multi-Method correlation matrix (MTMM). Campbell and Fiske (1959) developed MTMM as a way of establishing convergent and discriminant validity. If different methods of measuring the same trait are highly correlated then convergent validity is established. If similar methods of measuring different traits are uncorrelated, discriminant validity is established. This technique has the advantage of being able to separate trait/state variance from method variance (Waltz et al, 1991). After examining the construct validity of the IAT, using these constructs to predict somatization can be achieved.

Studies 2 & 3 have previously established the role of attachment style in emotional awareness and expression. The preoccupied individuals share too much of their negative affect with others while the dismissives are often unaware of their emotions and share very little. Using both implicit and explicit measures of negative

affect as predictors of somatization can allow us to indirectly assess the impact of attachment style while minimizing the influence of social desirability.

Both implicit and explicit measures of negative affect following a stressor task were examined as predictors of somatization along with Emotional Unawareness and Evaluative Concern playing a possible moderating role. Individuals with high levels of this construct lack the ability to use emotion as information and therefore constantly fear that others may be thinking negatively about them.

The first hypothesis to be tested is that the Anxiety-Anger IAT is a valid method of assessing anxiety and anger. The second hypothesis is that negative affect (i.e., anxiety or anger) leads to somatization in people who are unable to use emotion as information. That is, people who are high on Emotional Unawareness and Evaluative Concern will have a greater number of somatic complaints because they are unable to adequately disclose their emotions. These individuals may fail to recognize and appropriately label their emotions and/or may fail to adequately disclose their emotions because of a fear of what other may think.

In the case of dismissively attached individuals, they may be unaware of the emotions they are feeling. This was demonstrated in Study 2, where dismissively attached individuals reported little negative affect but showed negative affect when measured implicitly. The preoccupied individual may always fear that their attachment figures will become disinterested in them and leave. Constantly disclosing their negative emotions may be a way to keep their attachment figures nearby.

Method

Participants

Ninety (N=90) Rutgers University undergraduates were solicited from the university subject pool. Thirty-four participants were male and 54 were female.

Materials/Procedure

Subjects were asked to complete measures of Fear of Negative Evaluation (Watson and Friend, 1969), Alexithymia (Bagby, Taylor, and Parker, 1994), and the Marlowe-Crowne Social Desirability Scale (Crowne and Marlowe, 1960). The Marlowe-Crowne Social Desirability Scale is a 33 item true-false scale which measures an individual's tendency to project favorable images of themselves during social interaction. They were then asked to complete a series of difficult quantitative and verbal reasoning problems under extreme time pressure which constituted the stressor task. This was the same stressor task that was utilized during Study 2 with subjects self-reporting that the task was stressful. Subjects were once again pressured during their performance with a confederate constantly reminding them to hurry up and counting out loud the time remaining. They were also told that the psychology faculty would get a list with their names and scores on it. Only two of the 90 participants did in fact get perfect scores on these tasks. All subjects were thoroughly debriefed at the conclusion of the study. Two subjects were removed from the analysis due to their distress that their scores would be posted for the faculty to

evaluate them. They were still given full credit for their participation before being debriefed.

After the stressor task, subjects completed the Anger-Anxiety IAT, the same implicit measure used in studies 2 and 3. This was followed by a word memory task in which subjects had to read a list of twenty words divided into five categories. The categories were anger, anxiety, neutral, positive, and somatic. The order in which the categories were presented was counterbalanced. Subjects had one minute to memorize the list and then had to do a free recall. The number of words recalled served as an additional implicit measure of anxiety, anger, and somatization. Following the word list, subjects were asked to complete self-report measures of state anxiety using the State Trait Anxiety Inventory (Spielberger et al, 1970), anger using the Cook-Medley Hostility Scale (Cook and Medley, 1954), somatic complaints via the Somatic Symptom Inventory (Barsky & Wyshak, 1990) and the Patient Health Questionnaire (Kroenke et al, 2002), health anxiety via the Health Anxiety Inventory (Salkovskis, 2002), and attachment style via the Relationship Questionnaire (RQ) (Bartholomew and Horowitz, 1987).

Results and Discussion

In order to evaluate construct validity, a Multi-Trait Multi-Method Analysis (MTMM) was utilized. This procedure established by Campbell and Fiske (1959) assesses both convergent and discriminant validity by using a series of correlations

arranged by method of measurement. The reliabilities of each measure occur on the main diagonal while correlations between traits measured with different methods occupy a sub-diagonal within each block and estimate convergent validity.

Discriminant validity is estimated by using correlations between different measures and different traits. These heterotrait-heteromethod correlations are expected to be the lowest correlations in the entire matrix.

Both anxiety and anger were measured by four different methods. The first two measures were reaction times and errors committed by each subject taking the Anxiety-Anger Implicit Association Test (this test is described in Study 2). Traditionally these measures are combined into a composite score for the strength of the implicit response. However, these metrics were kept separate in accordance to the recommendations set forth by Blanton and Jaccard (2006) as discussed previously. The third metric was the number of anxiety and anger related words remembered from a list that was studied following a stressor task. The fourth metric was a measure of self-reported anxiety and anger. Table 11 below presents the MTMM combining both implicit and explicit measures (SR= Self-report, RT=Reaction Time on the IAT, ERR=Errors on the IAT).

Table 12: MTMM Matrix of Correlations for both Implicit and Explicit Measures of Anxiety and Anger

	Traits	SR		RT		ERR		Words	
		ANX	ANG	ANX	ANG	ANX	ANG	ANX	ANG
SR	ANX	.781							
	ANG	-.209	.757						
RT	ANX	-.269*	.135	.847					
	ANG	-.176	.099	.750	.847				
ERR	ANX	.176	.063	.121	-.129	.793			
	ANG	.090	.053	.071	.011	.671	.793		
Words	ANX	-.279*	.021	-.055	-.164	-.104	-.181	.490	
	ANG	.172	.073	-.107	-.007	-.237*	-.240*	.015	.490

*= $p < .05$

As is shown in Table 12, implicit measures of anxiety significantly correlate with self-reported anxiety but not anger ($r = -.269$ for RT and $-.279$ for anxiety words). Self-reported anger does not correlate with any implicit measure of anger ($r = .099$ for RT, $.053$ for ERR, and $.073$ for words). This can be interpreted as convergent validity shown for the anger-anxiety implicit IAT when it comes to measuring anxiety and also discriminant validity shown for the implicit anxiety measures since they do not correlate with self-reported anger. Looking at the correlations between traits using the same measures, we see high correlations between anxiety and anger using reactions times ($r = .750$) and errors ($r = .671$).

These methods are assessing anxiety and anger in similar ways which is ideal. However, there is no correlation between the words assessing anxiety and the words assessing anger ($r = .015$) which suggests that the memorized words from the list are operating in different ways or more simply that the valence of the word is accounting for much more variance than just the method of measurement. Overall, the correlations are not of great magnitude but this is to be expected given that implicit and explicit measures may not be assessing the same construct, but rather related constructs (i.e. implicit anxiety may be a fundamentally different construct compared with explicit anxiety, rather than being separate indicators of a single latent variable). Significant correlations between self-reported anxiety and implicit measures though do provide preliminary evidence that the IAT measures anxiety to some extent and fails to adequately assess anger.

The second hypothesis stated that Emotional Unawareness and Evaluative Concern will moderate the relationship between negative affect and somatization. The first step was to regress all the measures of negative affect, both implicit and explicit, on somatization. The variables included were self-reported anxiety, self-reported anger, reaction time for anxiety, reaction time for anger, errors for anxiety, errors for anger, and finally Emotional Unawareness and Evaluative Concern (EUEC) (see Table 13).

Table 13: Regression Model Predicting Somatization from Implicit and Explicit Measures of Negative Affect and Emotional Unawareness and Evaluative Concern (EUEC)

R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	Change Statistics			Sig. F Change
					F Change	df1	df2	
.727 ^a	.529	.484	.71415864	.529	11.872	7	74	.000

a. Predictors: (Constant), SRANG, RTANG, ERRANG, SRANX, ERRANX, RTANX, EUEC

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	-1.861	.592		-3.141	.002
SRANX	.148	.018	.805	8.311	.000
SRANG	.037	.059	.051	.623	.535
RTANX	.000	.000	-.159	-1.188	.239
RTANG	.000	.000	.065	.498	.620
ERRANX	.030	.013	.278	2.322	.023
ERRANG	-.003	.011	-.030	-.272	.786
EUEC	-.404	.099	-.402	-4.076	.000

As can be seen from the model, SRANX, ERRANX, and EUEC all significantly predict somatization, with SRANX being the strongest predictor (Beta=.805). Anger has very little predictive power and thus all measures of anger

will be dropped from subsequent analyses. The next step is to examine both self-reported anxiety and errors on the IAT for anxiety stimuli and see if they are moderated by high EUEC. It is hypothesized that if someone has a high level of Emotional Unawareness and Evaluative Concern (EUEC), they will be unable to adequately deal with the negative emotion elicited during the stressor task and this will lead to greater levels of somatization.

The interaction effect between EUEC and self-reported anxiety will be examined using moderated multiple regression. A moderator is a variable that alters the strength of a relationship between two other variables (Baron & Kenny, 1986). Table 14 shows a significant interaction between SRANX and EUEC in predicting somatization, $t(79) = 3.059$, $p = .003$. This result indicates that the effect of self-reported anxiety on somatization varies with one's level of EUEC.

Table 14: Moderated Multiple Regression Model Predicting Somatization from Self-Reported Anxiety and EUEC

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.610^a	.373	.357	.47733	.373	23.747	2	80	.000
2	.663^b	.439	.418	.45419	.066	9.359	1	79	.003

a. Predictors: (Constant), Zscore(SRANX), EUEC

b. Predictors: (Constant), Zscore(SRANX), EUEC, SRANX_EUEC

Table 14 (Continued)

Model		Unstandardized		Standardized		Sig.
		Coefficients		Coefficients		
		B	Std. Error	Beta	t	
1	(Constant)	-1.705	.052		35.20	.000
	EUEC	-.014	.060	-.023	-.226	.822
	SRANX	.369	.060	.621	6.166	.000
2	(Constant)	1.637	.055		29.993	.000
	EUEC	-.059	.059	-.099	-.996	.322
	SRANX	.340	.058	.572	5.883	.000
	SRANX*					
	EUEC	.146	.048	.280	3.059	.003

a. Dependent Variable: Somatization

As can be seen in Table 14, adding the interaction term significantly increased the overall fit of the model with approximately 44% of the variability in somatization being accounted for. Figure 4 displays the interaction between self-reported anxiety and EUEC. There is a significant main effect for anxiety, with high self-reported anxiety leading to greater levels of somatization. In contrast to our hypothesis, there was no significant main effect of EUEC. The significant interaction between self-reported anxiety and EUEC shows

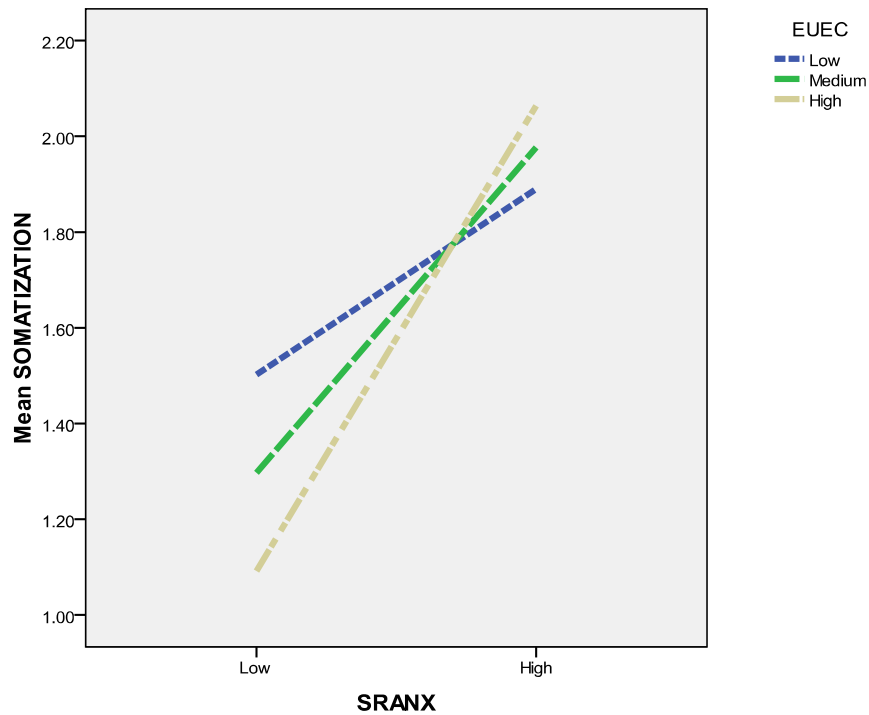


Figure 4: The interaction between Emotional Unawareness and Evaluative Concern (EUEC) and self-reported anxiety in predicting somatization

that when anxiety is low, EUEC is not playing that large of a role. Individuals may be unaware of their low levels of anxiety and may not be willing to disclose these negative feelings but this is not leading to major problems with somatization.

However, as anxiety increases, being unaware of this increased anxiety and failing to adequately disclose it will lead to greater levels of somatization. It is at this time when anxiety is high that somatization increases due to the inability to effectively resolve negative emotions. An individual with low levels of EUEC will be able to more effectively resolve their emotions under high anxiety conditions.

The question arises as to why individuals with low EUEC should ever experience somatic complaints given their greater ability to experience and disclose their negative emotions. Attachment style may help us understand this relationship and Figure 8 displays EUEC as a function of attachment style. Securely attached individuals show the lowest levels of EUEC while preoccupieds show the highest levels. Securely attached individuals are aware of their own emotions and are not afraid of disclosing these emotions to others which allows them to adequately cope under conditions of high anxiety. Preoccupied individuals exaggerate their negative emotions and feel as if others don't really care. However, by continuously disclosing these emotions, they may attain proximity in a dysfunctional manner. Dismissively attached individuals were expected to show greater levels of EUEC than what they showed. This is most likely the result of dismissively attached individuals having very little concern about how others evaluate them.

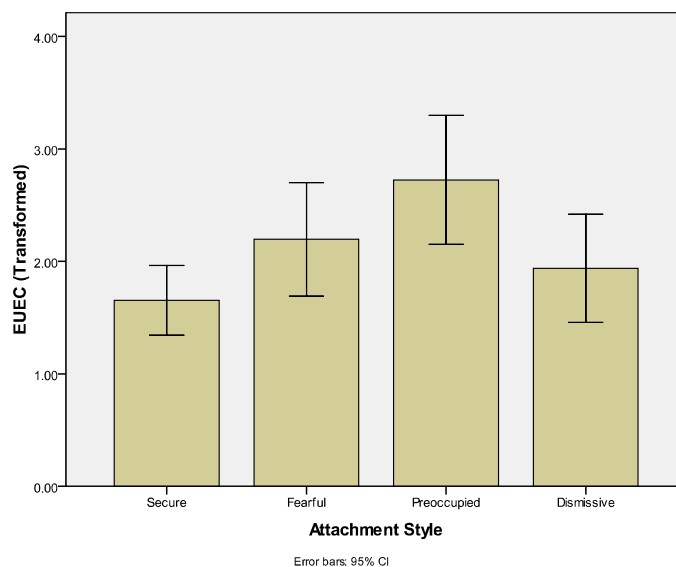


Figure 5: EUEC as a function of attachment style

Having examined the mediating role of EUEC with self-reported anxiety, it was important to also examine if EUEC moderates errors made classifying the anxiety words on the IAT. Numbers of errors classifying the anxiety stimuli on the Anxiety-Anger IAT was the only other significant predictor of somatization in the first regression model. Table 15 shows the regression model with the interaction between EUEC and errors on the anxiety portion of the IAT as predictors. There was no significant interaction between EUEC and errors on the anxiety portion of the IAT, $t(78) = 1.287, p = .202$. The model fit did improve from $R = .114$ to $R = .183$ with the addition of the interaction term, but has very low power in predicting somatization.

Table 15: Moderated Multiple Regression Model Predicting Somatization from Errors on the Anxiety measure of the IAT and EUEC

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.114 ^a	.013	-.012	1.00051389	.013	.522	2	79	.595
2	.183 ^b	.034	-.004	.99638707	.021	1.656	1	78	.202

a. Dependent Variable: Somatization

b. Predictors: (Constant), EUEC, Zscore: ERR-ANX

Table 15 (Continued)

Model		Unstandardized Coefficients		Standardized	t	Sig.
		B	Std. Error	Coefficients		
1	(Constant)	-.016	.111		-.144	.886
	EUEC	-.044	.114	-.044	-.391	.697
	Zscore: ERR-ANX	.109	.110	.112	.994	.323
2	(Constant)	-.042	.112		-.372	.711
	EUEC	-.019	.115	-.019	-.169	.866
	Zscore: ERR-ANX	.072	.113	.074	.635	.528
	ERRANX * EUEC	.164	.127	.149	1.287	.202

Overall, Study 4 showed that the newly created Anxiety-Anger IAT to be a valid way of assessing anxiety but not anger. Both implicit and explicit measures of anxiety do a very good job in accounting for somatization while all forms of anger did not. The implicit measures of anger that were designed may in fact not be a valid way to measure anger.

The Anxiety-Anger IAT consists of emotion laden words as stimuli that need to be classified as quickly and as accurately as possible. Anxiety-relevant stimuli may

have a biological basis for being prioritized by one's attentional system. Being sensitive to threat can help ensure the survival of a species and provide them with an evolutionary advantage over others. Williams et. al. (1996) have demonstrated that there is attentional bias for cues related to stress and that trait anxiety increases this bias. Psychophysiological studies have also supported this result, showing that autonomic responses are easily conditioned to fear-related stimuli but not to neutral stimuli.

Words were chosen as stimuli rather than pictures because previous research has shown that word-based IATs have larger effect sizes than picture based IATs (Nosek et al, 2002; Greenwald, 2004). This is because words have a greater level of representation of the target construct than pictures (Fironi & Bel-Bahar, 2010). However, the failure of the Anxiety-Anger IAT to adequately measure anger may be due to anxiety words having a greater level of representation of the anxiety construct than anger words have of the anger construct.

Angry faces have been shown to be detected at a faster rate compared to neutral faces due to their threatening value which heightens their salience and increases spatial selective attention (Fox et al, 2000). This bias is moderated by age, with older adults showing less of an attentional bias to angry faces and younger adults showing a more pronounced bias (Mather & Carstensen, 2003). Since the subjects in Study 4 were predominately college-freshman, an increase in bias would be expected. That is angry faces would be very salient while anger-related words may not represent the category as well. In contrast to previous IAT research which hasn't

focused on the assessment of emotion, picture stimuli may trump word stimuli especially when measuring anger.

General Discussion

The results of all four studies lend support to the hypothesis that attachment style and emotional awareness play an important role in the somatization process. Study 1 demonstrated this by showing that attachment style has an effect on self-reported levels of somatic complaints, and also that alexithymics have greater levels of somatization. Studies 2 and 3 explored the research question in greater depth by showing that there are differences in emotional awareness and expression for each attachment style and these differences only prominently appear under stress. Problems with emotional awareness have previously been extensively tied to somatization.

Studies 2 and 3 also provided a unique and original operationalization of emotional awareness and showed that it varies with attachment style. While stressed, secures are aware of their emotions but disclose only as much as they need to, preoccupieds are aware of and disclose too much emotion in an effort to keep their attachment figures nearby, and dismissives are unaware of and disclose too little emotion. Finally, Study 4 returned to the direct assessment of somatization using the methodology established in Studies 2 & 3 and demonstrated that explicit measures of anxiety are the best predictors of somatization and that EUEC, a newly developed construct, is an important complement to attachment style from which to examine the etiology of somatization. Each one of these studies provided a unique contribution to the study of attachment style, emotional awareness, and somatization.

Study 1 examined the role of self-reported attachment style on somatization. The results of Study 1 agreed with previous research done by Ciechanowski et al. (2002). However, this study extended these previous findings by showing that anxious attachment significantly predicts somatization independent of other measures of negative affect.

Emotional unawareness is a primary factor involved in the development of somatization (van der Kolk et al, 1996). Study 2 showed that emotional awareness and expression varies by attachment style. This study attempted to measure emotional awareness and expression implicitly. Much of this previous research on emotional awareness and dysregulation used self-report measures of maladaptive patterns of behavior such as drinking, substance abuse problems, and impulsive behavior (Carver & Scheier, 1996). While these methods are viable, they are prone to social desirability (Uziel, 2010). Since implicit measures are less prone to social desirability than self-report measures (Gawronski et al, 2007), Study 2 attempted to measure emotional awareness by using the correspondence between implicit and explicit measures of anxiety and anger. Differences in emotional awareness and expression between attachment styles were found that might have been easily missed using standard self-report measures of negative affect.

Study 3, which was the control condition for Study 2, showed that stress is needed for attachment style to have its full effect on emotional awareness and expression. Bowlby (1973) had theorized as to the effect of stress activating the attachment behavioral system but there had been little empirical evidence directly

supporting this idea. In Study 3, all of the variables from Study 2 are kept constant except for stress. The removal of the stressor task by itself caused the correspondence between implicit and explicit measures of negative affect between attachment styles to diminish.

Finally, Study 4 used both explicit and implicit measures of negative affect to predict somatization. Previous research has not used a combination of implicit and explicit measures of negative affect to predict somatization. The newly developed construct, Emotional Unawareness and Evaluative Concern (EUEC) interacts with self-reported anxiety to significantly predict somatization.

The Implicit Measurement of Emotion

Another major theme in this research is whether emotions can be measured implicitly. One way to help ensure that that attachment style was playing an important role in regulating negative affect was to use both self-report data and an implicit measure. The implicit measure being used was the Implicit Association Test (IAT) originally created to measure attitudes that were prone to social desirability, such as racism, sexism, bias against obese individuals, etc. (Greenwald & Banaji, 1995). Anxiety and anger are both negative emotions associated with distinct physiological changes such as increased respiration, blood pressure, muscle activation and contractions, etc. These physiological measures obviously cannot be measured with a cognitive processing task such as the IAT. However, secondary to these physiological

changes, there is an activation of a more reflective mode of thinking (Beck & Clark, 1997). There are negative automatic thoughts that lead to the perpetuation of the anxiety or anger response. These automatic cognitive processes can lead to the same type of bias that the IAT measures when used to assess stereotyping. The only difference is that traditionally the IAT measures bias against others while an IAT designed to measure emotion assesses one's perception of him/herself, which can in fact be biased with the kinds of negative automatic thoughts associated with anxiety, anger, and depression. Depression is an important long-term consequence of stress and poor emotion regulation (Kostiuk and Fouts, 2002). Being that it is not a short term reaction to stress, depression was not assessed implicitly.

Study 4 did provide validity for the anxiety measure of the Anxiety-Anger IAT, but implicit anger was not adequately measured. Future research will address this issue and possibly change the modality of the stimuli from words to pictures to more effectively measure anger. Even with anger not being properly measured, there is promise to using implicit measures like the IAT to study emotion.

Limitations

The first major limitation is not having behavioral and physiological measures of anxiety and anger to use in the Multi-Trait Multi-Method (MTMM) validation of the IAT. Behavioral measures could be obtained in a laboratory setting by having participants engage in a stressful interactive task with a confederate or even interact online with several confederates, possibly a variation on the popular cyberball

studies. To assess physiological changes, galvanic skin response (GSR) or heart rate variability (HRV) would allow one to determine whether subjects are actually aware these negative emotions but reluctant to report it .

For instance, the dismissively attached individuals may either be experiencing anxiety or anger and unwilling to report it, or they may not be even aware of the emotion they are experiencing. If they show a discrepancy between the anxiety/anger IAT and the self-report measures of anxiety and anger, they could either be unaware of their emotions or aware of their emotions but reluctant to report it. By using a physiological measure, the actual experience of emotion can be quantified and whether subjects are just refusing to report their emotions can be determined. If the IAT measures correlate with these behavioral and physiological measures, we would have strong convergent validity.

Future Studies

Addressing the limitations mentioned before, the first study that could be done is to use a physiological measure of anxiety and anger and incorporate it into what was done with Study four. The physiological measure of choice would be heart-rate variability (HRV) taken during the stressor task to be used as an additional implicit measure of anxiety and anger. Links between emotion and HRV have been found for depression and anxiety, and anger (Bhattacharyya et al., 2008; Dishman et al., 2000; Appelhans et al., 2006). Since HRV has been studied as a measure of emotion regulation, it would be an interesting idea to look at the differences in HRV across those with the four attachment groups.

A second study that could be conducted would be to improve upon the anxiety-anger IAT. An initial attempt at constructing an emotion based IAT employed anger and anxiety related words. Employing pictorial stimuli representing either anxiety and/or anger would be a step that could be used to expand the usefulness of the IAT. Pictures may be easier for some individuals to classify since they are encoded both visually and semantically, according to Pavio's (1986) dual coding theory. This seems especially useful for the anger stimuli which did not have its anticipated impact in lexical form.

A third study that can be conducted is to measure attachment style implicitly. Having examined social desirability and seeing that there is a difference in social desirability across individuals with various attachment styles, it is evident that self-report measures of attachment style may be plagued with the same concerns with which measures of anxiety and anger are plagued. Many of the attachment items revolve around anxiety and avoidance in romantic relationships and that may be information that certain individuals will not want to share.

There may be an overestimation of securely attached individuals when using the Emotional Closeness in Relationships Scale (ECR) (Brennan et al., 1998). This is the 36-item scale that consists of a continuous anxiety and avoidance dimension. The relationship quotient (RQ)(Bartholomew and Horowitz, 1991) a 4 single-paragraph measure where one has to pick the paragraph that best describes them may be even more prone to social desirability since there is only one item that determines one's attachment classification. Most research utilizing these two measures does not result

in four evenly distributed categories making up attachment style. Instead there is usually greater than 60 percent scores when either of these measures is utilized.

Importance and Applications of this Research

Having shown that attachment style and emotional awareness significantly contribute to the severity of somatization, current treatment for the disorder may need to be modified. Traditional cognitive behavioral therapy is effective in treating depression and anxiety, due to its emphasis on restructuring distorted patterns of thinking. However, it does not focus on aspects of affect regulation that deal with interpersonal relationships. Awareness and disclosure of emotions to others is a major component of maintaining proper emotion regulation (Schwartz and Drotar, 2004). Therefore, interpersonal therapy may be a possible intervention that can be used to help individuals become aware of and disclose their emotions more effectively.

Interpersonal therapy, a derivative of psychodynamic therapy, focuses on past and present interpersonal experiences and the emotions that accompany them (Cutler et al. 2004). It is less focused on negative patterns of thinking than CBT, and more focused on how one effectively relates to his/her environment. Since attachment style is formed early in infancy and is considered a relatively stable way of perceiving the environment, interpersonal difficulties in childhood unless addressed are likely to carry over into adulthood. Preoccupied, dismissive, and fearful attachment styles are all characterized by having problems in interpersonal relationships. Interpersonal therapy focuses on changing one's perceived role in relationships and individuals with insecure attachment style have come to believe that others are rejecting and

untrustworthy. Changing one's view of relationships with attachment figures can lead to earned security (Mikulincer and Shaver, 2003), or a shift to becoming more secure. This earned security can lead to more effective emotion regulation and a decrease in somatic complaints.

Earned security seems like an effective treatment plan for most patients with somatization. However, at this time, most clinicians and attachment researchers are unaware how stable a construct attachment style actually is. Bowlby (1969) originally theorized that attachment style was extremely stable from childhood to adulthood and change was very difficult. More recently, Fraley (2002) has theorized that there may not be as stable of a relationship between childhood attachment and adult attachment as once thought. For example, correlations between .20 and .50 have been found when examining attachment style to one's parent in childhood and attachment style to one's romantic partner later in life. This indicates that there is a small to moderate association between a similar construct measured at two points in time.

There are two interpretations for Fraley's (2002) findings. The first is that attachment style is being measured differently at two points in time. In infancy, Ainsworth's (1978) strange situation is used to assess attachment style. This is a behavioral measure that is coded by an observer and classified into one of three main categories. This measure is taken after a stressor, the parent leaving the infant alone. By adulthood, behavioral measures are not used to assess attachment style. Instead, the attachment figure has switched from the parent to a romantic partner and self-

report measures are primarily used. It is unclear whether these assessment techniques are actually measuring the same construct.

Another complication is that it is problematic assessing attachment style in the context of romantic relationships when some individuals have little to no experience in such relationships. For instance, college freshmen, who make up the majority of research subjects at a university, may not have ever been in a romantic relationship. It is possible that attachment to their parents at age 18 would be the appropriate measure of their attachment style, but other students are being asked about their attachment to their romantic partner. These situations may or may not be considered equivalent. Measurement problems such as these make the assessment of a change in attachment style extremely difficult, and makes testing the idea that interpersonal therapy can lead to earned security and with it an increase in proper emotion regulation strategies that much harder to assess.

The research in this thesis has shown that a lack of emotional awareness and disclosure can lead to an increase in somatization. In addition, attachment style plays a large role in determining how effective individuals are at dealing with their negative emotions. Interpersonal therapy is an effective way for individuals to become more emotionally aware and shift to a secure attachment style. Due to the high financial and quality of life burden of somatization, the use of interpersonal therapy to address faulty emotional regulation strategies is a possible cost-effective treatment that may lead to substantial improvements in the well-being of the patient.

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Appendix A-Measures

SSI

During the past month, please indicate how distressing each of the following symptoms is / has been. Do not indicate symptoms that are part of a diagnosed medical condition.

1= Not at All 2= A Little Bit 3= Moderate 4= Quite a Bit 5= A Great Deal

1. Nausea and vomiting _____
2. Soreness in your abdomen _____
3. Pains or cramps in your abdomen _____
4. Feeling faint or dizzy _____
5. Trouble with your vision _____
6. Your muscles twitching or jumping _____
7. Feeling fatigued, weak, or tired all over _____
8. A fullness in your head or nose _____
9. Pains in your lower back _____
10. Constipation _____
11. Trouble catching your breath _____
12. Hot or cold spells _____
13. A ringing or buzzing in your ears _____
14. Pains in your heart or chest _____

15. Difficulty keeping your balance while walking _____
16. Indigestion, upset stomach, or acid stomach _____
17. The feeling that you are not in as good physical health as most of your friends

18. Numbness, tingling, or burning in parts of your body _____
19. Headaches _____
20. A lump in your throat _____
21. Feeling weak in parts of your body _____
22. Not feeling well most of the time in the past few years _____
23. Heavy feelings in your arms or legs _____
24. Your heart pounding, turning over, or missing a beat _____
25. Your hands and feet not feeling warm enough _____
26. The sense that your hearing is not as good as it used to be _____

SAS

Not at All	A little	Moderately	Quite a bit	Extremely
0	1	2	3	4

Please indicate how typical the following situations are:

1. When someone else coughs, it makes me cough too.
2. I can't stand smoke, smog, or pollutants in the air.
3. I am often aware of various things happening within my body.
4. When I bruise myself, it stays noticeable for a long time.
5. Sudden loud noises really bother me.
6. I can sometimes hear my pulse or my heartbeat throbbing in my ear.
7. I hate to be too hot or too cold.
8. I am quick to sense the hunger contractions in my stomach.
9. Even something minor, like an insect bite or a splinter, really bothers me.
10. I have a low tolerance for pain.

HAI

Each question in this section consists of a group of four statements. Please read each group of statements carefully and then select the one which best describes your feelings, over the past six months. Identify the statement by filling the letter next to it, i.e. if you think that statement (a) is correct, fill statement (a); it may be that more than one statement applies, in which case, please fill any that are applicable.

1. (a) I do not worry about my health.
 (b) I occasionally worry about my health.
 (c) I spend much of my time worrying about my health.
 (d) I spend most of my time worrying about my health.
2. (a) I notice aches and pains less than most other people (of my age).
 (b) I notice aches and pains as much as most other people (of my age).
 (c) I notice aches and pains more than most other people (of my age).
 (d) I am aware of aches and pains in my body all the time.
3. (a) As a rule I am not aware of bodily sensations or changes.
 (b) Sometimes I am aware of bodily sensations or changes.
 (c) I am often aware of bodily sensations or changes.
 (d) I am constantly aware of bodily sensations or changes.
4. (a) Resisting thoughts of illness is never a problem.
 (b) Most of the time I can resist thoughts of illness.
 (c) I try to resist thoughts of illness but am often unable to do so.
 (d) Thoughts of illness are so strong that I no longer even try to resist them.

5.
 - (a) As a rule I am not afraid that I have a serious illness.
 - (b) I am sometimes afraid that I have a serious illness.
 - (c) I am often afraid that I have a serious illness.
 - (d) I am always afraid that I have a serious illness.
6.
 - (a) I do not have images (mental pictures) of myself being ill.
 - (b) I occasionally have images of myself being ill.
 - (c) I frequently have images of myself being ill.
 - (d) I constantly have images of myself being ill.
7.
 - (a) I do not have any difficulty taking my mind off thoughts about my health.
 - (b) I sometimes have difficulty taking my mind off thoughts about my health.
 - (c) I often have difficulty in taking my mind off thoughts about my health.
 - (d) Nothing can take my mind off thoughts about my health.
8.
 - (a) I am lastingly relieved if my doctor tells me there is nothing wrong.
 - (b) I am initially relieved but the worries sometimes return later.
 - (c) I am initially relieved but the worries always return later.
 - (d) I am not relieved if my doctor tells me there is nothing wrong.
9.
 - (a) If I hear about an illness I never think I have it myself.
 - (b) If I hear about an illness I sometimes think I have it myself.
 - (c) If I hear about an illness I often think I have it myself.
 - (d) If I hear about an illness I always think I have it myself.

10.
 - (a) If I have a bodily sensation or change I rarely wonder what it means.
 - (b) If I have a bodily sensation or change I often wonder what it means.
 - (c) If I have a bodily sensation or change I always wonder what it means.
 - (d) If I have a bodily sensation or change I must know what it means.
11.
 - (a) I usually feel at very low risk for developing a serious illness.
 - (b) I usually feel at fairly low risk for developing a serious illness.
 - (c) I usually feel at moderate risk for developing a serious illness.
 - (d) I usually feel at high risk for developing a serious illness.
12.
 - (a) I never think I have a serious illness.
 - (b) I sometimes think I have a serious illness.
 - (c) I often think I have a serious illness.
 - (d) I usually think that I am seriously ill.
13.
 - (a) If I notice an unexplained bodily sensation I don't find it difficult to think about other things.
 - (b) If I notice an unexplained bodily sensation I sometimes find it difficult to think about other things.
 - (c) If I notice an unexplained bodily sensation I often find it difficult to think about other things.
 - (d) If I notice an unexplained bodily sensation I always find it difficult to think about other things.

14. (a) My family and friends would say I do not worry enough about my health.
(b) My family and friends would say I have a normal attitude to my health.
(c) My family and friends would say I worry too much about my health.
(d) My family and friends would say I am a hypochondriac.

For the following questions, please think about what it might be like if you had a serious illness of a type which particularly concerns you (such as heart disease, cancer, multiple sclerosis and so on). Obviously you cannot know for certain what it would be like; please give your best estimate of what you think might happen, basing your estimate on what you know about yourself and serious illness in general.

15. (a) If I had a serious illness I would still be able to enjoy things in my life quite a lot.
(b) If I had a serious illness I would still be able to enjoy things in my life a little.
(c) If I had a serious illness I would be almost completely unable to enjoy things in my life.
(d) If I had a serious illness I would be completely unable to enjoy life at all.

16. (a) If I developed a serious illness there is a good chance that modern medicine would be able to cure me.
- (b) If I developed a serious illness there is a moderate chance that modern medicine would be able to cure me.
- (c) If I developed a serious illness there is a very small chance that modern medicine would be able to cure me.
- (d) If I developed a serious illness there is no chance that modern medicine would be able to cure me.
17. (a) A serious illness would ruin some aspects of my life.
- (b) A serious illness would ruin many aspects of my life.
- (c) A serious illness would ruin almost every aspect of my life.
- (d) A serious illness would ruin every aspect of my life.
18. (a) If I had a serious illness I would not feel that I had lost my dignity.
- (b) If I had a serious illness I would feel that I had lost a little of my dignity.
- (c) If I had a serious illness I would feel that I had lost quite a lot of my dignity.
- (d) If I had a serious illness I would feel that I had totally lost my dignity.

FNE

Carefully read each of the 30 statements listed below. Decide whether each statement is true or false as it pertains to you personally. If you are unsure which is the better answer, decide which one is slightly more applicable to how you are feeling at the moment and answer accordingly. Try to answer based on your first reaction to the statement. Don't spend too long on any one item.

- _____ 1. I rarely worry about seeming foolish to others.
- _____ 2. I worry about what others will think of me even when I know it doesn't make any difference.
- _____ 3. I become tense and jittery if I know someone is sizing me up.
- _____ 4. I am unconcerned even if I know people are forming an unfavorable impression of me.
- _____ 5. I feel very upset when I commit some social error.
- _____ 6. The opinions that important people have of me cause me little concern.
- _____ 7. I am often afraid that I will look ridiculous or make a fool of myself.
- _____ 8. I react very little when other people disapprove of me.
- _____ 9. I am frequently afraid of other people noticing my shortcomings.
- _____ 10. The disapproval of others would have little effect on me.
- _____ 11. If someone is evaluating me, I tend to expect the worst.
- _____ 12. I rarely worry about what kind of impression I am making on someone.
- _____ 13. I am afraid that others will not approve of me.
- _____ 14. I am afraid that people will find fault with me.

- _____ 15. Other people's opinions of me do not bother me.
- _____ 16. I am not necessarily upset if I do not please someone.
- _____ 17. When I am talking to someone, I worry about what they may be thinking about me.
- _____ 18. I feel that you can't help making social errors sometimes, so why worry about it.
- _____ 19. I am usually worried about what kind of impression I make.
- _____ 20. I worry a lot about what my superiors think about me.
- _____ 21. If I know someone is judging me, it has little effect on me.
- _____ 22. I worry that others will think I am not worthwhile.
- _____ 23. I worry very little about what others may think of me.
- _____ 24. Sometimes I think I am too concerned with what other people think of me.
- _____ 25. I often worry that I will say or do the wrong things.
- _____ 26. I am often indifferent to the opinions others have of me.
- _____ 27. I am usually confident that others will have a favorable impression of me.
- _____ 28. I often worry that people who are important to me won't think very much of me.
- _____ 29. I brood about the opinions my friends have about me.
- _____ 30. I become tense and jittery if I know I am being judged by my superiors.

- ____ 17. I am very comfortable being close to romantic partners.
- ____ 18. I do not often worry about being abandoned.
- ____ 19. I get uncomfortable when a romantic partner wants to be very close.
- ____ 20. It makes me mad that I don't get the affection and support I need from my partner.
- ____ 21. I talk things over with my partner.
- ____ 22. When my partner is out of sight, I worry that he or she might become interested in someone else.
- ____ 23. I find it difficult to allow myself to depend on romantic partners.
- ____ 24. It's not difficult for me to get close to my partner.
- ____ 25. I tell my partner just about everything.
- ____ 26. I often worry that my partner doesn't really love me.
- ____ 27. My desire to be very close sometimes scares people away.
- ____ 28. I feel comfortable sharing my private thoughts and feelings with my partner.
- ____ 29. I often worry that my partner will not want to stay with me.
- ____ 30. I rarely worry about my partner leaving me.
- ____ 31. I prefer not to show a partner how I feel deep down.
- ____ 32. I prefer not to be too close to romantic partners.
- ____ 33. I find it relatively easy to get close to my partner.
- ____ 34. I'm afraid that I will lose my partner's love.
- ____ 35. I worry a lot about my relationships.
- ____ 36. I'm afraid that once a romantic partner gets to know me, he or she won't like who I really am.

RQ

Following are four general relationship styles that people often report. Place a checkmark next to the letter corresponding to the style that best describes you or is closest to the way you are.

____ A. It is easy for me to become emotionally close to others. I am comfortable depending on them and having them depend on me. I don't worry about being alone or having others not accept me.

____ B. I am uncomfortable getting close to others. I want emotionally close relationships, but I find it difficult to trust others completely, or to depend on them. I worry that I will be hurt if I allow myself to become too close to others.

____ C. I want to be completely emotionally intimate with others, but I often find that others are reluctant to get as close as I would like. I am uncomfortable being without close relationships, but I sometimes worry that others don't value me as much as I value them.

____ D. I am comfortable without close emotional relationships. It is very important to me to feel independent and self-sufficient, and I prefer not to depend on others or have others depend on me.

Now please rate each of the relationship styles above to indicate how well or poorly each description corresponds to your general relationship style.

Style A

1	2	3	4	5	6	7
Disagree Strongly			Neutral/ Mixed			Agree Strongly

Style B

1	2	3	4	5	6	7
Disagree Strongly			Neutral/ Mixed			Agree Strongly

Style C

1	2	3	4	5	6	7
Disagree Strongly			Neutral/ Mixed			Agree Strongly

Style D

1	2	3	4	5	6	7
Disagree Strongly			Neutral/ Mixed			Agree Strongly

BDI

Please read each group of statements carefully. Then pick out **ONE** statement in each group which best describes the way you have been feeling **THE PAST TWO WEEKS, INCLUDING TODAY**. Circle the number besides the statement you have picked. If several statements in the group seem to apply equally well, circle the highest number for that group. Be sure that you do not choose more than one statement for any group.

1.

- 0 I do not feel sad.
- 1 I feel sad.
- 2 I am sad all the time and I can't snap out of it.
- 3 I am so sad or unhappy that I can't stand it.

2.

- 0 I am not particularly discouraged about the future.
- 1 I feel discouraged about the future.
- 2 I feel I have nothing to look forward to.
- 3 I feel that the future is hopeless and that things cannot improve.

3.

- 0 I do not feel like a failure
- 1 I feel as if I have failed more than the average person
- 2 As I look back on my life, all I can see is a lot of failures.
- 3 I feel I am a complete failure as a person.

4.

- 0 I get as much satisfaction out of things as I used to.
- 1 I don't enjoy things the way I used to.
- 2 I don't get real satisfaction out of anything anymore.
- 3 I am dissatisfied or bored with everything

5.

- 0 I don't feel particularly guilty.
- 1 I feel guilty a good part of the time.
- 2 I feel guilty most of the time.
- 3 I feel guilty all of the time.

6.

- 0 I don't feel I am being punished.
- 1 I feel I may be punished.
- 2 I expect to be punished.
- 3 I feel I am being punished.

7.

- 0 I don't feel disappointed in myself.
- 1 I am disappointed in myself.
- 2 I am disgusted with myself.
- 3 I hate myself.

8.

- 0 I don't feel I am any worse than anybody else.
- 1 I am critical of myself for my weaknesses or mistakes.
- 2 I blame myself all the time for my faults.
- 3 I blame myself for everything bad that happens.

9.

- 0 I don't have any thoughts of killing myself.
- 1 I have thoughts of killing myself, but I would not carry them out.
- 2 I would like to kill myself.
- 3 I would kill myself if I had the chance.

10.

- 0 I don't cry anymore than usual.
- 1 I cry more now than I used to.
- 2 I cry all the time now.
- 3 I used to be able to cry, but now I can't even though I want to.

11.

- 0 I am no more irritated now than I ever am.
- 1 I get annoyed or irritated more easily than I used to.
- 2 I feel irritated all the time now.
- 3 I don't get irritated at all by the things that used to irritate me.

12.

- 0 I have not lost interest in other people.
- 1 I am less interested in other people.
- 2 I have lost most of my interest in other people
- 3 I have lost all of my interest in other people

13.

- 0 I make decisions about as well as I ever could.
- 1 I put off making decisions more than I used to.
- 2 I have greater difficulty in making decisions than before.
- 3 I can't make decisions at all anymore.

14.

- 0 I don't feel I look any worse than I used to.
- 1 I am worried that I am looking old or unattractive.
- 2 I feel that there are permanent changes in my appearance that make me look unattractive.
- 3 I believe that I look ugly.

15.

- 0 I can work about as well as before.
- 1 It takes an extra effort to get started at doing something.
- 2 I have to push myself very hard to do anything.
- 3 I can't do any work at all.

16.

- 0 I can sleep as well as usual.
- 1 I don't sleep as well as I used to.
- 2 I wake up 1-2 hours earlier than usual and find it hard to go back to sleep.
- 3 I wake up several hours earlier than usual and cannot get back to sleep.

17.

- 0 I don't get more tired than usual.
- 1 I get tired more easily than I used to.
- 2 I get tired from doing almost anything.
- 3 I am too tired to do anything.

18.

- 0 My appetite is no worse than usual.
- 1 My appetite is not as good as it used to be.
- 2 My appetite is much worse now.
- 3 I have no appetite at all anymore.

19.

- 0 I haven't lost much weight, if any lately.
- 1 I have lost more than 5 pounds.
- 2 I have lost more than 10 pounds.
- 3 I have lost more than 15 pounds.

20.

- 0 I am no more worried about my health than usual.
- 1 I am worried about physical problems such as aches and pains; or upset stomach; or constipation.
- 2 I am very worried about physical problems and it's hard to think of much else.
- 3 I am so worried about my physical problems, that I cannot think about anything else.

21.

- 0 I have not noticed any recent change in my interest in sex.
- 1 I am less interested in sex than I used to be.
- 2 I am much less interested in sex now.
- 3 I have lost interest in sex completely.

TAS

1 2 3 4 5
Strongly Disagree Neutral Strongly Agree

Please indicate how you feel about the following statements:

1. I am often confused as to what emotion I'm feeling
2. It is difficult for me to find the right words for my feelings.
3. I have physical sensations that even doctors can't understand.
4. I am not able to describe my feelings easily.
5. I prefer to just describe problems rather than analyze them.
6. When I am upset, I don't know if I am sad, frightened, or angry.
7. I am often puzzled by sensations in my body.
8. I prefer to just let things happen rather to understand why they turned out this way
9. I have feelings that I can't quite identify.
10. Being in touch with emotions is not essential.
11. I find it hard to describe how I feel about people.
12. People tell me to describe my feelings more.
13. I don't know what is going on inside of me.
14. I often don't know why I'm angry.
15. I prefer talking to people about their daily activities rather than their feelings.

16. I prefer to watch “light” entertainment shows rather than psychological dramas.
17. It is difficult for me to reveal my innermost feelings, even to close friends.
18. I can’t feel close to someone, even in moments of silence.
19. I find examination of my feelings useless in solving personal problems.
20. Looking for hidden meanings in movies or plays distracts from their enjoyment.

MC

Listed below are a number of statements concerning personal attitudes and traits. Read each item and decide whether the statement is true (T) or false (F) as it pertains to you.

- | | | |
|---|---|--|
| T | F | 1. Before voting I thoroughly investigate the qualifications of all the candidates. |
| T | F | 2. I never hesitate to go out of my way to help someone in trouble. |
| T | F | 3. It is sometimes hard for me to go on with my work if I am not encouraged. |
| T | F | 4. I have never intensely disliked anyone. |
| T | F | 5. On occasion I have had doubts about my ability to succeed in life. |
| T | F | 6. I sometimes feel resentful when I don't get my way. |
| T | F | 7. I am always careful about my manner of dress. |
| T | F | 8. My table manners at home are as good as when I eat out in a restaurant. |
| T | F | 9. If I could get into a movie without paying and be sure I was not seen, I would probably do it. |
| T | F | 10. On a few occasions, I have given up doing something because I thought too little of my ability. |
| T | F | 11. I like to gossip at times. |
| T | F | 12. There have been times when I felt like rebelling against people in authority even though I knew they were right. |
| T | F | 13. No matter who I'm talking to, I'm always a good listener. |
| T | F | 14. I can remember "playing sick" to get out of something. |
| T | F | 15. There have been occasions when I took advantage of someone. |
| T | F | 16. I'm always willing to admit it when I make a mistake. |
| T | F | 17. I always try to practice what I preach. |

- T F 18. I don't find it particularly difficult to get along with loud-mouthed, obnoxious people.
- T F 19. I sometimes try to get even, rather than forgive and forget.
- T F 20. When I don't know something I don't at all mind admitting it.

- T F 21. I am always courteous, even to people who are unpleasant.
- T F 22. At times I have really insisted on having things my own way.
- T F 23. There have been occasions when I felt like smashing things.
- T F 24. I would never think of letting someone else be punished for my wrongdoings.
- T F 25. I never resent being asked to return a favor.
- T F 26. I have never been bothered when people expressed ideas very different from my own.
- T F 27. I never make a long trip without checking the safety of my car.
- T F 28. There have been times when I was quite jealous of the good fortune of others.
- T F 29. I have almost never felt the urge to tell someone off.
- T F 30. I am sometimes irritated by people who ask favors of me.
- T F 31. I have never felt that I was wrongly punished.
- T F 32. I sometimes think when people have a misfortune they only got what they deserved.
- T F 33. I have never deliberately said something that hurt someone's feelings.

STAI

Read each statement and then choose the response that indicates how you feel right now. There is no right or wrong answers. Do not spend too much time on any one statement, just give the answer which seems to describe your feelings best.

1= Not at All 2= Somewhat 3= Moderately so 4= Very Much so

1. I feel calm
2. I feel secure
3. I am tense
4. I feel strained
5. I feel at ease
6. I feel upset
7. I am presently worrying over possible misfortune
8. I feel satisfied
9. I feel frightened
10. I feel comfortable
11. I feel self-confident
12. I feel nervous
13. I am jittery
14. I am indecisive
15. I am relaxed

16. I feel content
17. I am worried
18. I feel confused
19. I feel steady
20. I feel pleasant

PHQ

During the past month, how much have you been bothered by any of the following problems, that are NOT due to a diagnosed medical condition?

Not Bothered At All
0

Bothered a Little
1

Bothered a Lot
2

1. Stomach pain
2. Back pain
3. Pain in your arms, legs, or joints (knees, hips, etc.)
4. Headaches
5. Chest pain
6. Dizziness
7. Fainting spells
8. Feeling your heart pound or race
9. Shortness of breath
10. Pain or problems during sexual intercourse
11. Constipation, loose bowels, or diarrhea
12. Nausea, gas, or indigestion
13. Feeling tired or having low energy
14. Trouble sleeping

MAS

Please indicate how each of the following statements describes you.

- | | | |
|---|---|---|
| T | F | 1. I am often sick to my stomach. |
| T | F | 2. I am about as nervous as other people. |
| T | F | 3. I work under a great deal of strain. |
| T | F | 4. I blush as often as others. |
| T | F | 5. I have diarrhea once a month or more. |
| T | F | 6. I worry quite a bit over possible troubles. |
| T | F | 7. When embarrassed, I often break out in a sweat which is very
annoying |
| T | F | 8. I do not often notice my heart pounding |
| T | F | 9. I am seldom short of breath |
| T | F | 10. Often, I don't have a bowel movement for several days at a time |
| T | F | 11. At times I lose sleep because I am worrying |
| T | F | 12. My sleep is restless and disturbed |
| T | F | 13. I often dream about things I don't like to tell other people |
| T | F | 14. My feelings are hurt easier than most people |
| T | F | 15. I often find myself worrying about something |
| T | F | 16. I wish I could be as happy as others |
| T | F | 17. I feel anxious about something or someone almost all of the time |
| T | F | 18. At times I am so restless that I cannot sit in a chair for very long |

- T F 19. I have often felt that I faced so many difficulties that I could not overcome them
- T F 20. At times I have been worried beyond reason about something that did not really matter
- T F 21. I do not have as many fears as my friends
- T F 22. I am more self-conscious than most people
- T F 23. I am the kind of person that takes things hard
- T F 24. I am a very nervous person
- T F 25. Life is often a strain for me
- T F 26. I am not at all confident in myself
- T F 27. At times I feel that I am going to crack
- T F 28. I don't like making important decisions

CMHS

	TRUE	FALSE
1 No one cares much what happens to you.	T	F
2 I have often met people who were supposed to be experts who were no better than I.	T	F
3 Some of my family have habits that bother and annoy me very much.	T	F
4 I have often had to take orders from someone who did not know as much as I did.	T	F
5 It makes me feel like a failure when I hear of the success of someone I know well.	T	F
6 People often disappoint me.	T	F
7 It is safer to trust nobody.	T	F
8 I have often felt that strangers were looking at me critically.	T	F
9 I tend to be on my guard with people who are somewhat more friendly than I had expected.	T	F
10 My way of doing things is apt to be misunderstood by others.	T	F

How stressed did you feel during the task? _____ (1-100)

1= No Stress at All

100= Intolerable Stress

Please indicate the following:

Gender (check one): male _____ female _____

Race/Ethnicity: Caucasian: _____ African American _____ Asian _____

Hispanic _____ Native American _____ Pacific Islander _____

Other _____

Age: _____

Appendix B – Additional Materials**Emotion Word List-Study 4**

Frustrated

Hot-Headed

Satisfied

Competent

Out of Breath

Fatigued

Rejected

Quantity

Dizziness

Embarrassed

Rectangle

Resentful

Accepted

Achiness

Terrific

Terrified

Vehicle

Furious

Defeated

Colorful

Samples of Difficult Verbal and Quantitative Problems used in Study 2

OBSTREPEROUS is to EQUABLE as _____ is to _____.

- a) SANGUINE: BOYANT
- b) MALADOROUS: NOISOME
- c) PECCABLE: QUINTESSENTIAL
- d) SUMPTUOUS: LUXURIOUS

TENABLE is to CREDIBLE as _____ is to _____.

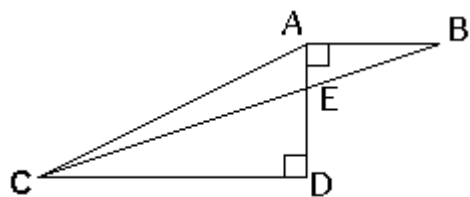
- a) INDIGNANT: COMPLACENT
- b) AQUISITIVE: MAGNANIMOUS
- c) PROSTRATE: INVIGORATED
- d) PARTISAN: PREJUDICED

SAUNTER is to AMBLE as _____ is to _____.

- a) PRATE: BLATHER
- b) GLIMPSE: SCRUTINIZE
- c) NIBBLE: SCARF
- d) BLANCH: CHARBROIL

$$2^{30} + 2^{30} + 2^{30} + 2^{30} =$$

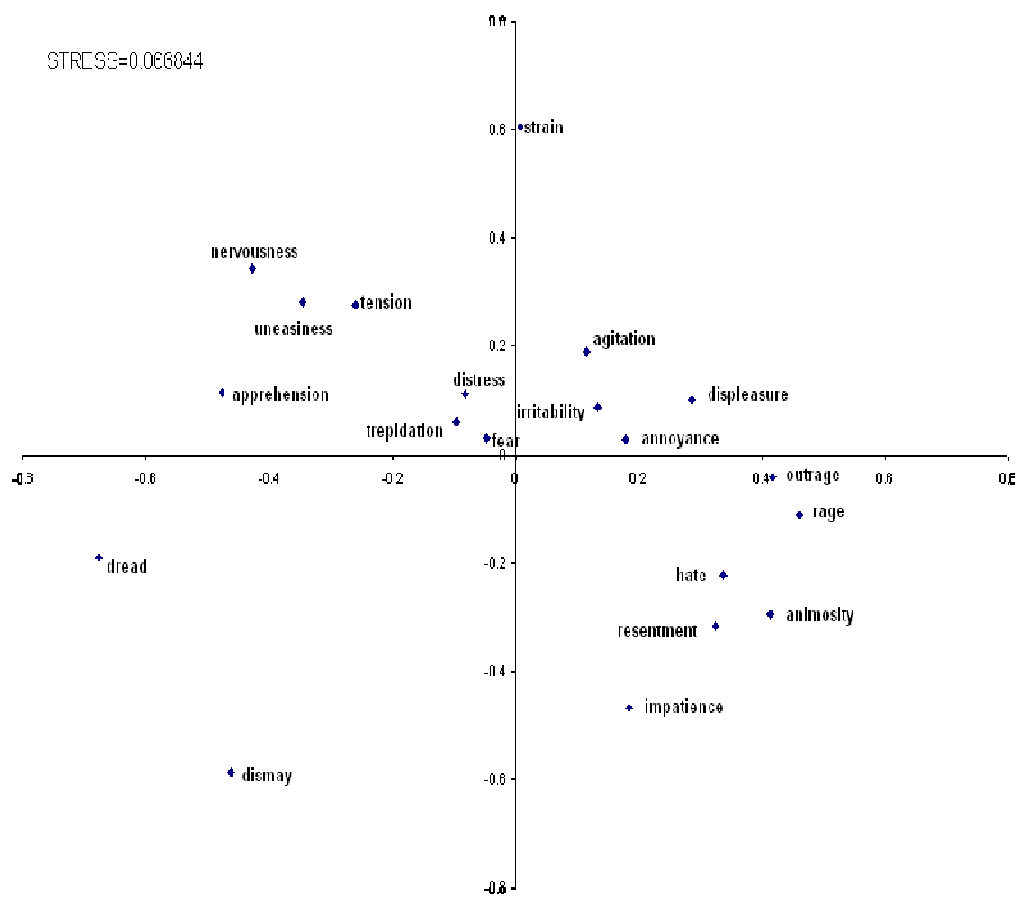
- a) 8^{120}
- b) 8^{30}
- c) 2^{32}
- d) 2^{30}
- e) 2^{26}



In the figure above $AD = 4$, $AB = 3$ and $CD = 9$. What is the area of triangle AEC ?

- a) 18
- b) 13.5
- c) 9
- d) 4.5
- e) 3

Multi-Dimensional Scaling (MDS) of Stimuli used in the Anxiety-Anger IAT



Correlations between Measures used in Study 1

		Correlations								
		FNE	State Anx	Alexi	Health Anx	Somatic Amp	Somat	Depres	Anx Close	Avoid Close
Fear of Negative Evaluation	Pearson Correlation	1	-.454**	.362**	.285**	.271**	.331**	.468**	.222 [†]	-.278**
	Sig. (2- tailed)		.000	.000	.001	.002	.000	.000	.013	.002
	N	123	123	123	122	122	123	123	123	123
State Anxiety	Pearson Correlation	.454**	1	-.395**	-.352**	-.244**	-.433**	-.669**	-.196 [†]	.384**
	Sig. (2- tailed)	.000		.000	.000	.007	.000	.000	.029	.000
	N	123	123	123	122	122	123	123	123	123
Alexithymia	Pearson Correlation	.362**	-.395**	1	.360**	.143	.325**	.551**	.158	-.286**
	Sig. (2- tailed)	.000	.000		.000	.116	.000	.000	.082	.001
	N	123	123	123	122	122	123	123	123	123
Health Anxiety	Pearson Correlation	.285**	-.352**	.360**	1	.558**	.502**	.360**	.292**	-.191 [†]
	Sig. (2- tailed)	.001	.000	.000		.000	.000	.000	.001	.035
	N	122	122	122	122	121	122	122	122	122
Somatic Amplification	Pearson Correlation	.271**	-.244**	.143	.558**	1	.509**	.222 [†]	.422**	-.055
	Sig. (2- tailed)	.002	.007	.116	.000		.000	.014	.000	.550
	N	122	122	122	121	122	122	122	122	122
Somatization	Pearson Correlation	.331**	-.433**	.325**	.502**	.509**	1	.464**	.444**	-.243**
	Sig. (2- tailed)	.000	.000	.000	.000	.000		.000	.000	.007
	N	123	123	123	122	122	123	123	123	123
Depression	Pearson Correlation	.468**	-.669**	.551**	.360**	.222 [†]	.464**	1	.310**	-.337**
	Sig. (2- tailed)	.000	.000	.000	.000	.014	.000		.000	.000
	N	123	123	123	122	122	123	123	123	123
Anxiety in Close Relationships	Pearson Correlation	.222 [†]	-.196 [†]	.158	.292**	.422**	.444**	.310**	1	-.091
	Sig. (2- tailed)	.013	.029	.082	.001	.000	.000	.000		.317
	N	123	123	123	122	122	123	123	123	123
Avoidance in Close Relationships	Pearson Correlation	-.278**	.384**	-.286**	-.191 [†]	-.055	-.243**	-.337**	-.091	1
	Sig. (2- tailed)	.002	.000	.001	.035	.550	.007	.000	.317	
	N	123	123	123	122	122	123	123	123	123

p<.01=**

P<.05=*

Curriculum Vitae

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