Examining the experience of alexithymia using descriptive experience sampling

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EXAMINING THE EXPERIENCE OF ALEXITHYMIA
USING DESCRIPTIVE EXPERIENCE SAMPLING

by

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ABSTRACT

Examining the Experience of Alexithymia using Descriptive Experience Sampling

by

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The present study aimed to examine the differences in inner experience between alexithymic and nonalexithymic individuals, as identified by the TAS-20. Six individuals high in alexithymic characteristics and six control individuals completed a total of four days of experience sampling using the Descriptive Experience Sampling method. Over the course of these four days, participants’ inner experiences were randomly sampled. All participants also completed a fifth day of experience sampling in a controlled environment, during which time they observed four emotion-eliciting film clips. Overall, results indicated that individuals with alexithymia tended to experience emotions, as well as other major phenomena of inner experience at the same rate as nonalexithymic individuals. However, individuals with evidenced much more impoverished, less detailed inner experience overall. It is concluded that individuals with alexithymia have a deficit not only of emotion experience, but of inner experience as a whole.
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INTRODUCTION

Over 50 years ago psychologists began noting that some of their patients suffered from an inability to express their emotions and feelings verbally. These patients seemed unimaginative, had a lack of inner experience and a very minimal emotional awareness. The patients had trouble identifying and accessing their feelings and were inarticulate and dull.

In the late 1960's, Harvard psychiatrists Sifneos and Nemiah came across a subset of inpatients with psychosomatic complaints who also had an exceedingly arduous time discussing their emotions. In 1973 Sifneos coined the term *alexithymia* to describe the symptoms he witnessed in these somatizing patients. In the same year Sifneos published the first article looking exclusively at the construct of alexithymia in psychosomatic patients. At the same time in other studies, evidence of the characteristics of alexithymia was being documented in patients with eating disorders, post-traumatic stress disorder, and drug addictions (Krystal, 1968; Krystal & Raskin, 1970; Wurmser, 1974; Bruch, 1973).

Alexithymic individuals are characterized as having difficulty describing their feelings, their cognitive style is concrete and reality-based and they have impoverished emotional and fantasy lives (Taylor, Bagby, & Parker, 1991, 1997). Alexithymic individuals “know very little about their own feelings and, in most instances, are unable to link them with memories, fantasies, or specific situations” (Taylor et al., 1991, p.155). A list of currently accepted features of the alexithymia construct is as follows: difficulty
in identifying feelings; difficulty in verbalizing feelings to others; a lack of fantasies and a restricted imagination; an externally oriented cognitive style and a lack of attention toward inner experience (Parker, Taylor, & Bagby, 2001). Alexithymia is viewed as a dimensional construct distributed throughout the population, and not as a categorical phenomenon.

The role of emotions in psychological functioning has always been a topic of great interest to psychologists. It has been proposed that understanding one's own emotions and the ability to share those emotions with others are important aspects of interpersonal relationships and ultimately of happiness in our daily lives. Emotional intelligence (EI) has recently become an area of great interest to psychologists. Emotional intelligence refers to the ability of individuals to express and understand emotions in a competent manner, as well as an ability to regulate both negative and positive emotions effectively.

Gardner (1983) described two types of emotional intelligence, intrapersonal and interpersonal. Intrapersonal intelligence is the ability to define and acknowledge one's own feelings, whereas interpersonal intelligence is the ability to recognize and differentiate feelings and emotions in others. Alexithymia overlaps quite substantially with the idea of intrapersonal emotional intelligence. Alexithymic individuals seem to lack this type of intelligence. Recently, some studies have shown that individuals with alexithymia have difficulty in understanding the emotions of others as well (Parker, Taylor, & Bagby, 1993).

Several measures have been developed to assess for alexithymia. These include self-report questionnaires, observer-report measures, structured interviews, and projective
techniques. Most of these measures have been found to lack reliability and validity (e.g., MMPI-Alexithymia Scale, Rorschach, etc.). Currently, the most widely used measure of alexithymia is the 20-item Toronto Alexithymia Scale (TAS-20), a self-report measure developed by Bagby, Parker and Taylor (1994) (see Appendix A). This scale provides a total score for alexithymia with higher scores indicating higher levels of alexithymia. The 20 items on the TAS-20 represent three factors: (1) difficulties in identifying feelings and distinguishing between emotional and physical sensations; (2) difficulties in describing feelings; and (3) externally oriented thinking.

Because of the inherent difficulties in asking people to report about their internal experiences, such as their experience of emotions, there is reason to believe that standard questionnaires examining alexithymia, such as the TAS-20, give an incomplete view of the inner experience of those identified as alexithymic. This study employed the Descriptive Experience Sampling method (DES) developed by Hurlburt (1990, 1993) to explore the inner experience of individuals identified via the TAS-20 as high in alexithymic characteristics. DES is centrally concerned with obtaining accurate, unbiased accounts of inner experience by focusing on very brief moments in time. DES is an exploratory, qualitative method aimed at obtaining precise accounts of inner experience. The current study utilized this method to explore the inner worlds of alexithymic and non-alexithymic individuals in their daily lives, as well as in a controlled situation intended to evoke emotional experience.
CHAPTER 1

LITERATURE REVIEW

Overview of the Alexithymia Literature

Alexithymia has been defined in the 7th edition of the American Psychiatric Glossary (1994) as "A disturbance in affective and cognitive functioning that overlaps diagnostic entries but is common in psychosomatic disorders, addictive disorders, and post-traumatic stress disorder. The chief manifestations are difficulty in describing or recognizing one's emotions, a limited fantasy life, and general constriction in the affective life" (p.199).

Alexithymia can be generally described as a disturbance of affective processing that includes a chronic inability to express one's own emotions. Alexithymia is currently thought to involve a deficit in the regulation and processing of emotions. The alexithymia construct has gained considerable attention in the last decade or so, with a current search of the PsycINFO database producing over 1000 journal articles on alexithymia.

Although the term alexithymia was not introduced until 1973 (Sifneos), characteristics of this condition were being observed in psychosomatic patients as early as the 1940's when psychologists began noting that some of their patients suffered from an inability to express their emotions and feelings verbally. For example, Reusch (1948) and McLean (1949) observed that many of their psychosomatic patients had great difficulty in talking about their emotion-related experiences. These patients showed a
lack of significant progress in psychoanalytic therapy due to their inability to express themselves effectively.

In 1952, Horney and Kelman described a group of psychiatric patients who were exhibiting a concrete, externally oriented thinking style, accompanied by a lack of substantial inner experience, and little interest in dreams, wishes and desires. These patients seemed unimaginative and had little to no emotional awareness; the patients also tended to have many unsubstantiated bodily complaints. Many tended to binge eat and abuse alcohol. These maladaptive behaviors were explained as individual attempts at controlling chaotic inner states by compensating for lack of emotional awareness through physiological means.

About a decade later, in France, the term *la pensée opératoire*, translating literally to mean operational thinking, was put forth by Marty and de M’Uzan in 1963 (as cited in Taylor & Bagby, 2000). Patients who lacked a substantial fantasy life, who were externally oriented in their thinking and who obsessed over physical symptoms were given this label. These patients showed the same symptoms that other psychosomatic patients had been experiencing around the world.

In the late 1960’s, Harvard psychiatrists Sifneos and Nemiah came across a subset of inpatients with psychosomatic complaints who had an exceedingly arduous time discussing their emotions. They began the first systematic studies of these individuals and it was at this point that the cluster of symptoms witnessed by psychologists for decades came to be known as alexithymia. In 1973, Sifneos coined the term *Alexithymia* (literally translated from Greek to mean *a lack of words for emotion*: a –lack, *lexi* – word, *thymos* – emotion) to describe the symptoms he witnessed in these somatizing patients.
As interest in the construct grew, evidence of the characteristics of alexithymia, such as a lack of inner awareness and imagination, were being documented in patients with alcohol and drug abuse disorders (Krystal & Raskin, 1970), posttraumatic stress disorders (Krystal, 1968; Zeitlin, Lane, O’Leary, & Schrift, 1989), and eating disorders (Bruch, 1973; Wurmser 1974). It is thought that the deficit in emotional awareness and related lack of cognitive processing of affect experienced by individuals with alexithymia leads them to focus more intently on the physical aspects of the emotional experience, providing an explanation for why the construct was seen so often in psychosomatic patients. In addition to the disorders mentioned above, alexithymia has been linked to inflammatory bowel disease (Porcelli, Zaka, Leoci, Centonze, & Taylor, 1995), hypertension (Jula, Salminen, & Saarijärvi, 1999), gastrointestinal disorders (Porcelli, Taylor, Bagby, & De Carne, 1999), somatoform disorders (Taylor, Bagby, Parker, & Acklin, 1992), and panic disorder.

In 1976 Nemiah, Freyberger and Sifneos published the influential article, “Alexithymia: A view of the psychosomatic process.” This article appeared just before the 11th European Conference on Psychosomatic Research in Vienna, leading to a push for an accepted definition and conception of the alexithymia construct in the fields of psychology and medicine (Taylor & Bagby, 2000).

A list of the four currently accepted essential features of the alexithymia construct are: a difficulty in identifying and differentiating between feelings and bodily sensations; difficulty in verbalizing or describing feelings to others; a paucity of fantasies and a restricted imagination; and an externally oriented cognitive style, or lack of attention towards inner experience (Parker, Taylor & Bagby, 2001). Alexithymia is viewed by
most researchers as a stable personality trait (although this is sometimes debated; see 
below) and is thought to be a risk factor that predisposes individuals to both psychiatric 
and psychosomatic disorders (Taylor, 2000).

Other characteristics have been associated with alexithymia, including a difficulty 
in recalling dreams, a constricted range of facial expressions, a stiff posture and a 
tendency to social conformity (Taylor, Bagby & Parker, 1997). However, it was found 
that dream recall and social conformity are not essential features of the construct (Bagby, 
Parker & Taylor, 1994). Additionally, some findings indicate that individuals with 
alexithymia tend to show poor empathy for others and often have difficulty 
differentiating between their own perspective and the perspective of others (Taylor, 
1984). Individuals with alexithymia are very externally-focused and are able to provide 
descriptions of events, but these descriptions lack reference to emotions or an inner 
perspective and are extremely self-centered (Nemiah, 1978).

It is important to note that individuals with alexithymia are not completely unable 
to verbalize their emotions and do acknowledge that they experience emotions. More 
accurately, individuals with alexithymia have been reported as having a limited 
vocabulary for describing their emotions (Sifneos, 1967), and have poorly differentiated 
emotional states (Taylor & Bagby, 2000). Sifneos (1967) reported that his patients could 
identify anxiety and depression, as well as simple symptoms such as tension, irritability 
and boredom. These patients had a limited vocabulary and were unable to elaborate upon 
experienced feelings and symptoms, but were not completely unable to identify certain 
feelings. For example, patients had the ability to note in a very general sense what 
emotion they were experiencing (anger) but were unable to describe what that anger was
like, how it was experienced, and so forth. Additionally, individuals with alexithymia seem to experience this restriction of the ability to effectively express emotions across all situations (Svanaeus, 1999).

Alexithymia is a trait that is distributed across the general population (Taylor, 1994) and should be regarded as a dimensional variable rather than a diagnostic category (Kench & Irwin, 2000). The prevalence and rate of alexithymia have been found to be relatively stable across different populations and cultures. The prevalence of alexithymia in community samples has been shown to be between 9.3 -18.8% (Tacon, 2001). As part of a large-scale Health 2000 project, 5454 Finnish adults (at least 30 years of age) completed the TAS-20. The prevalence of alexithymia was significantly higher among men than women. Alexithymia was also associated with single marital status, low income, low education, chronic somatic disease, self-perceived poor health, psychiatric disturbances and depression (Joukamaa, et al., 2003).

In a study of a United States community sample of 380 individuals, alexithymia was associated with older age, male sex, lower socio-economic status and lower levels of education (Lane, Sechrest, & Riedel, 1998). In contrast, another study found higher rates of alexithymia in female undergraduates, especially those majoring in science, than in male undergraduates (Mason, Tyson, Jones & Potts, 2005). Loas, Fremaux, Otmani and Verrier (1995) found that college students in general have stronger alexithymic tendencies than do non-students. Borens, Grosse-Schulte and Jaensch (1977) interviewed individuals with psychosomatic disorders and found that those from a lower SES demonstrated less affect in their responses, less imagination and less verbal facility during the interview.
It should also be noted that Freyberger (1977) described an alternative form of alexithymia which he labeled secondary alexithymia. Freyberger observed that some medically ill patients showed a constriction of emotional expression and imaginal activity as a result of their illness (Lundh, Johnsson, Sundqvist, & Olsson, 2002). It is believed that these somatic patients view their health problems as having a medical basis and not a psychological basis, and are therefore less motivated to discuss their emotions, dreams and fantasies (Lundh et al., 2002). For the purposes of this study, we will focus on primary alexithymia.

Etiology

As of yet there is no clear understanding of the etiology of alexithymia. Childhood/family environment, neurobiological abnormalities and socio-cultural factors are all thought to play a role in the development of alexithymia (Taylor & Bagby, 2004).

The prospective Northern Finland 1966 Birth Cohort Project has produced some of the most comprehensive research on the etiology of alexithymia. This project consists of information gathered on over 12,000 live-born children in two Finnish provinces. In 1997 a 31-year follow-up included the administration of the TAS-20 to 5,983 participants. Results indicated that alexithymia was more common in individuals from rural dwellings. Unwanted children and those born into families with several children also showed higher levels of alexithymia (Joukamaa et al., 2003). In a related study drawn from the same set of data, Kokkonen et al. (2003) found that participants who were early speakers had lower total TAS scores, providing evidence for an inverse association between early language development and adult alexithymia.
Early childhood abuse or trauma has been associated with the development of alexithymia in adulthood. Krystal (1988a) has proposed that developmental traumatology, such as early maltreatment may contribute to alexithymia by interfering with neuroanatomical as well as psychological development. Evidence for the effects of early maltreatment on neuroanatomical development is slowly accumulating. For example, abused children with post-traumatic stress disorder have smaller prefrontal cortex volumes and have a less developed corpus callosum than non-abused children (De Bellis, et al., 2002, 1999; Teicher, 2000). In a study assessing alexithymia among adults who reported childhood physical abuse, the abused adults reported more difficulty in identifying their emotions using both self-report and observer report methods (Berenbaum, 1996).

Research on attachment has shown that childhood attachment experiences can affect the development of affect regulation and imagination. More specifically, avoidant and insecure attachment styles are associated with inhibited affect (Cassidy, 1994) and effective emotion-regulation skills are more likely to develop in the context of secure attachments (Taylor & Bagby, 2004).

In a study examining attachment style and alexithymia, 100 young men with mood disorders completed the TAS-20 and measures of attachment and separation anxiety. High TAS-20 scores were associated with higher separation anxiety and a higher need for approval. Men who reported childhood patterns of insecure attachment and more severe symptoms of separation anxiety had pronounced alexithymic characteristics (Troisi, D’Argento, Peracchio, &Petti, 2001). Among those with insecure attachment
styles, those with dismissing patterns had a lower prevalence of alexithymia (36%) than did those with fearful or preoccupied patterns (73% and 65%, respectively).

The association between attachment style and alexithymia provides further evidence for the role of early developmental factors in the etiology of alexithymia. These findings are especially important because highly supportive relationships have been shown to have a positive impact on health and functioning (Berkman, 1995). For this reason, insecure and fearful attachment patterns seen in alexithymic individuals may adversely affect illness behavior and duration (Lumley, Stettner & Wehmer, 1996) and result in the misinterpretation of and focus on physical symptoms seen in alexithymic individuals.

Several investigators have attempted to identify the neural correlates associated with the deficit in the cognitive processing of affect seen in alexithymia ever since Nemiah (1977) postulated that a discontinuity between the limbic system and the neocortex may be at fault. One strategy for identifying the neural correlates of alexithymia has been to examine the effects of separating the brain hemispheres via commissurotomy. It is believed that the left cerebral hemisphere in right-handed individuals has an advantage for verbal and analytical functions, and the right hemisphere an advantage for nonverbal spatial processing, imagery and the perception of verbal and nonverbal expression of emotion (Galin, 1976). Therefore, it is reasonable to believe that individuals who have undergone complete or partial commissurotomies may exhibit alexithymic characteristics. Essentially the hypothesis is that by separating the left hemisphere from the right hemisphere, commissurotomies interfere with the ability to process and express emotions. In 1977 Hoppe and Bogen proposed that alexithymia may
involve a "functional commissurotomy" or an interruption of the normal transfer of information between the two hemispheres of the brain. In a study of 12 “split-brain” patients, Hoppe and Bogen found these patients had difficulty identifying feelings, lacked fantasies, and had a very operational style of thinking.

In another study eight patients with commissurotomies (six complete and two partial) were assessed for alexithymia. Using a content-analysis method, participants’ spoken and written responses to a film that symbolically represented death and loss were compared and assessed for emotional expressiveness and fantasy quality. Results indicated that commissurotomized patients were more alexithymic on all measured variables than were neurologically intact controls (TenHouten, Hoppe, Bogen, & Walter, 1986).

In a study by Zeitlin, Lane, O’Leary and Schrift (1989), a tactile finger localization task was used to test the efficiency of interhemispheric information transfer in 25 males with post-combat PTSD. The tactile finger task required blindfolded participants to respond to fingers being touched by the examiner. Results indicated that the efficiency of interhemispheric communication was a significant predictor of the degree of alexithymia (measured by the TAS). In other words, the alexithymic veterans with PTSD showed a significant bidirectional deficit in the interhemispheric transfer of sensorimotor information as compared with controls. The authors concluded that some forms of alexithymia may be mediated by a deficit in interhemispheric communication (Zeitlin et al., 1989).

A more recent study examined the association between interhemispheric transfer and alexithymia in a non-clinical sample and followed the same procedures as the Zeitlin
et al. (1989) study. Twenty-nine right-handed male undergraduates performed the tactile finger localization task in order to assess the efficiency of interhemispheric communication. Results indicated that alexithymic individuals were significantly less efficient at bidirectional interhemispheric transfer than were non-alexithymic individuals. The results of this study provide further support for a deficit in information processing between the two cerebral hemispheres (Parker, Keightley, Smith, & Taylor, 1999).

Researchers are also exploring a possible correlation between alexithymia and the size of the right anterior cingulate gyrus (ACG; Gündel et al., 2004). Preliminary findings indicate a significant positive correlation between alexithymia (as measured with the TAS-20) and the size of the right ACG (Gündel et al., 2004) in healthy men and women.

Other researchers have hypothesized that alexithymia may be associated with a deficit in activity in the anterior cingulate cortex (ACC) during emotional arousal (Lane, Ahern, Schwartz, & Kaszniak, 1997). Functional magnetic resonance imaging (fMRI) has been used to assess brain activity during the viewing of emotion-inducing pictures; results indicate that there are differences in the activity of the ACC in alexithymic individuals as compared with controls (Berthoz, et al., 2002). In another study by Huber et al. (2002), alexithymia was associated with reduced activity in the ACC and the corpus callosum. Other researchers have employed electroencephalogram (EEG) recordings to explore emotional processing in alexithymia (Aftanas & Varlamov, 2004; Aftanas, Varlamov, Reva, & Pavlov, 2003a). Their preliminary findings indicate that alexithymia may be associated with a dysregulation of anterior cortical regions during the early phases of emotional processing.
Relationship of Alexithymia to Other Constructs

The construct of alexithymia has been related to a wide range of other conditions, including variation in the experience of emotion across cultures. In this section an overview of how alexithymia relates to a range of other psychological constructs and physical disorders is provided.

Culture and Family Environment

A number of researchers have explored the extent to which the experience and expression of emotions vary across cultures, and the relation of these variations to the construct of alexithymia. It is important to keep in mind that the construct of alexithymia was borne from within the psychodynamic school of thought, which is very much influenced by Western ideologies. Verbal expression of emotions is not necessarily valued in non-Western culture (Lesser, 1981). In some Eastern cultures, especially Asian culture, verbal expression of emotions is unusual (Marsella, Kinzie, & Gordon, 1973), and Asians tend to be less likely than Euro-Americans to use emotion terms when communicating with one another (Frymier, Klopft, & Ishii, 1990).

In a study by Dion (1996), an ethnically heterogeneous group of over 900 undergraduates at the University of Toronto in Canada were administered the TAS-20. Overall, non-native English speakers had significantly higher total TAS-20 scores than native English speakers. In addition to this, non-native English speakers reported having a harder time identifying feelings than did native English speakers. Chinese language speakers scored higher on the TAS-20 measure of alexithymia than both English speakers and European language (e.g., French, Italian, Greek, Portuguese, Spanish, Polish, German) speakers. In addition to these findings, men on average scored higher than
women on the TAS-20. These results indicate that a gender difference may exist and also that ethnolinguistic factors should be taken into consideration when examining the construct of alexithymia. The author attributes the high TAS-20 scores obtained by the Chinese speakers to Chinese culture. Alexithymic-like characteristics tend to be fostered among these individuals because Chinese culture encourages the somatic expression of emotions over the verbal expression of emotions (Tseng, 1975).

In another study examining the relationship between alexithymia and culture, Euro-American, Asian-American and Malaysian students were compared on mean levels and correlates of alexithymia. Using the three subscales of the TAS-20 (difficulty in identifying feelings, difficulty in verbalizing feelings to others, and externally oriented thinking), Euro-Americans had significantly less difficulty identifying feelings and communicating emotion as compared with Asian-Americans (Le, Berenbaum, & Raghavan, 2002). Both Asian groups had higher levels of somatization than did the Euro-American group. In addition to these findings, Asian-American participants were less likely to report hearing their parents verbalize positive emotions, and Euro-American and Asian-American men tended to report having parents who displayed less physical affection than did women. Overall, these results highlight the importance of culture (and family environment) in the development of the ability to express emotions.

In another study, 92 undergraduates completed the TAS-20 and a measure of childhood family environment, the Family-Functioning Scale (Bloom & Naar, 1994). Two Family-Functioning factors were predictors of high TAS-20 scores; Expressiveness and Intellectual-Cultural Orientation were negatively correlated with the TAS-20. These
findings support the hypothesis that childhood family environment has somewhat of a bearing on adult alexithymic tendencies (Kench & Irwin, 2000).

In a study examining the relationship between family factors and alexithymia, 127 young adults were assessed using the TAS-20 measure of alexithymia and the McMaster Family Assessment Device (Epstein, Baldwin & Bishop, 1983), a measure of family interaction and relations. Results indicated that general family pathology was moderately correlated with alexithymia (Lumley, Mader, Gramzow, & Papineau, 1996). More specifically, difficulty in identifying feelings was associated with dysfunctional family affective involvement, particularly in males; and externally oriented thinking correlated with poor behavior control, especially in females. In the second part of this study, 80 mothers of the young adults in the first part of the study were assessed again using the TAS-20. There was a statistically significant correlation between mothers' scores on the TAS-20 and their offspring's score. These findings implicate maternal alexithymia and dysfunction in families as factors in the etiology of alexithymia.

In a study examining the relationship between alexithymia and family environment, it was found that alexithymia was associated with retrospective reports of low levels of family expressiveness, and also with feeling less emotionally safe during childhood (Berenbaum & James, 1994). Additionally, the authors found that high levels of alexithymia were associated with low levels of positive communication within the family. It was also found that individuals with alexithymia had significantly more dissociative experiences, and greater ambivalence concerning the expression of emotion than did controls (Berenbaum & James, 1994).
It should be noted that all these studies employed retrospective methods of assessing childhood environment and therefore results should be interpreted cautiously. Additionally, the relationships found between family environment and alexithymia also could be due, in part or whole, to heritable substrates of alexithymia. The more sophisticated designs employed in behavioral genetics research that allow clearer differentiation between environmental and genetic causes of family associations have not yet been used to explore the origins of alexithymia.

In a study by Fischer and Good (1997), it was found that alexithymia and a fear of intimacy were strongly related to more traditional masculine gender roles, as indicated on the Gender Role Conflict Scale. Male participants who indicated greater identification with their male roles tended to also score higher on a measure of alexithymia (TAS-20), even after controlling for social desirability effects.

Other Disorders and Diseases

As the construct of alexithymia originated out of research examining patients with psychosomatic diseases (Nemiah, Freyberger, & Sifneos, 1976; Nemiah & Sifneos, 1970), there are a number of studies which examine the presence of alexithymia in individuals with various psychosomatic and medical illnesses. To date, hypertension has been most strongly associated with alexithymia (Taylor, 2000). Two independent studies found higher rates of alexithymia in hypertensive men and women than in controls (Jula, Salminen, & Saarijärvi, 1999; Todarello, Taylor, Parker, & Fanelli, 1995). Todarello and colleagues found a rate of 55% of alexithymia in hypertensive patients, as opposed to 16% in a community sample. Jula and colleagues found rates of alexithymia of 46% and
57% in hypertensive women and men, respectively; these results were independent of alcohol and sodium intake, body mass index, and physical fitness.

Alexithymia has also been linked with inflammatory bowel disease (IBD). One study found that approximately 33% of individuals with IBD also exhibited alexithymic characteristics, contrasted with only 4.5% of a group of healthy individuals (Porcelli et al., 1995). Additionally, individuals with functional gastro-intestinal disorders such as irritable bowel syndrome had high rates of alexithymia (66%).

In a comprehensive review of the alexithymia and somatization literature, De Gucht and Heiser (2003) determined that there is an association between alexithymia and the reporting of somatic symptoms. The alexithymia factor that had the strongest correlation with somatic reporting was difficulty in identifying feelings.

Another study examined the association of alexithymia, somatoform disorders and depressive disorders (Duddu, Isaac and Chaturvedi, 2003). Thirty participants diagnosed with depressive disorder, 30 diagnosed with somatoform disorder and 30 controls were all given the TAS-20 measure of alexithymia. Results showed that participants in the somatoform and depressive disorders group had higher TAS-20 scores (60.4 and 62.5, respectively) than did the controls (54.2). It was also found that individuals with depressive disorder had greater difficulty expressing their emotions. Both somatoform disordered individuals and depressive disordered individuals experienced greater difficulty in identifying bodily sensations and feelings than did controls.

Moderate to high rates of alexithymia have also been reported in individuals with panic disorder (Parker, Taylor, & Bagby, 1993) and eating disorders. Rates of alexithymia range from 48% to 77% in anorexic individuals and 40% to 61% in bulimic
individually (Bourke et al., 1992; Cochrane et al., 1993; Schmidt, Jiwany, & Treasure, 1993).

There remains a lingering debate as to whether alexithymia is a state phenomenon brought on in response to physiological changes caused by somatic diseases, or whether it is in fact a stable trait (Taylor, 2000). However, there seems to be mounting evidence pointing to alexithymia as a stable personality trait and not merely a reaction to emotional stress or illness. In a one-year follow-up of 54 psychiatric outpatients, rates of alexithymia remained stable in both men and women, despite a significant decrease in psychological distress from the initial assessment (Salminen, Saarijärvi, Äärelä, & Tamminen, 1994). Based on these results, the authors concluded that alexithymia is a stable trait. In another study, physically healthy women completed the TAS-20 after undergoing a gynecological exam, and prior to learning the results of their exam. Those women found to have dysplasia (cancerous lesions of the cervix) had significantly higher rates of alexithymia than did women without dysplasia (Todarello et al., 1997).

Alexithymia has been shown to reduce the quality of life of individuals with chronic diseases, such as Irritable Bowel Syndrome (Verissimo, Mota-Cardosa, & Taylor, 1998). Interpersonal interactions can be difficult for individuals with alexithymia, contributing to a reduced quality of life. For this reason, it is important to increase our understanding of the nature of the construct in order to more effectively treat individuals with alexithymia.

A study examining the relationship between alexithymia and interpersonal relationships found that alexithymia was significantly correlated with interpersonal problems, and that individuals with alexithymia had more interpersonal problems than
did non-alexithymic individuals, especially problems with being overly hostile and socially avoidant (Spitzer et al., 2005). The authors concluded that the interpersonal style of alexithymic individuals tends to be more 'cold' and socially avoidant than that of non-alexithymic individuals.

Dreams

Some clinical observations have suggested that in addition to the difficulty in identifying feelings and paucity of imagination in waking life that characterize alexithymia, individuals may also experience difficulty in the recall of dreams and a lack of imagination during dreaming. To date, little systematic research has been conducted to verify these observations and results have been inconsistent (Taylor, 2000).

In an early study by Tantam, Kalucy and Brown (1982), six individuals with eczema were studied in a sleep laboratory. Of the six individuals, some exhibited alexithymic characteristics that were associated with a trend towards less REM sleep and a lack of involvement or interest in the dream collection process.

Lumley and Bazydlo (2000) conducted two studies in which they tested the hypotheses that alexithymic individuals rarely recall dreams and that the dreams they do recall are nightmarish and unregulated. Using retrospective dream surveys and dream diaries, the investigators found that the externally oriented thinking factor of the TAS-20 was related to less dream recall, shorter dreams and recalled dreams that were boring and lacked vividness. The difficulty identifying feelings and difficulty describing feelings factors were related to elevated frequency of nights with disturbing dream content and recalling dreams as bizarre and violent. These findings have yet to be consistently replicated by other investigators.
In a study by Parker, Bauermann and Smith (2000), eight individuals with alexithymia (as measured by the TAS-20) and eight non-alexithymic individuals were awakened for dream reports during three rapid eye movement periods over the course of one night of monitored sleep in a sleep laboratory. No significant differences were found in the number of dreams reported by the alexithymic and non-alexithymic individuals, or in the number of words used to describe those dreams. However, alexithymic individuals rated their dreams as “less fantastic” on the Dream-Like Fantasy Scale. In other words, alexithymic individuals reported less fantasy and surrealism, and more concreteness when describing their dream content. These results lend support to the validity of the alexithymia construct, and support the notion that a component of alexithymia includes a paucity of fantasy and imagination. Further research is necessary in the area of dream physiology and its association with alexithymia.

*Emotional Intelligence*

The study of human emotion has captured the interest of intellectuals throughout history. In the past century, psychologists have been drawn by the allure of this mysterious concept in the hopes of shedding a scientific light on the roots of human happiness, anger and sadness. It has been proposed that understanding one’s own emotions, and the ability to share those emotions with others, are important aspects of interpersonal relationships and of happiness in our daily lives (Mathews, Zeidner, & Roberts, 2002). It is no wonder that psychologists and others alike share a keen interest in discovering the nature of emotions. Emotions are of central importance in the daily lives of most people; we are surrounded by references to emotions in all arenas of life. The Merriam-Webster Dictionary defines emotion as “the affective aspect of
consciousness; a state of feeling; a conscious mental reaction (as anger or fear) subjectively experienced as strong feeling usually directed toward a specific object and typically accompanied by physiological and behavioral changes in the body.”

From within the field of psychology, Lazarus (1991) put forth a definition proposing that emotion “includes overall an appraisal, outcome action tendencies, a psychological response pattern, and a subjective experience” (p. 210) and that all these components can enter the chain at any point after the initial appraisal.

Perhaps more important than emotion itself is the human ability to understand emotion, to be self-aware. The construct of Emotional Intelligence (EI) refers to the ability to express and understand emotions in a competent manner, as well as an ability to regulate both negative and positive emotions effectively. Emotional intelligence has received increasing attention in both psychological research as well as in the mainstream media over the past 10 years. Introduced by Salovey and Mayer (1989), emotional intelligence was derived from the construct of social intelligence and is defined as “the ability to monitor one’s own and others’ feelings and emotions, to discriminate among them and use this information to guide one’s thinking and actions” (p. 189).

Gardner in 1983 described two types of personal emotional intelligence, intrapersonal and interpersonal. Intrapersonal intelligence is the ability to define and acknowledge one’s own feelings, whereas interpersonal intelligence is the ability to recognize and differentiate feelings and emotions in others. Alexithymia correlates substantially and negatively with the idea of intrapersonal emotional intelligence. Alexithymic individuals seem to lack this type of intelligence. Recently, studies have
shown that individuals with alexithymia have difficulty in understanding the emotions of others as well (interpersonal intelligence; Lane 1996; Parker, et al 1993).

In a study by Parker, Taylor and Bagby (2001), the constructs of emotional intelligence and alexithymia were compared using latent variable analysis. Seven hundred and thirty four participants completed the TAS-20 and the BarOn Emotional Quotient Inventory (EQ-i; Bar-On, 1997), a measure of emotional intelligence. A strong negative correlation was found between the TAS-20 and the EQ-i, indicating that individuals with salient alexithymic characteristics also tended to have lower emotional intelligence. In another study, Schutte et al. (1998) developed a 33-item scale of emotional intelligence which correlated negatively with the TAS-20 and positively with attention to feelings, clarity of feelings, mood repair, and optimism and impulse control.

These findings have implications for the quality of life of alexithymic individuals. Emotional intelligence has been associated with an ability to empathize with others, as well as the ability to form warm and close relationships with others (Matthews, et al., 2002). Those with both low levels of emotional intelligence and who suffer from symptoms of alexithymia may have difficulty relating to others on an intimate level and may not have the emotional skills necessary to deal with stress-invoking situations (Taylor & Bagby, 2000).

Emotional Processing

One of the most central assumptions underlying the construct of alexithymia is that there exists a deficit in the cognitive processing of emotions. It has been hypothesized that affective-cognitive schemata are not integrated in individuals with high levels of alexithymia and that these individuals have a deficit in the processing of
emotions (Taylor & Bagby, 2004). In their model, Taylor, Bagby and Parker (1997) state that alexithymia involves a deficit in the ability to construct mental representations of emotions. This deficit is also accompanied by a tendency to hyper-focus on the somatic sensations accompanying emotional arousal and to mistake these sensations as illness (Lundh & Simonsson-Sarnecki, 2001).

In a study by Parker, Taylor and Bagby (1993), alexithymic and non-alexithymic individuals participated in a modified Stroop task involving color-naming. Individuals with high levels of alexithymia were more easily distracted than non-alexithymic individuals by words evoking affective arousal. This finding was interpreted as the result of a reduced ability in the cognitive processing of affects.

In another study, individuals with high levels of alexithymia showed a negative priming effect in a lexical task in which emotion words were primed by emotion situations or neutral filters (Suslow & Junghanns, 2002). In other words, high alexithymic individuals had a slower processing (lexical decision) speed when an emotion word was preceded by a related emotion situation as compared to an unrelated situation. These results indicate impairment in the ability of alexithymic individuals to differentially process emotions and support the hypothesis that elements of emotion schemata are poorly integrated in individuals with alexithymia.

Lundh and Simonsson-Sarnecki (2002) hypothesized that due to the tendency of alexithymic individuals to focus on the physical sensations of emotional arousal, these individuals should also have an attentional bias toward illness-related words. One-hundred and twenty individuals were given a combined Stroop and implicit memory task. High alexithymia individuals showed an attentional bias toward illness-related words.
versus negative emotion words. These findings lend support to the above mentioned model proposed by Taylor and colleagues (1997).

In another study, 72 college students were exposed to a series of emotion-eliciting visual slides while their heart-rate and electrodermal responses were being recorded (Wehmer, Brejnack, Lumley, & Stettner, 1995). The slides included images of victims of injury, accident, and starvation; images of nude couples in erotic/romantic interactions; and images of scenic landscapes. After participants viewed each emotion-provoking slide, they were asked to rate their feelings on a scale from 1 (very unpleasant) to 9 (very pleasant) and were also given the opportunity to verbally express their feelings for a period of 20 seconds. Results showed that individuals high in alexithymic characteristics as measured by the TAS-20 were less physiologically responsive and less verbally responsive to the slides than were non-alexithymic individuals. The authors pointed out a distinction between alexithymic individuals and other populations who have inhibited expression of emotion (e.g., repressors, internalizers, low-disclosers). These other populations tend to exhibit heightened autonomic reactivity to situational cues, whereas alexithymic individuals tend to display reduced or slowed autonomic reactivity to situational cues.

In a study conducted by Lane et al. (1996), a community sample of 380 participants completed two measures of alexithymia (the TAS-20 and the Levels of Emotional Awareness Scale) as well as a measure of the ability to match verbal and nonverbal emotion stimuli (the Perception of Affect Task; PAT). The Perception of Affect Task requires that participants match sentences and words (verbal-verbal), faces and words (nonverbal-verbal), sentences and faces (verbal-nonverbal), and faces and
photographs of scenes (nonverbal-nonverbal). In each of the above-mentioned subtasks, five sets of stimuli targeting seven emotions (happiness, sadness, fear, anger, surprise, disgust, and neutral) are presented. Participants must choose the correct response from a display of seven items corresponding to each of the seven emotions. Across the entire sample, individuals with high scores on the TAS-20, and corresponding low scores on the Levels of Emotional Awareness Scale (alexithymic individuals) obtained lower accuracy rates on each of the subtasks of the Perception of Affect Task. Alexithymic individuals also scored lower than non-alexithymic individuals on purely nonverbal matching, purely verbal matching, and mixed verbal-nonverbal matching subtasks. The authors concluded that the results suggest that individuals with alexithymia tend to have impaired verbal and nonverbal recognition of emotion stimuli, which may signal a general impairment in the capacity for emotion-information processing.

In another study examining the emotion-processing deficit in individuals with alexithymia, 34 alexithymic individuals (19 women and 15 men), and 31 non-alexithymic individuals (15 women, 16 men) were presented with standardized emotion-eliciting color slides for several seconds while heart rate, facial muscle activity, and skin conductance were recorded. The same stimuli were presented a second time and subjects were asked to provide emotion self-reports using a paper-and-pencil version of the Self-Assessment Manikin and to generate a list of words pertaining to their emotional reactions to each of the slides. Alexithymic individuals generated fewer emotion-related words than non-alexithymic individuals to describe the slides. Furthermore, alexithymic individuals produced fewer physiological responses (fewer skin conductance responses and less heart-rate deceleration) than did the control group (Roedema & Simons, 1999).
These results are consistent with the definition of alexithymia which states that alexithymia is characterized in part by a deficit in the identification of emotional states.

**Phenomenology**

Svanaeus (1999) examined the construct of alexithymia from a phenomenological approach: “Phenomenology takes on the subjective, meaning-oriented perspective and initially brackets the causal explanations in order to reach an original understanding of what it is like to live through the vectors of feelings, body, and language” (p. 1). In his paper, he discusses how the philosophy of Martin Heidegger can be used to conceptualize alexithymia. Svanaeus identifies the three ‘territories’ of the alexithymic individual that fail to connect—feeling, language, and the body. The body of the alexithymic is described as a body that is not “lived from within” (p. 3), but is instead seen as an object. This may account for why alexithymic individuals tend to mistreat their bodies (e.g., drug abuse, bulimia; Krystal, 1982).

Svanaeus discusses Heidegger’s being-in-the-world from the perspective of *das Man*, comparing him with the alexithymic individual. He discusses Heidegger’s description of inauthentic existence, in which the world is not visible as a meaning- and communication- structure. He then links this inauthentic existence of being-in-the-world with McDougall’s description of an alexithymic individual as a normopath (consumed by the outer world, and lacking in subjectivity and feelings). In both cases, the alexithymic individual does not see the world as a meaningful place in which he/she fits in, and therefore has a deficient meaning-structure.

This deficient meaning-structure is broken down into three categories; attunement, language and body. Attunement refers to the way humans understand
themselves in the world, as well as others. Alexithymic individuals are thought to lack attunement, rendering life meaningless and causing a lack of creativity (fantasy, imagination).

The language of the alexithymic individual lacks feeling and subjectivity, as does the language of Heidegger’s das Man. According to Heidegger’s philosophy, being-in-the-world is an inter-subjective experience, and to be together with others, or to commune, is part of this experience. Language is part of the communion, and is therefore attuned (Svanaeus, 1999). The language of the alexithymic individual indicates that there is a basic deficiency in communication and togetherness, which means that true communion as well as true individuality is impossible.

Lastly, the body is addressed. Svanaeus states that the psychosomatic illnesses that alexithymic individuals express are related to a lack of attunement to being-in-the-world. Complex attunements exist between the body and the greater world-structure. Human emotions and moods reveal the way the body is lived from within. In alexithymic individuals, the attunements that exist between body and world are diminished and represented as pain. This pain represents the remnants of the world-phenomena that have become trapped within the body.

In sum, alexithymia is described as a deficient meaning-structure using a phenomenological approach, as well as through the use of Heidegger’s philosophy. The importance of body, feeling (attunement), and language in alexithymia are outlined and the disconnect among these territories is examined.
CHAPTER 2

ASSESSING ALEXITHYMIA

Overview of the Issues Involved in Measurement

Since its conception in 1967, many efforts have been made to accurately measure and describe the construct of alexithymia. Several measures have been developed over the years and have fallen from use due to weak psychometric properties. All of the measures used historically will not be reviewed as many are no longer in wide use. Several different strategies have been used to measure alexithymia; these strategies are self-report, observer-report, structured interview/questionnaire combinations, and projective techniques. Measures that have been developed within each of these categories will be reviewed. Unfortunately, as will be discussed, many of these measures have been found to have psychometric shortcomings. Others have not been sufficiently investigated. To this end, the true nature of alexithymia still remains unclear.

There are several self-report instruments that are currently used to measure alexithymia. Self-report methods of measuring alexithymia include the 20-item Toronto Alexithymia Scale (TAS-20); the Schalling-Sifneos Personality Scale-Revised (SPSS-R); the Levels of Emotional Awareness Scale (LEAS); the Amsterdam Alexithymia Scale/Bermond-Vorst Alexithymia Questionnaire (BVAQ-40); and the Minnesota Multiphasic Personality Inventory-Alexithymia Subscale (MMPI-AS).
Alexithymia is also assessed through the use of collateral reports. Observer-report measures require that an observer who knows the individual to some extent, for example a therapist, rate the individual on several different criteria. An example of an observer-report measure is the Observer Alexithymia Scale.

Another strategy used by researchers to examine the construct of alexithymia is the structured interview, coupled with a questionnaire completed by the interviewer following the interview. Examples of these types of measures include the Alexithymia Provoked Response Questionnaire (APQR) and the modified Beth Israel Hospital Psychometric Questionnaire (mBIQ).

In addition to these methods and instruments, projective techniques have been used to measure alexithymia. These include the Reality-Fantasy subset of the Rorschach projective test (Acklin & Alexander, 1988; Acklin & Bernat, 1987), and the Symbolic Archetypal Test (SAT9; Cohen, Auld, Demers-Desrosiers, & Catchlove, 1985). These projective techniques will be only briefly mentioned here as they have been shown to be among the least reliable measures of alexithymia and are not currently in wide use. A subset of the Rorschach response characteristics hypothesized to be associated with alexithymia were derived using a variety of conceptually relevant indexes from the Rorschach Comprehensive System (Exner, 1986). This subset compromises the Reality-Fantasy subset of the Rorschach projective test. The Symbolic Archetypal Test is a projective drawing technique which assesses the capacity of an individual to form fantasies (Bagby, Parker, & Taylor, 1991).
Self-Report Measures

Toronto Alexithymia Scale, 20 items

Currently, the most widely used measure of Alexithymia in both empirical research and clinical settings is the 20 item Toronto Alexithymia Scale (TAS-20), a self-report measure developed by Bagby, Parker and Taylor (1994). This scale is the "gold standard" with which other measures being developed are compared and contrasted. Items are scored on a five-point Likert scale from 1 (strongly disagree) to 5 (strongly agree). This scale provides a total score for alexithymia with higher scores indicating higher levels of alexithymia. The TAS-20 consists of three subscales: (1) difficulty in identifying feelings, (2) difficulty describing feelings, and (3) externally oriented thinking. Questions on the TAS-20 address emotions and feelings, such as "I am often confused about what emotion I am feeling" and "Being in touch with emotions is essential."

The TAS-20 is the latest version of the measure, developed from the original TAS. The authors of the TAS initially identified five factors of alexithymia: (1) difficulty in describing feelings; (2) difficulty in distinguishing between emotions and physical sensations; (3) lack of introspection; (4) social conformity; and (5) paucity of fantasies and difficulty recalling dreams (Kooiman, Spinhoven, & Trijsburg, 2002). Forty-one questions were compiled to represent these factors. Some of these questions were drawn from the Interoceptive Awareness Subscale of the Eating Disorder Inventory (Garner, Olmstead, & Polivy, 1983); the Need for Cognition scale (Cacioppo, 1960) and the Schalling-Sifneos Personality Scale (Apfel & Sifneos, 1979). Fifteen items were later dropped due to low factor correlations, and factors three and four were removed and
Instead the externally oriented thinking factor was introduced. This resulted in the TAS-26. Psychometric studies later proved that the TAS-26 had some shortcomings. Items on the daydreaming subscale of the TAS-26 correlated highly with measures of social desirability (Bagby, Parker, & Taylor, 1994). Furthermore, a negative correlation was found between the daydreaming factor and the affect awareness and externally oriented thinking factors (Haviland, Hendryx, Cummings, & Shaw, 1991), indicating that the daydreaming items may have had little theoretical relevance to the other factors of the alexithymia construct (Bagby, Parker, & Taylor, 1994). The authors generated a new set of questions, in addition to the existing 26 items, in an attempt to create an improved version of the TAS-26, the TAS-R. This version had none of the imaginal activity items of the TAS-26 and factor analysis yielded a two-factor (as opposed to the previous four-factor) solution (Bagby et al., 1994). Further testing of the factor structure of the TAS-R using confirmatory factor analysis revealed that a three-factor structure was a better match to the data, and for this reason the TAS-20 was created.

The TAS-20 was normed on an English-speaking adult community population (880 men, 1053 women) of mean age 35.74 years and mean education 14.75 years. The overall mean for the TAS-20 is 45.57 (SD=11.35). The mean for men on the TAS-20 is 47.30 (11.32) and the mean for women is 44.15 (11.19). Mean scores for female and male university students are 48.99 (SD=11.48) and 51.14 (SD=10.40), respectively (Bagby, Taylor & Parker, 1994).

The TAS-20 has good convergent and concurrent validity (Bagby, et al., 1994), as well as internal reliability. The three-factor structure of the TAS-20 has been replicated in a large community sample (n=1933 adult men and women) as well as separately in males.
and females. Furthermore, the variables of gender, age and education account for relatively small amounts of variability in total TAS-20 scores (Parker, Taylor, & Bagby, 2003).

The TAS-20 has shown good validity and reliability across different cultures and different languages (Taylor, Bagby, & Parker, 2003). The TAS-20 has been adequately translated in 18 different languages including French, Portuguese, Italian, German, Polish, Swedish, Persian and Spanish (Morera, Culhane, Wason, & Skewes, 2005; Taylor, et al., 2003). There is strong support for the three-factor structure of the TAS-20 across languages and cultures; the first two factors show good internal consistency for most translations, but the third factor lacks internal consistency for some translations (Taylor, et al., 2003). The authors suggest that this may be due to cultural differences, or to a response bias (e.g., giving socially/culturally acceptable answers to certain items).

Schalling-Sifneos Personality Scale

The Schalling-Sifneos Personality Scale (SSPS; Apfel & Sifneos, 1979) is a 20-item self-report questionnaire. Items are scored on a 4-point scale. The SSPS is considered a poor and unreliable measure of alexithymia, as stated by the authors themselves (Apfel & Sifneos, 1979).

Levels of Emotional Awareness Scale

The Levels of Emotional Awareness Scale (LEAS) (Lane, Quinlan, Schwartz, Walker, & Zeitlin, 1990) includes 20 emotionally arousing/evocative short-stories/vignettes involving the reader and another individual. The scale assesses for Emotional Awareness, which is thought to be one facet of alexithymia. Emotional awareness has been shown to negatively correlate with alexithymia, and thus the LEAS is
an indirect measure of alexithymia. For each story on the LEAS, participants write how both they and another person would feel in the given situation. Responses are scored and coded according to a manual which assigns higher scores for greater levels of differentiation, specificity, and blending of emotions. Scores can range from 0 to 5 for each story, with higher scores indicating greater emotional awareness. The LEAS does not correlate well with the TAS-20, and has been shown to have poor reliability.

**Amsterdam Alexithymia Scale and the Bermond-Vorst Alexithymia Questionnaire**

The Amsterdam Alexithymia Scale and the Bermond-Vorst Alexithymia Questionnaire (Bermond, Vorst, Vingerhoets, & Gerritsen, 1999; Vorst & Bermond, 2001) were developed because the authors indicated the TAS-20 did not fully capture all dimensions of alexithymia. The authors originally developed the 20-item Amsterdam Alexithymia Scale and added 20 additional items, creating the Bermond-Vorst Alexithymia Questionnaire (BVAQ). The BVAQ measures five different traits believed to provide a more complete conceptualization of the alexithymia construct. These traits are: Emotionalizing, the degree to which a person is aroused by emotional events; Fantasizing, the tendency for a person to engage in fantasies; Identifying, a person’s ability to define his/her emotional arousal states; Analyzing, a person’s interest in seeking out explanations for his/her emotional reactions; and Verbalizing, a person’s inclination to describe or communicate emotions (Morera, et al., 2005). Items on the BVAQ are rated on a five-point Likert-type scale, ranging from *this definitely applies to me* to *this in no way applies to me.*
Minnesota Multiphasic Personality Inventory Alexithymia Scale

The Minnesota Multiphasic Personality Inventory Alexithymia Scale (MMPI-AS; Kleiger & Kinsman, 1980) is a brief 22-item self-report measure developed using the empirical criterion method of scale construction (Bagby, Parker, & Taylor, 1991). The MMPI-AS includes questions such as, “At times I feel like smashing things” and “If given a chance I could do something that would be of great benefit to the world.” The MMPI-AS has been found to have little reliability, and is not considered a valid measure of the alexithymia construct (Bagby, et al., 1991; Norton, 1989). Not included in the measure are item domains related to the ability to identify and communicate feelings, or to the ability to distinguish between bodily sensations and feelings, which are central to the alexithymia construct.

Observer Report Measure

The Observer Alexithymia Scale (Haviland, et al., 2002) is based on the assumption that alexithymia results in behaviors that can be reliably reported by those who know the individual well. The OAS is a 33-item scale that assesses for alexithymia and is based on alexithymia experts’ descriptions of the prototypical alexithymic person. The Observer Alexithymia Scale can be completed by professional or lay raters. Items are scored on a 4-point Likert scale from zero (never or not at all like the person) to 3 (all of the time or completely like the person). Total scores range from zero to 99 with higher scores indicating greater levels of alexithymia. The scale structure has five factors: distant (poor interpersonal skills/relationships); unsightful (poor stress tolerance, insight and self-understanding); somatizing (health worries/physical problems); humorless (uninteresting and boring); and rigid (excessive self-control). The scale has a
coefficient alpha of 0.90 and correlates with other observer-report measures of alexithymia, as well as with the TAS-20 ($r = 0.69$). The authors recommend that when possible, two separate Observer Alexithymia Scale ratings be used and the scores averaged to yield a single score; this will lead to a score with more reliability.

Structured Interviews

*Beth Israel Hospital Psychosomatic Questionnaire*

The modified Beth Israel Hospital Psychosomatic Questionnaire (Bagby, Taylor, & Parker, 1994) is a 12-item revision of Sifneos' original Beth Israel Questionnaire (BIQ; Sifneos, 1973). Although the questionnaire itself consists of an observer-rated scale, it is only completed by the clinician following a structured or semi-structured clinical interview. Items are rated on a 7-point scale ranging from 1 (*not true*) to 7 (*very true*). Total scores can range from zero to 84. Higher scores indicate greater alexithymia. The modified BIQ has two structure factors: affect awareness (ability to identify and express feelings) and operatory thinking (which includes imaginal activity and externally oriented thinking). The modified BIQ has been used primarily as a means to validate other alexithymia measures (Bagby, Taylor & Parker, 1994; Haviland, Warren, Riggs, & Nitch, 2002). This scale is limited by the potential for interview bias.

*Alexithymia Provoked Response Questionnaire*

The Alexithymia Provoked Response Questionnaire (APRQ; Krystal, Giller, & Cicchetti, 1986) is a structured interview comprised of 17 questions designed to “provoke” the patient to produce affective material. Questions on the APRQ ask the individual to imagine him/herself in a variety of potentially stressful situations and to describe any feelings associated with these situations. For example, participants are asked
questions like, “How would you feel if you saw a truck coming at you at 90 miles per hour?” and “How would you feel if someone pulled a gun on you?” The APQR correlates well with the modified Beth Israel Hospital Psychosomatic Questionnaire (r = 0.72).

It has been recommended that in order to accurately measure all the characteristics of alexithymia, at least two measures that employ different strategies should be utilized (Taylor & Bagby, 2004). This seems to indicate that no one measure of alexithymia is thought to be reliable enough on its own, and that in order to boost reliability, several measures should be used simultaneously. All of these scales rely on either retrospective accounts of emotional experience (TAS-20); an observer’s opinion of an individual’s emotional experience, gained over a short period of time (mBIQ, OAS); or a leading/probing style of eliciting responses (LEAS).

**Methodological Issues in the Measurement of Alexithymia**

All the methods used to measure alexithymia are subject to various sources of error. As discussed previously, most of the tools currently used have been shown to have poor validity and reliability. In many of the questionnaires currently used to assess alexithymia, the material that will be covered has been pre-determined by the type of questions provided (e.g., vignettes covering emotionally arousing or evocative topics), thus leading the examinee in a specific direction. The measures also rely heavily on retrospective accounts of what an individual believes him-/herself to be like, and these have oftentimes been found to be inaccurate and biased. Observer report measures rely solely on the opinion of an external individual to rate the experience of another individual. There exists some level of inaccuracy, bias, and judgment in this method as well.
Furthermore, because the experience (or lack thereof) of emotion is central to the concept of alexithymia, problems inherent in examining emotion become an issue for alexithymia researchers, including issues of memory (recall accuracy and capacity). Additionally, issues concerning measurement procedures, specifically demand characteristics, reactivity, and ecological validity may present problems.

The TAS-20 is the primary tool used to measure alexithymia; it is the gold-standard in the field of alexithymia research, and it is a self-report questionnaire. Self-report questionnaires like the TAS-20 ask that individuals think back over the past several days or weeks, and make assumptions or judgments about their cognitions and emotions. Unfortunately, accuracy issues arise when asking participants to make judgments about the nature and frequency of their cognitions and emotions (Hurlburt, Heavey, & Seibert, 2004).

Self-report measures can be problematic for several reasons. The TAS-20, for example, asks individuals to answer questions about their thinking style. Accuracy when answering a question depends on the type of memory that is prompted by the question or task. Semantic memory is one type of memory – the memory for knowledge or generalizations for events, free of time and place. Episodic memory is the memory of an event that has specific time, place, and experiential details, such as emotions. It has been shown that the self-assessment of traits (such as thinking style) requires that individuals draw information from semantic memory. When retrieving an answer, people will tend to access either semantic or episodic memory (Robinson & Clore, 2002).

Therefore, self-report measures rely primarily on the individual’s beliefs about him/herself in general, as formed by the accessible memory information regarding his/her
functioning. Therefore, a construct is measured accurately by self-report only to the extent that the individual has valid memory information of this kind available (Lundh, et al., 2002). This problem is intensified when using self-report to measure alexithymia. The TAS-20, for example, requires that individuals with alexithymia report on their difficulties with experiencing and expressing emotion. The measure requires that alexithymic individuals have meta-emotional awareness despite the fact that alexithymia is conceptualized as a deficiency in meta-emotional processing. This is further complicated by the potential for distortions in semantic memory. Robinson and Clore (2002) provided a review differentiating between emotion (episodic, contextual) and beliefs about emotion (semantic, conceptual). In their review, they found that contextual details of events can aid in recall of emotions. However, as time lapses, recall of contextual details declines which may cause random and systematic retrospective biases. Once details are lost, the memory of an emotion shifts from episodic memory to semantic memory. As semantic memory takes over for an event, other retrospective biases may become involved, such as belief-consistent bias (i.e., the tendency to recall and report events consistent with one’s own beliefs).

Beliefs about emotion can have direct effects on retrospective reports, leading to incongruence between feelings at the time of experience versus estimations of those feelings at a later date. For example, McFarland and Ross (1987) tracked romantic relationships over a two-month period. Participants were asked about their perceptions of their relationship at the beginning and at the end of the period. At the second report they were also asked to report on their feelings two months earlier. These retrospective reports were systematically biased in the direction of their current perceptions.
In the storage stage of memory, difficulties may arise due to memory capacity and decay. People have a limited amount of information that can be received, processed, and remembered. Miller (1956) found that regardless of the element (e.g. digits, letters or words) people retained around seven plus or minus two elements of information in their short term working memory. Since his study, other researchers have proposed retention levels of less than seven elements in short term memory (Cowan, 2001). Factors affecting the ability to encode, store, and recall new information include rehearsal (Atkinson & Shiffrin, 1968), processing (Craik & Lockhart, 1972) and lexical status of the contents (Hulme, Roodenrys, & Brown, 1995). If items are not rehearsed and processed, then they do not move from working memory to long term memory. This can result in deficiencies when attempting to recall information. In addition, storage is influenced by things such as the primacy effect. The primacy effect involves information presented earlier in a series being more likely to be recalled than information presented later because the time available for rehearsal or processing of new material decreases as information continues to be presented. Along these same lines, the recency effect states that, given a list of items to remember, the last few items will more likely be remembered than those things in the middle; this is a short term memory effect and therefore is only true with immediate recall.

With regard to memory decay, studies involving memory have shown that people experience rapid loss of details following an event (Rubin & Wetzel, 1996). As the time between the event and the recall of the event increases, the accuracy of the recalled details deteriorates (Bernard, Killworth, Kroenfeld, & Sailor, 1984). Tourangeau’s (2000) attempt at providing a mathematical formula related to retention of information as
a function of time led to the conclusion that forgetting increases monotonically over time, but it occurs rapidly at first then slows down. Additionally, Hurlburt (1984) concluded that when people rate their experiences after a delay, they tend to intensify their experiences by exaggerating their ratings of irritation, anger, vividness, and clarity. The evidence from this line of research indicates that the ability to recall information accurately decreases as a function of passed time, and must therefore be approached with a degree of skepticism. In order to minimize errors associated with memory decay, researchers should attempt to obtain details of experiences as soon after a given event as possible.

Another problem with self-report measures relates to mood-congruent memory retrieval (Ellis & Moore, 1999). In general, individuals are better able to recall or retrieve information that is of the same affective tone as the mood they are currently experiencing (Blaney, 1986). Therefore, it may be easier to retrieve beliefs about positive activities when in a positive mood, and negative activities when in a negative mood. Because research has shown that the TAS-20 correlates positively with measures of negative affect and negatively with measures of positive affect (Bagby et al., 1994; Lundh & Simonsson-Sarnecki, 2001), it may be the case that individuals who are in a negative state when completing the TAS-20 may judge their abilities of identifying and expressing emotions more negatively than people in a positive emotional state. Along these same lines, a subgroup of depressed patients were found to have elevated scores on the TAS-20 due to their depression (Honkalampi, Hintikka, Saarinen, Lehtonen, & Viinamaki, 2000).

Procedural measurement issues, including demand characteristics, reactivity and ecological validity, arise when using self-report measures. Demand characteristics consist
of anything that may occur during an experimental situation that may give the participant cues as to what the researcher is looking for, or may elicit unnatural behaviors from the participants. Demand characteristics include things like evaluation apprehension, hypothesis guessing or suspiciousness, and so forth. The experimenter can unintentionally influence the participant’s responses with his/her conduct, types of questions, demeanor, and even appearance. Problems of demand characteristics can be especially problematic when conducting structured interviews. Social desirability bias can be a problem for self-report questionnaires as well. Social desirability refers to situations in which the participant responds to a question in what they believe is a socially acceptable manner (Fisher, 1993). Prior studies have found that social desirability can attenuate, inflate, or moderate variable relationships (Zerbe & Paulhus, 1987); increase measurement error (Cote & Buckley, 1988); and affect variable means (Peterson & Kerin, 1981). Thus demand characteristics, especially social desirability, are important to consider when conducting research involving self-reports.

Another methodological issue that should be considered when using the TAS-20 is reactivity. Reactivity occurs when the measurement instrument influences the participant to behave or respond in a manner that deviates from their true experience or behavior. The Hawthorne Effect is a classic example of participant reactivity. The Hawthorn Effect states that when participants are observed by a significant other, their behavior is likely impacted or changed. Questionnaires can also produce reactivity. Knowles and Byers (1996) identified three sources of reactivity: within measure context effects, meaning clarification, and self-referencing.
Another issue faced when using self-report questionnaires is that of ecological or external validity. In order for an experiment to possess ecological validity, the methods, materials, and setting must approximate the real-life situation (Brewer, 2000). In general, achieving ecological validity is very difficult when using traditional experimental research methods. According to Hurlburt (1997), the traditional experiment will not be ecologically valid because it attempts to provide one condition that is identical across all participants. To maximize ecological validity, participants should be evaluated in their natural environments while engaging in their daily activities with as little disturbance as possible. Self-report questionnaires do not generally test people in their natural environments.

Methods that Reduce Measurement Error

Self-report measures are currently the most widely used form of assessment for alexithymia despite the fact that self-report measures are subject to memory biases and procedural measurement issues, as reviewed above. Alexithymia, because it involves a disruption of the emotions, is a difficult construct to measure accurately. For this reason, it is important to be able to access the inner experience of alexithymic individuals in the most methodologically accurate way possible.

In an attempt to reduce the methodological errors associated with self-report and observer-report measures, introspectionists have developed several alternative methods for exploring individual inner experience. These methods of examining inner experience include think-aloud, thought listing, and thought sampling methods. Electronically cued checklists include the Experience Sampling Method and Ecological Momentary Assessment.
Think-Aloud

The think-aloud method has been used to assess cognitive products and processes in individual experience. In standard think-aloud procedures, participants are instructed to verbalize cognitions while simultaneously performing some problem-solving task. Responses are tape-recorded and coded by researchers (Yang, 2003). Think-aloud methods allow researchers to collect information about the cognitive processes of an individual as they occur, thus minimizing the effects of retrospection and biases of memory.

To date, no studies have examined the construct of alexithymia using the think-aloud method, however, research on anxiety and depression has proved the method useful for exploring cognitive processes.

An alternative think-aloud paradigm termed Articulated Thoughts in Simulated Situations (ATSS) was created by Davison, Robins and Johnson in 1983. Participants listen to audio-tapes of varying scenarios while imagining themselves in those scenarios, and are then asked to report their thoughts aloud. The scenarios presented range from highly emotional to neutral, and some are designed to elicit specific cognitions (e.g., social anxiety, aggression). ATSS has several advantages, including an unstructured response format, which minimizes the threats of socially desirable responding and experimenter biases. Furthermore, the ATSS paradigm collects cognitive information from the participant as that information is being produced, thus reducing the risks of retrospective recall.
Thought Listing

In the thought listing procedure (Brock, 1967; Greenwald, 1968), participants are asked to list all thoughts they have while being presented with a particular stimulus (usually visual) or a problem-solving task (Cacioppo, & Petty, 1981). This method is less prone to the risks of retrospection than other methods, and has increased ecological validity due to the nature of the design. No studies to date have used thought-listing to explore alexithymia.

Thought Sampling

Thought sampling techniques require participants to complete checklists or questionnaires related to cognitions immediately following a cue, which is most commonly a beeping signal. The primary purpose of thought sampling is to quantify characteristics of thoughts and moods (Hurlburt, 1997). Participants are cued to respond on a random interval or programmed schedule. Due to the immediacy of response, this method significantly reduces the risks of retrospection and increases ecological validity (Hurlburt, 1997). To date, no known studies have used thought-sampling to explore the experience of individuals with alexithymia.

Electronically Cued Checklists

Experience Sampling Method. The experience sampling method (ESM) was developed by Csikszentmihalyi and colleagues (1987) in an attempt to study the daily experience of individuals in a natural setting. The method requires that participants complete questionnaires regarding specific aspects of their experience (cognitions, emotions, activities, etc.) at random or quasi-random periods throughout the day (Hurlburt, 1997). Similar to the thought-sampling method, ESM cues participants at
intervals using a beeper. ESM differs from thought-sampling methods in that it requires that participants also include descriptions of the social and environmental context and situation in which their experience occurred (Hurlburt, 1997). The main advantage of ESM is that participants are required to respond immediately upon being cued, reducing the risk of retrospective recall errors. Another advantage of the ESM is that by repeatedly sampling the experience of individuals in their natural environment, ecological validity is greatly increased.

ESM places the emphasis on the contextual variables that impact thinking, and incorporates repeated self-report measures in order to increase the accuracy of reports of behavioral patterns over time. Due to the nature of the questions asked in ESM, the content of responses gathered has the potential of being much more complex than data gathered using more traditional measures. As with the other methods discussed above, there is no research that we know of that uses ESM to explore the construct of alexithymia.

Ecological Momentary Assessment. EMA is an alternate method for exploring the inner experience of individuals in their natural environment. EMA relies on repeatedly sampling momentary states in a subject’s natural environment (Shiffman & Stone, 1998). A picture of a participant’s experience is drawn from repeated momentary assessments taken in real-world situations. These assessments or samples of experience are collected using signal-contingent cues, such as those produced by a beeper. Samples can also be collected at intervals of 15 to 45 minutes, or can be collected in conjunction with a particular event (similar to a self-monitoring procedure). Participants record their experiences on palm-top computers, reducing the risk of faking that is often seen when
using more traditional paper-and-pencil methods of journaling. In addition to obtaining self-report data, EMA may also involve collecting physiological data from participants. This broader scope of data collected gives the EMA method an advantage over more traditional self-report measures. Additionally, because the sample of moments collected in the EMA method are representative of the subject’s full range of daily experience, accuracy and validity are greatly increased.

Despite the flexibility of EMA, and the increased ecological validity of the method over other methods, EMA has some limitations. Because participants are repeatedly cued to pay attention to their behavior, they may become more attentive to this behavior than they previously were, thus creating potential reactivity problems. Furthermore, because of the extensive time commitment and complexity of the task of responding to cues, attrition may become a problem (Stone & Shiffman, 1994).

Ecological momentary assessment (EMA) differs from the experience sampling method (ESM) in that EMA is a more broadly defined construct (Stone & Shiffman, 2002). Additionally, EMA utilizes recording of events as well as self-reports of behaviors and physiological responses.

**Descriptive Experience Sampling**

The Descriptive Experience Sampling method (DES; Hurlburt, 1990, 1993) is a method developed for obtaining high fidelity accounts of individual inner experience. The objective of DES is to describe the details of the experience at a given moment while minimizing the generalizations and pitfalls of other methods (e.g., self-report) of exploring experience. Inner experience for our purposes refers to anything that is ongoing in an individual’s consciousness/awareness at a particular moment. This could include
tickles, sounds, sights, thoughts, feelings, images, etc. The DES method focuses on the individual’s inner experience by asking the question “What was ongoing in your experience right at the very moment the beep disturbed your awareness?”

DES participants are provided with a device that emits a beep through an earphone at random intervals. Participants wear this ‘beeper’ in their natural environment as they go about their daily activities. Participants are instructed to pay attention to what is ongoing in their experience right at the moment of the beep. Participants jot down notes regarding the characteristics of that experience; specific instructions as to what to jot down are not given as it is at the participant’s discretion to write down what he/she was experiencing (e.g., thoughts, feelings, images, physical sensations, etc.). Within 24 hours of collecting six moments of experience, a detailed interview with the participant is conducted by the investigator. Participant and investigator collaborate in an attempt to fully examine and understand each moment of experience. The investigator attempts to suspend all presuppositions as to the nature of experience and aids the participant in doing likewise. In order to effectively avoid contamination from pre-held beliefs, the investigator begins the interview by asking very open-ended and unassuming questions. Throughout the course of the interview, the questions become more specific but do not coincide with any pre-set agenda.

It is the duty of the investigator to ensure that the interview does not reach beyond the limits of the last undisturbed moment before the beep disturbed the experience, and that the conversation remains focused on that very narrow period of time. In addition to this, the interviewer must be very careful to avoid leading the participant in a particular direction, and therefore must use open-ended and “open-beginninged” questions. In other
words, questions are not predetermined, nor are they leading. The interviewer (and participant alike) should be very careful to avoid being distracted by pre-held beliefs about the world and the nature of experience. In other words, the interviewer should bracket presuppositions, and should not assume he/she understands the language or the meaning of the participant’s descriptions without detailed exploration.

The period of experience sampling with each participant usually ranges in length from four to eight days, with six sampled moments collected per day (in total, approximately 24 to 48 sampled moments are obtained). The first day of sampling is considered a training day for participants, and data collected on this day is generally discarded.

DES is an idiographic procedure that attempts to characterize one person’s experience. But DES can also be used to examine the inner experience of a group of people who have similar characteristics (e.g., high scores on a measure of alexithymia). When used in this manner, several individuals with a shared characteristic are sampled. Qualitative observations of individuals within each group are made, and qualitative observations of group similarities and differences are noted. This can allow for nomothetic characterizations of common experiences.

The primary difference between DES and other sampling methods is that DES asks participants to focus on whatever is ongoing in their awareness at the cued moment. The experience sampling method (ESM) picks aspects of awareness and other aspects of experience, such as social or environmental context and activity as the focus of investigation a priori. In addition, ESM asks subjects to report on these dimensions using a structured format. Sometimes ESM does not investigate the participant’s actual
thinking, but rather measures their mood, quality of life, and physical concerns.

Furthermore ESM may use a Likert-type rating scale to measure the items of interest. DES is only focused on the participant’s inner experience as it naturally occurs to the participant. DES does not ask the participant to pay special attention to the environment or to physiological changes unless that is what the participant is paying attention to at the cued moment. Additionally, DES provides qualitative descriptions rather than quantitative analyses (Hurlburt, 1997).

Although each of the methods reviewed in this section is able to address some of the methodological concerns relevant to understanding inner experience, we believe that DES addresses these concerns most comprehensively. Memory decay and the potentially biasing influence of mood-congruent memory are significantly reduced by the short interval between the event of interest and the examination of that event. DES targets episodic memory because it targets specific, clearly identified moments, thus reducing the likelihood of contamination of reports by semantic memory. Errors associated with memory capacity are reduced because DES is interested in only brief moments of experience. Participant reactivity is minimized because the method does not try to invoke processes that go beyond the capture and scope of the experience, and also allows the participant to report the experience without restrictions. Reactivity is also likely to be diminished by the repeated nature of the sampling process spread across a number of days. Ecological validity is maximized in the DES procedure because participants are sampled in their natural environments. Demand characteristics are minimized by training DES interviewers to bracket their presuppositions and to ask open-ended, unbiased questions. Additionally, DES participants are assured that there are no right or wrong
answers and that they are co-investigators in the process of understanding their inner experience, thus reducing some of the pressures associated with being in an experimental situation. DES is a procedure that can effectively minimize errors associated with retrospective self-reports. The DES method is primarily an exploratory method in which the objective is to obtain an accurate account of an individual's inner experience. There is no other pre-determined task of the DES method.

The present study employed the Descriptive Experience Sampling (DES) method to explore the inner experience of individuals with and without alexithymia. The inner experience of these alexithymic and non-alexithymic individuals was examined to determine the extent to which they reflected the criteria laid out in the extant literature regarding the characteristics of alexithymia.
CHAPTER 3

METHODOLOGY

Overview

This study proceeded in four phases. Phase I, the Screening Phase, was used to identify and recruit participants. Phase II was the Qualification Phase, during which identified participants completed additional questionnaires. Phase III was the Sampling Phase, during which the inner experience of individuals with and without alexithymia was explored. Phase IV was the Controlled Experience-Sampling Phase during which participants watched emotion-eliciting film clips and were cued to pay attention to their inner experience, which was then explored through an expositional interview.

Phase I: Screening Phase

Overview

Undergraduate volunteers taking an introductory psychology course completed a measure of alexithymia (TAS-20; Bagby, Taylor, & Parker, 1994), a demographic questionnaire and an informed consent form at the University of Nevada, Las Vegas. Based on this initial screening, those found to exhibit characteristics of alexithymia (high scores on the TAS-20) were contacted and invited to participate in the second phase of the study.
Participants

Approximately 248 undergraduate students from several introductory psychology courses at the University of Nevada, Las Vegas were screened. Volunteering students were provided with half of a research participation credit.

Instruments

The 20-item Toronto Alexithymia Scale (TAS-20; Bagby, Taylor, & Parker, 1994), currently the most widely used measure of alexithymia, was created to address the shortcomings of the earlier versions of the self-report measure; the TAS and TAS-R. The TAS-20 can be used with adults and takes approximately 15 minutes to complete. It has a three-factor structure in college students, measuring the interrelated aspects of alexithymia: difficulty identifying feelings (seven items); difficulty describing feelings (five items); and externally oriented thinking (eight items). The questions are self-descriptive and are rated on a 5-point scale ranging from 1 (strongly disagree) to 5 (strongly agree). The TAS-20 has demonstrated good internal consistency (Cronbach’s Alpha = 0.81), test-retest reliability (0.77; Bagby et al., 1994).

The demographic questionnaire given asked participants to provide their name, address, phone number, cell phone number, age, race/ethnicity, sex, marital status, education level, and employment.

Procedure

With the permission of instructors, the investigator entered several different Psychology 101 classrooms over the course of the spring 2007 and fall 2007 semesters. The investigator briefly described the study and asked for volunteers. Volunteers completed the screening in the classroom, which took approximately 15 minutes.
Volunteers received research credit (0.5 research credits) for their participation. Prior to completing the measures, informed consent was explained and obtained. Participants completed the TAS-20 and the demographic form. The measures were then collected and scored.

The demographic questionnaire included a spot for participants to indicate whether or not they were willing to be contacted for the next phase of the study. Participants who indicated they were not willing to participate further were excluded from further consideration.

Phase II: Qualification Phase

Overview

The undergraduate volunteers involved in the screening phase participated in a more detailed and thorough assessment involving the use of a measure of overall psychological functioning, and a measure of depression. Those found to exhibit characteristics of alexithymia and no other significant depression were invited to participate in the sampling phase of the study.

Participants

Participants identified as having the highest and lowest scores on the TAS-20 in phase I were contacted via telephone and asked to participate in phase II of the experiment. Due to the relative small number of individuals with high TAS-20 scores, all participants with scores above the threshold for alexithymia were contacted by this investigator. Participants from the screening phase with low scores on the TAS-20 (nonalexithymic) were randomly selected and contacted by this investigator. Participants
received one research credit for completing this phase of the study. The demographic information for participants from this phase of the study is included in Table 1. The mean age of the sample was 21.56 years.

Table 1

<table>
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</table>
Instruments

The Symptoms Checklist-90-Revised (SCL-90-R; Derogatis, 1994) was used to measure overall psychological functioning. The SCL-90-R is a self-report inventory consisting of 90 items rated on a 5-point Likert scale ranging from 0 (not at all) to 4 (extremely). There are nine primary symptom subscales: Somatization, Obsessive-Compulsive, Interpersonal Sensitivity, Depression, Anxiety, Anger-Hostility, Phobic Anxiety, Paranoid Ideation, and Psychoticism. The Global Severity Index, the Positive Symptom Total, and the Positive Symptom Distress Index provide measures of overall psychological distress. The internal consistencies of all nine subscales are good, with Cronbach's alpha ranging from 0.78 (Paranoid Ideation and Psychoticism) to 0.90 (Depression; Schmitz, et al., 2000).

The Beck Depression Inventory-Second Edition (BDI-II; Beck, Steer, & Brown, 1996) is currently the most widely used measure for assessing the severity of depression. The BDI-II is a brief 21-item self-report measure for use with individuals over 13 years of age. The BDI-II takes approximately 10 minutes to administer. The BDI-II uses DSM-IV diagnostic criteria to assess for depressive symptoms over the preceding 2 weeks. Symptom intensity is measured on a 4-point Likert scale ranging from 0-3; higher scores indicate more severe symptoms. Scores falling in the 0-13 range indicate little to no depression; scores in the 14-19 range indicate mild depression; scores in the 20-28 range indicate moderate depression and scores in the 29-63 range indicate severe depression. Overall the BDI-II has been shown to have excellent test-retest reliability (.93; Beck et al., 1996) and excellent internal consistency (.93; Dozois, Dobson, & Ahnberg, 1998).
Procedure

Qualifying participants were invited back to complete the assessment battery. The recruitment process occurred over a period of approximately two semesters. This phase of the study took approximately one hour to complete. Prior to completing the assessment battery, informed consent for this second phase was obtained. Participants completed the questionnaires in the Experience Sampling Lab, located in the Central Desert Complex at UNLV. Participants received 1 research credit for this phase of the study.

Phase III: Sampling Phase

Overview

Six participants confirmed in the qualification phase as having alexithymic characteristics and no other significant depression, plus a control group of six participants with low or no alexithymic characteristics, were invited to participate in Descriptive Experience Sampling (DES). This phase involved the collection of samples of the participants’ daily inner experiences.

Participants

Six participants identified as having significant alexithymic characteristics and no comorbid depression, as well as six participants identified as having few to no alexithymic characteristics, and no significant depression, participated in this phase of the study. Participants received one hour of research course credit for every hour of participation, resulting in a total of 6.5 research course credits for participation in all phases of the study. The mean age of participants in the control group was 21.67, and the
mean age of participants in the alexithymia group was 20.67. The demographic information from both groups is presented in Table 2.

Table 2

<table>
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<td>1</td>
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</tr>
</tbody>
</table>

Apparatus

In order to sample random moments of inner experience, this study employed a beeping device developed by Hurlburt. The beeper is a small rectangular device which generates a 700-Hz tone at random intervals. The time at which a beep occurs is random
with a mean duration between signals of 30 minutes. The beeper is connected to an earphone in order to minimize external interference. The volume of the beep is adjustable to accommodate different situations and ambient noise levels. Participants can silence and reset the beeper by pressing a button on the top of the beeper. Participants in this study were also provided with a pocket-sized notebook in which to write notes about their experience at the moment of the beep.

Procedure

Phase II participants who qualified for the sampling phase of the study were contacted within three days of completing phase II and were asked to participate in the sampling phase of the study. BDI-II and SCL-90-R scores were used to assess for comorbid depression and other significant symptoms, such as somatic symptoms. Individuals with scores above 20 on the BDI-II were excluded from the study in order to attempt to separate symptoms of depression from alexithymic characteristics. Individuals with high scores on the SCL-90-R were not excluded from the study as the existence of other significant physical symptoms is not thought to be confounded with the construct of alexithymia. Participants deemed eligible were contacted by phone and asked to participate in the sampling phase of the study. Participants were invited to come in for an initial introductory session during which informed consent for the sampling phase and the controlled experience-sampling phase of the study was obtained, confidentiality was explained, and participants were advised that they could discontinue participation in the study at any point, and for any reason, with no penalty.

The nature of the DES method and procedure was then explained in detail to the participant. Participants were shown the mechanisms of the beeper device; how to turn
the beeper on and off, how to adjust the volume of the beep, and how to reset the beeper. Participants were provided with a small notebook and instructed to jot down notes about their experience at the moment of the beep.

In DES, the participant is considered a partner or co-investigator and is encouraged to be open and honest about his/her inner experience. In addition, the participant is given the right to refuse discussion of any sensitive material of his/her choosing and the investigator explicitly agrees to respect the participant's privacy when this is requested. If this is ever the case, the participant is asked to indicate explicitly that he/she does not wish to discuss the sensitive material in order to avoid only partial or incomplete beep descriptions. The participants were made aware of their co-investigator status and their right to privacy.

Participants were asked to collect six consecutive samples of inner experience during a time of their choosing. The moment of the beep was explained to the participants as the last fraction of a second before their inner experience was disturbed by the beep. Participants were not given detailed instructions regarding what to jot down or what to pay attention to at the moment of the beep; this was left up to the participants in order to gain the purest account of the unique inner experience of every participant. The particulars of what the participants wrote in their notebooks were never seen by the investigator, in order to maintain the participants' privacy.

An hour-long "expositional interview" was scheduled to take place within 24 hours of each sampling day. This was done in order to reduce the decay of the memories of the moments of experience. During these expositional interviews, the investigator and the participant discussed the six sampled moments in great detail, with the aim of
reaching a shared understanding of the participant's inner experience. These interviews all took place in the Experience Sampling Lab, and were video-taped, with two exceptions. One expositional interview was conducted in the Psychology Department, in a private office because the Experience Sampling Lab was otherwise occupied. In the second exception, the expositional interview was not video-taped due to a missing video-camera. This investigator conducted 93% of the interviews alone and 7% of the interviews with Dr. Heavey. During the expositional interview the investigator and participant discussed each sampled moment until both (or all three) parties felt they had a clear, shared understanding of what was occurring in the participant's inner experience at the moment of the beep. The interviewer took extensive notes during each discussion and immediately following the interview wrote a summary of each moment of experience. A random sampling of these written summaries can be found in Appendix B.

The process of collecting six moments of inner experience and meeting within 24 hours for an expositional interview was repeated for a total of four sessions for each participant. All sampled moments were coded by the investigator as they were collected using the codebook developed by Hurlburt and Heavey (1999).

Phase IV: Controlled Experience-Sampling Phase

Overview

During this phase of the study, participants from Phase III returned for a final sampling session during which time moments of their inner experience were sampled as they watched emotion-eliciting film clips.
Participants

Participants in this phase were the same as those in the sampling phase (Phase III).

Apparatus

Brief film clips were used during this phase of the study. These four film clips were selected by the investigator based on the research conducted by Gross and Levenson (1994). Gross and Levenson reviewed 250 film clips to determine the extent to which each elicited specific emotions; the four clips used in this study elicited the most intense and discrete emotional responses from Gross and Levenson’s 494 participants. According to Gross and Levenson (1994), the four chosen film clips frequently elicited amusement, anger, fear and sadness, respectively, in English-speaking participants from a variety of ethnic backgrounds. Instructions on the creation and use of these film-clips were provided by Gross and Levenson at the request of the investigator.

The first film clip was taken from the commercial film *Silence of the Lambs* (1991). It is 3 minutes and 29 seconds in length. This clip successfully elicited the emotion of fear in approximately 60% of viewers in the Gross and Levenson (1994) study. The second film clip was taken from the commercial film *Cry Freedom* (1987), and is 2 minutes and 36 seconds in length. This clip successfully elicited the emotion of anger in 22% of viewers. The third film clip was taken from the commercial film *When Harry Met Sally* (1989) and is 2 minutes and 35 seconds in length. This film clip successfully elicited the emotion of amusement in over 93% of viewers. The final film clip was taken from the film *The Champ* (1979), and is 2 minutes and 51 seconds in length. This film clip successfully elicited the emotion of sadness in over 94% of viewers.
Procedure

During a final, fifth session the participants returned to the Experience Sampling Lab without having collected any beeps ahead of time. Instead, the participants were instructed to watch a series of film clips (described above). All participants watched the same four film clips in the same order: *Silence of the Lambs*, *Cry Freedom*, *When Harry Met Sally* and *The Champ*. Participants were told that while watching these film clips, a beep would sound, much as it had when they collected sampled moments in their natural environments. Participants were instructed to pause each film clip at the moment of the beep, to jot down whatever was in their awareness at that moment, and to resume watching the film clips when ready. Film clips were presented to individual participants on one DVD, which was pre-placed in a DVD player attached to a television in a private viewing room. Film clips played one after the other, and each film clip was followed by approximately 30 seconds of a blank, black screen. The participants were given the remote control, and the pause, play and volume buttons were pointed out to each participant. The viewing portion of the controlled experience sampling session lasted approximately 20 minutes.

After watching the four film clips, the participants met with the investigator for an expositional interview to explore each sampled moment of experience. At the end of this session the participant was thanked for his/her participation and was given the opportunity to review and discuss the interviewer’s written summaries from the interview sessions. Only four participants asked to review and discuss the written summaries. All sampled moments from this phase were coded using the codebook

63
developed by Hurlburt and Heavey (1999). All the sample summaries from the fifth day of sampling can be found in Appendix C.

In order to examine the accuracy of the codings made by the investigator, twenty-four sampled moments were selected randomly and coded independently by Dr. Heavey. In order to code the sampled moments, Dr. Heavey watched the videotapes of the 24 sampled moments. He then prepared a written summary of the experience at each moment and coded the experience using the Hurlburt and Heavey (1999) codebook. An analysis of agreement between the two coders yielded 96% agreement, indicating high reliability for the coding of the sampled moments.

The data collected from the first day of sampling (Day 1) was discarded for all participants. The first day of sampling is considered a training day, in which participants are becoming acquainted with the method, as well as with the mechanisms of the beeper. Therefore, samples collected on this first day are potentially of lower fidelity and therefore were not used.

Qualitative observations were made throughout the study, and quantitative analyses were conducted on the data collected from the study. Qualitative observations included an examination of all the sample descriptions for each participant at the completion of the sampling phases (III and IV). The investigator examined all the sample descriptions in order to examine individual salient characteristics or patterns of inner experience. The investigator also examined the extent to which there were commonalities or differences in the nature of the inner experience of the participants and the extent to which any identified commonalities or differences corresponded to group membership (i.e., alexithymic group versus control group).
Quantitative examination of the data included analyses of between-group differences in the frequency of the major five phenomena of inner experience, as described by Heavey and Hurlburt (2008).

The data were also analyzed in order to examine the extent to which the sampled moments collected did or did not reflect the four essential features of alexithymia. In order to accomplish this, four independent raters examined the extent to which each written sample summary reflected the following constructs:

1. **Emotion** – The presence of any emotion/feeling content.

2. **Externally Oriented Focus** – Focus of awareness on the external world.

3. **Negative Bodily Sensations** – Focus of awareness on negative or unpleasant bodily feelings or sensations, including but not limited to, aches, pains, soreness and illness-related inner experience.

4. **Daydreams** – The presence of fantasy or day-dream content.

The four constructs were chosen and defined based on the extant literature tying these constructs to alexithymia. Construct 1, emotion, was included in order to obtain an overall emotion rating for the alexithymia group and the control group, and is consistent with factors 1 and 2 on the TAS-20. Construct 2 is consistent with factor 3 on the TAS-20 (Bagby, Parker, & Taylor, 1994); individuals with alexithymia are thought to have a greater focus on the external world. Constructs 3 and 4 are consistent with the essential features of alexithymia: more frequent negative bodily sensations, and less frequent daydreams (Parker, Taylor & Bagby, 2001) than individuals without alexithymia. In order to pilot test the four constructs, two graduate students rated 24 randomly selected sampled moments using the constructs described above. The four constructs were rated...
on a Likert-type scale, ranging from 0 (not at all) to 6 (extremely). Interrater reliability between the two raters demonstrated good reliability.

The four final raters consisted of one graduate student and three undergraduate research assistants at the University of Nevada at Las Vegas. Each of the raters was given a packet including specific written instructions and the constructs (please see Appendix D), as well as all 208 sampled moments from sampling days two through four, in random order.

Intraclass correlation coefficients were computed for each of the rating constructs in order to determine whether the reliability among the raters was sufficient. All of the intraclass correlations exceed a minimum of .70, indicating good overall agreement among the four raters, and establishing the ratings as reliable. The intraclass correlations were as follows: Emotion construct = .93; Externally Oriented Focus construct = .76; Negative Bodily Sensations construct = .94; and Daydreams construct = .87.

Finally, the richness of inner experience was examined. Richness of experience was operationalized as the number of words in the written summaries of sampled moments. The summaries of the sampled moments represent the individual’s experience at the moment of the beep; they are reflective of the content of the individual’s experience once both interviewer and participant have reached a shared understanding of the moment of the beep, as well as the content present right at that moment. Therefore, summaries of sampled moments are the best representation of the participant’s inner experience at any given moment. In order to ensure that richness of inner experience was not confounded by this author’s writing style, the 24 sample summaries written by Dr. Heavey (mentioned above) were compared with the sample summaries of those same 24
sampled moments, written by this author. Intraclass correlation coefficients were computed in order to determine if the word length between the two summary-writers was sufficiently reliable. The intraclass correlation was .91, indicating that the number of words in the written summaries of the moments of experience was highly reliable across the two writers.
CHAPTER 4

RESULTS

Qualitative Observations

Throughout the course of data collection, the most prominent observation made regarded the degree of difficulty in understanding the Descriptive Experience Sampling method between groups. The individuals in the alexithymic group evidenced much more difficulty in identifying the moment of the beep, as well as in accessing their inner experience at the moment of the beep. Throughout the sampling process, this author, as well as Dr. Heavey, noted any difficulties either reported by the participants, or observed during the expositional interviews. For example, during the second expositional interview (following the second day of sampling) with an alexithymic participant, Adam, Dr. Heavey and this author noted the following, "We stopped the interview after discussing four sampled moments because he did not seem to be clear about what was in his awareness at these moments. It was our sense that the questioning may have given him a better sense of the task and we judged that rather than continue with unclear descriptions, it was best to stop and try again the next day with the hope that his clearer understanding of the task would allow him to be clearer about what was in his awareness at the beep." Adam continued to exhibit difficulty in capturing his inner experience throughout the course of his sampling, despite the fact that he reported that he understood the task.
During the expository interview following the second day of sampling, Jason, another alexithymic participant, reported great difficulty in focusing on the moment of the beep. Jason’s difficulty was described by the investigator as follows, “Before starting this interview, he indicated that he had a very difficult time focusing in on the moment of the beep. He had a tendency during some beeps to look at whatever he was holding, and become convinced that that object was in his awareness at the moment of the beep but that at the same time, part of him was aware that the object actually hadn’t been in his awareness at the moment of the beep, but instead came into his awareness a millisecond after the beep. In other words, he had difficulty focusing back on the moment of the beep, and found himself “looking for” something in his awareness. He also found himself second-guessing his judgment of his inner experience.”

For another alexithymic participant, Mike, it appeared as though the concept of the moment of the beep was fully within his understanding, but that he had great difficulty in capturing his inner experience at that moment. When he was asked about his experience at the moment of the beep he often struggled to describe anything beyond a description of the context in which the beep occurred. For example, Mike’s fourth beep, collected on the fourth day of sampling was as follows, “He is in the dining commons for lunch. At the moment of the beep he is putting salad on his plate, and is listening to his sister speaking on the phone. She is saying something about leaving her kids at daycare so that she can get back to work on time, but he is not sure of her exact words right at the moment of the beep. He is unsure what else is in his awareness at that moment.” The third beep, also collected on the fourth day of sampling was as follows, “He is in psychology class, hearing the teacher talk about chapter seven material, but not really
listening to her. At the moment of the beep he is looking up at the teacher, and is listening to her speak now, because she is talking about what will be on the exam next week. She is saying something about reading all of chapter seven because it will be on the exam, but he is unsure exactly what she was saying at the moment of the beep. He is unsure what exactly is in his awareness at that moment.”

Mike expressed great difficulty in attempting to go beyond a simple description of his environment and into his inner experience. He also reported that he was unsure as to whether this difficulty occurred because he never had any salient experiences at the moment of the beep, or whether it occurred because he could not clearly access the experience he was having at the moment of the beep. Many of Mike’s sampled moments resemble the following moment, collected on the third day of sampling, “He is in the Dining Commons, and is about to eat lunch. He is wondering about what he should eat, but at the moment of the beep he is putting salad on his plate. There is nothing in his awareness; he’s just putting salad on his plate.” Due to his apparent difficulty in accessing his inner experience, 59% of Mike’s sampled moments were coded as “just doing,” indicating a focus on “the task at hand” with a general lack of any other awareness.

The apparent difficulty with the task of collecting sampled moments and then describing those sampled moments was evident with all six of the alexithymic participants. The six participants in the control group did not report or exhibit difficulties with the DES task after the first day of sampling, whereas the six alexithymic participants explicitly reported difficulty with the DES task beyond the first day of sampling despite extensive explanations of the moment of the beep and continued explanation of the task.
Another observation made during data collection was the differing ability for individuals in both groups to elaborate upon the details of their experience. This is explored more fully in the quantitative section below (also see Table 9). This difficulty with elaboration can be seen when specifically focusing on the experience of emotion. Although individuals in both groups reported emotion experience at a similar rate, the individuals in the alexithymia group tended to have more difficulty in describing what the experience of the emotion was like, how they were feeling it, and so forth. The data collected on days two through four will be used to illustrate the above. For example, although Adam, a participant in the alexithymic group, experienced feelings in 23% of his sampled moments, his descriptions of his emotion experiences were vague; he was unable to elaborate upon his experience of the emotion, other than to say the emotion was present at the moment of the beep. The sample summaries for Adam’s sampled moments containing feeling are provided in Appendix E.

A similar pattern was seen with Jason, also in the alexithymic group. In Jason’s single reported emotion experience he was able to provide a description of the image part of his experience at the moment of the beep, but was unable to elaborate upon the emotion part of the experience:

“He is washing the dishes and his hands and nails are soft from extended exposure to the water. There is a hard, crusted piece of old food stuck to one of the dishes he is washing. At the moment of the beep, he is having an image (described as more like a video than a picture) of his left hand holding the dish with the crusted food on it. In his image, he can also see the whole sink, and two bowls, a plate, three forks and a coffee mug piled in the bottom of the sink. Water
is gathered in the bottom of the sink. He can also see the faucet (no water running) and a bit of the surrounding countertop. In the image, he is using the thumb of his right hand to scrape the crusted food off the dish. While he is scraping, his thumbnail rips off of his thumb completely and is connected only on the inner corner of his nail-bed. Droplets of blood appear on his thumb. This image is accompanied by a "nails on a chalkboard" feeling of discomfort.

A similar pattern can be seen in the remaining four participants in the alexithymic group. The sample summaries of the moments containing feelings for all alexithymic participants can be found in Appendix E. As can be seen, the participants in the alexithymic group tended to have difficulty elaborating upon their feelings, and also tended to focus on the physical sensations accompanying their feelings. The participants in the control group were better able to elaborate upon the emotions they experienced.

Quantitative Results

Questionnaire Data

For this study, participants in both conditions completed a TAS-20 questionnaire, a BDI-II questionnaire, and an SCL-90-R questionnaire. The result of these self-reports are presented in Table 3.
Table 3

**Participant Scores on Self-Report Measures**

<table>
<thead>
<tr>
<th>Participant</th>
<th>Measure</th>
<th>TAS-20*</th>
<th>BDI-II</th>
<th>GSI-90-R</th>
<th>SCL-90-R</th>
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<tr>
<td></td>
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<td></td>
<td></td>
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<td>SOM*</td>
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<tr>
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<tr>
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<td>15.33</td>
<td>1.37</td>
<td>1.49</td>
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<td>SD</td>
<td>2.94</td>
<td>7.11</td>
<td>.89</td>
<td>.82</td>
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</tbody>
</table>

Control

|         |         |        |        |          |          |
| 1       | 31      | 8      | .56    | .42      |          |
| 2       | 31      | 8      | .75    | .08      |          |
| 3       | 34      | 1      | .18    | .08      |          |
| 4       | 36      | 14     | .99    | .34      |          |
| 5       | 34      | 11     | .84    | .67      |          |
| 6       | 46      | 13     | .47    | .75      |          |
| Mean    | 35.33   | 9.17   | .63    | .39      |          |
| SD      | 5.57    | 4.71   | .29    | .28      |          |

**Note.** TAS-20: ≥ 61 = high alexithymia and ≤ 51 = low alexithymia.

BDI-II: ≤ 19 = minimal – mild depression and ≥ 20 = moderate – severe depression.

SCL-90-R: GSI = Global Severity Index, SOM = Somatization Scale.

*p < .05.

As expected, a series of independent t-tests revealed that the alexithymia group had a significantly higher mean score on the TAS-20 (*t*(10) = -10.10, *p* < .001; *d* = 2.29) and on the SCL-90-R Somatization scale (*t*(10) = -3.09, *p* < .01; *d* = 1.78) than the control group. The effect sizes for both of these differences were large.
Although the differences were in the expected directions, the difference between group means for both the BDI-II and the SCL-90-R GSI were not significant.

**Characteristics of Inner Experience**

The percentage of sampled moments containing the five most frequently occurring characteristics of inner experience for each participant (inner speech, image, feeling, sensory awareness, unsymbolized thinking) are presented in Table 4.

<table>
<thead>
<tr>
<th>Participant</th>
<th>Inner Speech</th>
<th>Image</th>
<th>Feeling</th>
<th>Sensory Awareness</th>
<th>Unsymbolized Thinking</th>
</tr>
</thead>
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<td><strong>.12</strong></td>
<td><strong>.19</strong></td>
<td><strong>.02</strong></td>
</tr>
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</table>

**Effect Size**

| (d) | .33 | .15 | .67 | 1.19 | 1.00 |

*Note.* A total of 208 sampled moments were collected from day two through day four.
As can be seen in Table 4, there was substantial variability among individuals across most of the characteristics of inner experience, with the exception of inner speech and unsymbolized thinking in the control group. Examining group differences more closely revealed that the differences in the frequency of occurrence of sensory awareness and unsymbolized thinking between groups approached significance. The control group tended to have more frequent occurrences of sensory awareness $t(10) = 1.98, p < .07, d = 1.19$. The alexithymia group tended to have more frequent occurrences of unsymbolized thinking, $t(10) = -1.78, p < .10, d = 1.00$. Sensory awareness is "a sensory or perceptual experience (itch, hotness, pressure, visual taking-in, hearing) that is itself a primary theme or focus for the subject. Such a sensory awareness may be bodily (itch, tingle, pain, pressure, hotness, coldness, shiver, stiffness, etc.) or external (noting the color of a flower, smelling gasoline, taking in the characteristics of a sunrise, hearing the scratching of the cat at the door, etc.)." Unsymbolized thinking is "the experience of thinking some particular, definite thought without the awareness of that thought's being represented in words, images, or any other symbols" (Hurlburt & Heavey, 1999). There were no substantial differences among the frequencies of occurrence for the other three characteristics of inner experience (see Appendix F, Figure 1). It should be noted that the alexithymia group tended to have somewhat more frequent occurrences of feeling. This finding was in an unexpected direction, but was not significant.

Looking beyond the five characteristics of inner experience examined above, an examination of the data indicated that many of the individuals in the alexithymia group reported they were "Just Doing" or some variant of "just doing" (such as just listening, just reading, just writing, just talking or just watching TV) at the moment of the beep.
“Just Doing” is a phenomenon of inner experience in which participants report being engaged in some activity, but have no awareness of thinking about this activity, and no other aspect of inner experience that is in awareness. Similarly, “just listening, reading, writing, talking and watching TV” are phenomena of inner experience in which participants are engaged in the acts of listening, reading, writing, talking or watching TV, without any other aspect of inner experience being present in awareness. On average, individuals in the alexithymia group reported “just doing” or some variant of this in 25% of the sampled moments collected, in contrast to individuals in the control group, who reported “just doing” or some variant of this in only 8% of the sampled moments. This difference was significant, \( t(10) = -2.20, p < .05, d = 1.27 \).

Table 5 presents the percentage of sampled moments containing the six most frequently occurring characteristics of inner experience for each participant on the fifth day of sampling, the controlled experience-sampling phase.
Table 5

*Frequency of Five Characteristics of Inner Experience on Day 5*

<table>
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<th>Control</th>
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<td>1</td>
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<td>.08</td>
<td>.13</td>
</tr>
<tr>
<td>2</td>
<td>.25</td>
<td>.17</td>
<td>.30</td>
</tr>
<tr>
<td>3</td>
<td>.00</td>
<td>.50</td>
<td>.32</td>
</tr>
<tr>
<td>4</td>
<td>.00</td>
<td>.13</td>
<td>.31</td>
</tr>
<tr>
<td>5</td>
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<td>.04</td>
<td>.10</td>
</tr>
<tr>
<td>6</td>
<td>.00</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Effect Size (d)**

|             | .94 | .58 | .15 | .19 | 1.57 |

*Note.* A total of 48 sampled moments were collected on day five.

As can be seen in this table, there was substantial individual variability across all five characteristics of inner experience. There were significant differences in the occurrence of unsymbolized thinking between groups in this phase of the study. Individuals in the alexithymia group had much more frequently occurring unsymbolized thinking than did individuals in the control group, $t(10) = -2.71, p < .05, d = 1.57$. There
were no other significant between-group differences in the frequency of occurrence of the
other four characteristics of inner experience (see Appendix F, Figure 2).

A series of independent t-tests were conducted in order to compare the
occurrences of the four rated constructs between groups. The results of an examination of
the differences between groups in the four rated constructs are presented in Table 6.

Table 6

<table>
<thead>
<tr>
<th>Construct</th>
<th>Control Group Mean (SD)</th>
<th>Alexithymia Group Mean (SD)</th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emotion</td>
<td>.41 (.35)</td>
<td>.84 (.51)</td>
<td>-1.66</td>
</tr>
<tr>
<td>Externally Oriented Focus</td>
<td>3.87 (.77)</td>
<td>2.87 (.97)</td>
<td>1.97</td>
</tr>
<tr>
<td>Negative Bodily Sensations</td>
<td>.42 (.31)</td>
<td>.60 (.91)</td>
<td>-.48</td>
</tr>
<tr>
<td>Daydreams</td>
<td>.89 (.90)</td>
<td>1.22 (.81)</td>
<td>-.63</td>
</tr>
</tbody>
</table>

Note. Control n = 6; Alexithymic n = 6; df = 10; Rated on scale ranging from 0 to 6.

None of the t-tests were significant. The difference between the groups in the
occurrence of externally oriented focus approached significance, \( p < .07 \). However, this
difference was in an unexpected direction: the control group showed more occurrences of
externally oriented focus than did individuals in the alexithymia group. This was also
true for emotion; the mean emotion rating was, unexpectedly, higher for the alexithymia
group although this difference was not significant, \( p < .13 \).

To determine if there were differences in the richness of experience, as
operationalized by the number of words in the written descriptions of sampled moments,
an independent-samples t-test was conducted, and yielded significant results. The
The difference in group means was significant, $t(10) = 3.37, p < .001, d = 1.94$. Individuals in the control group appeared to have significantly richer inner experience than did individuals in the alexithymia group (see Table 7).

Table 7

<table>
<thead>
<tr>
<th>Participant</th>
<th>Word Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alexithymia</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>1100</td>
</tr>
<tr>
<td>2</td>
<td>2324</td>
</tr>
<tr>
<td>3</td>
<td>1930</td>
</tr>
<tr>
<td>4</td>
<td>1720</td>
</tr>
<tr>
<td>5</td>
<td>2007</td>
</tr>
<tr>
<td>6</td>
<td>1912</td>
</tr>
<tr>
<td>Mean</td>
<td>1832.17</td>
</tr>
<tr>
<td>SD</td>
<td>409.16</td>
</tr>
<tr>
<td>Control</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>2921</td>
</tr>
<tr>
<td>2</td>
<td>2873</td>
</tr>
<tr>
<td>3</td>
<td>2239</td>
</tr>
<tr>
<td>4</td>
<td>3373</td>
</tr>
<tr>
<td>5</td>
<td>2353</td>
</tr>
<tr>
<td>6</td>
<td>2282</td>
</tr>
<tr>
<td>Mean</td>
<td>2673.50</td>
</tr>
<tr>
<td>SD</td>
<td>455.00</td>
</tr>
</tbody>
</table>

*Note.* Sampling Days 2-5.

Finally, the extent to which the participants' scores on the self-report measures converged with the ratings of three of the four constructs was examined (see Table 8). The TAS-20 can be broken down into three separate factors: 1) difficulty identifying feelings (seven items); 2) difficulty describing feelings (five items); and 3) externally
oriented thinking (eight items). Scores on the first two factors (difficulty identifying feelings and difficulty describing feelings) were combined and compared to ratings on the emotion construct. The third TAS-20 factor (externally oriented thinking) was compared with the externally oriented focus construct. Finally, the Somatization scale score from the SCL-90-R was compared with the negative bodily sensations construct. The final rated construct, daydreams, was not compared with any of the measures because it did not parallel any of the measures.

Table 8

Correlations Among Self-Report Questionnaires and Rated Constructs

<table>
<thead>
<tr>
<th></th>
<th>TAS-20 Factor 1 &amp; 2</th>
<th>TAS-20 Factor 3</th>
<th>SCL-90-R SOM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emotion</td>
<td>.46</td>
<td>.23</td>
<td>.56</td>
</tr>
<tr>
<td>Externally Oriented Focus</td>
<td>-.58</td>
<td>-.49</td>
<td>-.32</td>
</tr>
<tr>
<td>Negative Bodily Sensations</td>
<td>.22</td>
<td>-.18</td>
<td>.24</td>
</tr>
</tbody>
</table>

None of the convergence correlations (found on the diagonal) were significant, although the correlation between the emotion construct and the TAS-20 factors 1 and 2 scales was relatively large, and approaching significance ($p < .13$). Again, however, this correlation was in the reverse direction of what was expected. This positive correlation indicated that higher degrees of alexithymia as measured by the TAS-20 were indicated with greater emotional content in the moments of experience as measured by the ratings.
The correlation between the externally oriented focus construct and the TAS-20 factor 3 scale also approached significance (p. < .11), but it also was in the unexpected direction.
DISCUSSION

The primary purpose of this study was to examine the inner experience of individuals high in alexithymic characteristics and individuals exhibiting no alexithymic characteristics, according to the TAS-20. It should be noted that in this study, of the six participants in the alexithymia group, five were males (as compared with two males in the control group). This is consistent with the findings in the extant literature of a higher prevalence of alexithymia in males than in females (e.g., Kokkonen, 2003; Salminen, Saarijärvi, Aärelä, Toikka, & Kauhanen, 1999; Lane, Sechrest, & Riedel, 1998), but nonetheless presents a possible confound for the observed results (i.e., results associated with greater alexithymia may in fact be due to the fact that males were overrepresented in the high alexithymia group).

Two clear findings emerged from the qualitative observations of the participants. First, participants in the alexithymia group evidenced much more difficulty with the DES task than did individuals in the control group. Second, individuals in the alexithymia group provided less detailed, more impoverished descriptions of their inner experience overall, and of their emotion experience specifically.

Participants exhibiting characteristics of alexithymia evidenced significantly higher somatization scores on the SCL-90-R than did participants in the control group,
adding support to the literature that indicates a higher prevalence of somatization among individuals with alexithymia (Bagby, Taylor, & Parker, 1988).

At the quantitative level of analysis, the alexithymia group and the control group appeared similar in many ways; individuals in both groups experienced the main five characteristics of inner experience (inner speech, image, feeling, sensory awareness, unsymbolized thinking) at comparable rates. Even in an emotion-eliciting environment (the fifth day of sampling), both groups evidenced a similar rate of occurrence of the main five characteristics of inner experience, with the exception of unsymbolized thinking, which was experienced more frequently in the alexithymia group.

The two groups differed substantially in the frequency of occurrence of the phenomenon of “just doing” (or a similar variant, described above); with the alexithymia group reporting “just doing” much more frequently than the control group (25% versus 8%, respectively). In a study by Heavey and Hurlburt (2008), the “just doing” phenomenon occurred in only 3% of the sampled moments, a number similar to the 8% found in the control group in this study. It can be concluded that the occurrence of “just doing” in 25% of the sampled moments of individuals in the alexithymia group is not typical of the normal population.

Overall, when examining the frequency of the main five phenomena of inner experience, the results between the groups were similar, with unexpected trends. Specifically, individuals in the alexithymic group tended to report feelings at a more frequent rate than participants in the control group. In agreement with this trend were the ratings provided by the raters as to the degree of emotion-content in the sampled moments. Although nonsignificant, individuals in the alexithymia group were rated as
having more frequent occurrences of emotion-content in their sampled moments than individuals in the control group. Similarly, individuals in the alexithymia group were rated as having a similar rate of occurrence of externally oriented focus, negative bodily sensations, and daydream content in their moments of experience as the control group. Furthermore, these nonsignificant trends were in the unexpected direction, with the exception of negative bodily sensations. An interesting finding was the difference in the mean length (or word counts) of the written sample summaries. Theses summaries were viewed as a proxy for the richness of inner experience, and were significantly longer for the control group than the alexithymia group.

An analysis of the convergence between three of the four rated constructs (emotion, externally oriented focus, negative bodily sensations) and the related factors on the TAS-20 and the SCL-90-R (somatization scale) indicated that the ratings of the moments of experience generally did not converge in expected ways with the scores on the TAS-20 or the somatization scale of the SCL-90-R. On the other hand, the TAS-20 accurately reflected that there was in fact a difference between the two groups in this study; individuals with “high” scores on the TAS-20 differed in significant ways (as discussed above and below) from individuals with “low” scores on the TAS-20. Therefore, although individuals with high TAS-20 scores reported feeling-experience at a similar frequency as individuals with low TAS-20 scores, at a more complex level, differences between the groups were evident.

Taken as a whole, some of the results in this study support an overarching conclusion. The Descriptive Experience Sampling method is a task designed to make inner experience as accessible and as easy to communicate as possible. The investigator
is careful to bracket any presuppositions that may interfere with obtaining as pure a report
of an individual's inner experience as possible (Hurlburt & Heavey, 2006). Therefore,
participants are free to use their own language and terminology throughout the sampling
process. This is done to minimize as much as possible the extent to which the fidelity of
the descriptions of experience are compromised by the restrictions and limitations
inherent in language. Despite the open-endedness of the DES task, the individuals in the
alexithymia group had substantial difficulty in completing the task as compared with the
control individuals. This finding, coupled with the finding that the alexithymic
individuals had substantially less detailed accounts of their inner experience is taken to
indicate a possible deficit in complex inner experience as a whole, a deficit that is not just
limited to emotional experience.

At a categorical level, it appears that alexithymic and nonalexithymic individuals
experienced feelings, inner speech, images, unsybolized thinking, and sensory awareness
at a similar rate. Additionally, individuals with alexithymia could identify the gross labels
for the emotions/feelings they were experiencing at any given moment much as the
nonalexithymic individuals were able to. Therefore, at the most basic level, individuals
with alexithymia appear similar to nonalexithymic individuals. Where the difference
appears to lie is in the richness or complexity of the experience, whether it is emotional
experience specifically, or inner experience as a whole; individuals in the alexithymia
group not only reported more difficulty in capturing their experience at the moment of the
beep, but also provided less detailed accounts of their experience (resulting in shorter
sampled-moment summaries) than did individuals in the control group.
The extant literature supports that individuals with alexithymia are in fact able to identify and verbalize their feelings to a certain extent. Sifneos (1967) observed that his alexithymic patients were able to verbalize basic emotions such as anger, irritability or boredom, but were unable to provide elaborate descriptions of their experience of these emotions. A similar pattern of results can be seen in this study, with the individuals in the alexithymia group reporting feelings such as anger, disgust and worry but, similar to the patients Sifneos observed, the alexithymic participants in this study had difficulty elaborating upon their emotions. This study extends the findings of the extant literature to include not only a difficulty in elaboration of emotion-content, but of inner experience overall. In a similar vein, De Gennaro and colleagues (De Gennaro et al., 2003) conducted a study in which the transcripts of audio-recorded dream reports from 14 consecutive morning awakenings of 10 alexithymic and 10 non-alexithymic females were compared in length and emotional content. The alexithymic women reported significantly shorter dreams and had greater difficulty in recalling their dreams than the non-alexithymic women. On the other hand, no between-group differences were found in the emotional valence or bizarreness of reported dreams. These results are similar to the results of this study, in that individuals with alexithymia reported similar emotion-content as the control group, but with a limited ability to elaborate upon the details of that content.

Turning again to the findings of Sifneos (1967), as well as Taylor and Bagby (2000), individuals with alexithymia have been shown to have a limited vocabulary for describing their emotions. Their difficulty in elaborating upon their emotions has been attributed to this limited vocabulary. In fact, the word "alexithymia" was derived from
the Greek meaning "lack of words for emotion" (Sifneos, 1973). This study supports a different interpretation of the difficulty of elaboration that alexithymic individuals exhibit. As described above, the DES task, by its nature, attempts to remove the limitations of emotion-specific vocabulary (or any vocabulary for that matter). Individuals are encouraged to describe their experience using any language accessible to them (Hurlburt & Heavey, 2006). Despite this freedom, individuals in the alexithymia group were still unable to elaborate upon their emotion experience, as well as their overall experience, supporting the interpretation that the observed difference is due to an overall deficit in, or lack of, complex inner experience, as opposed to just a "lack of words" to describe existing experience.

Further supporting a deficit of inner experience as a whole is the finding that individuals with alexithymia reported much higher rates of "just doing" or some variant of it than the nonalexithymic individuals. Just doing, just listening, just watching TV, etc., all describe a similar phenomenon: being fully engaged in the task at hand without reflecting upon or thinking about that task or anything else. In other words, "just doing" and the other similar phenomena can be thought to represent a lack of inner experience. A lack of reflection upon experience has been discussed by Lane and Schwartz (1987); these authors believe that individuals with alexithymia avoid reflecting upon their experience, and also tend not to generate symbolic representations of their experience. It is possible that the alexithymic individuals in this study were not avoiding self-reflection, but in fact had little inner experience upon which to reflect.
Limitations

The present study had a number of limitations. The first limitation was the small sample size (n=12). The Descriptive Experience Sampling method is, by its nature, a very time and labor intensive procedure that requires dedicated adherence from the participants as well as the researcher. This makes it difficult to study large samples. The small size of the sample also led to low statistical power to detect differences between the groups, furthering the need for caution when interpreting the results and for considering this study exploratory.

Another limitation of the study was the relatively small number of moments of experience collected by each participant. Participants engaged in four days of traditional sampling, with the first day of sampled moments being discarded as a training day. This resulted in an average of 18 sampled moments (collected over three days) for each participant, as well as four additional sampled moments collected on a fifth day of sampling. It is possible that the limited number of sampled moments do not provide a full view of the daily lives of the individuals being sampled. Another limitation of the study was that the researcher was not blind to group membership. Although blindness was attempted, it proved to be logistically impossible to maintain.

A further limitation of the study is a consequence of when and how the participants collected sampled moments of inner experience. Because participants were free to collect their sampled moments in their own natural environments, thereby increasing ecological validity, it was impossible to place constraints on when the participants chose to collect their sampled moments. It is possible that the varying
conditions under which participants collected their sampled moments may have resulted in systematic differences among the individuals and between the two groups.

Finally, as discussed above, the gender balance of the groups was confounded with group membership, with the high alexithymia group being predominantly male and the low alexithymia group being primarily female. This clouds the interpretation of the observed differences.

Conclusions and Future Research

In conclusion, the findings from this study suggest that individuals with alexithymia not only have a limited ability to describe their emotions and other inner experiences, but that these impoverished descriptions may, in fact, reflect a general lack of inner experience. In other words, individuals with alexithymia may not have the ability to elaborate upon their experience not because they lack the 'right words,' but because there is simply little being experienced upon which to elaborate.

Future research should address the limitations of this study discussed above by using a larger sample size, and sampling for a greater number of days. Additionally, in order to control for conditions under which individuals collect samples of inner experience while still maintaining ecological validity, the number of days spent sampling in a controlled laboratory environment should be equalized with the number of days spent sampling in the natural environment.

Other general directions for future research include addressing the gender imbalance of the present study. Although the higher number of male participants in the alexithymia group represents the gender imbalance that appears to be somewhat inherent
to the alexithymia syndrome, future studies should attempt to have an equal number of male and female participants in both groups in order to disentangle the effects of gender from the effects of alexithymia.
REFERENCES


development, assessment, and the application at home, school, and in the workplace (pp.40-67). San Francisco: Jossey-Bass.


APPENDIX A

TORONTO ALEXITHYMIA SCALE, 20 ITEMS

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

T A S – 20

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

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

1. I am often confused about what emotion I am feeling. 1 2 3 4 5
2. It is difficult for me to find the right words for my feelings. 1 2 3 4 5
3. I have physical sensations that even doctors don’t understand. 1 2 3 4 5
4. I am able to describe my feelings easily 1 2 3 4 5
5. I prefer to analyze problems rather than just describe them. 1 2 3 4 5
6. When I am upset, I don’t know if I am sad, frightened, or angry. 1 2 3 4 5
7. I am often puzzled by sensations in my body. 1 2 3 4 5
8. I prefer to just let things happen rather than to understand why they turned out that way.

9. I have feelings that I can’t quite identify.

10. Being in touch with emotions is 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’s going on inside me.

14. I often don’t know why I am 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 feel close to someone, even in moments of silence.

19. I find examination of my feelings useful in solving personal problems.

20. Looking for hidden meanings in movies or plays distracts from their enjoyment.
APPENDIX B

SAMPLE SUMMARIES

1. She is in her car driving North on Desert Inn. There is traffic around her, and she is speaking on the phone with her boyfriend [using a headset]. Her boyfriend is a few cars ahead of her, in the same traffic. At the moment of the beep, she is saying to her boyfriend “something smells over [beep] here.” She also aware of smelling a pungent odor, which reminds her of sewage. At this same moment, she is looking in her rearview mirror and is aware of seeing the car in her lane, about 100 yards behind her. She is aware that the car is there, but is not paying attention to the details of the car.

2. It is 4:00 pm and she is driving on Charleston. She has just pulled into a right-turn “mini-lane” or “indent” (not a real lane, but an indent for people wishing to turn right into a shopping plaza). She is looking slightly to her right, at the parking she is about to pull into and is noticing that there are not many cars in the parking lot. At the moment of the beep she is focused on looking for other cars to make sure she won’t hit anything. She is being cautious and paying attention. She is not aware of anything else at this moment.

3. It is 11:00 pm and she wants to take a short nap before finishing her homework. She is on the phone with her boyfriend, and is asking him to call her back in 15 minutes and wake her up from her nap. She is feeling bad for asking him this, as she feels it isn’t
4. his responsibility necessarily to call and wake her up, and at the moment of the beep she is saying “I feel bad [beep]” to her boyfriend. At the same time she is feeling bad /crappy about asking him. She is experiencing this a little bit physically as an overall “looseness” in her posture and kind of a limp feeling, but mostly this ‘down’ feeling is being experienced mentally.

5. She is sitting in class, in a lab. She is slightly bent over, and is trying to hide as best she can behind a large box on the table next to her. She is speaking on the phone with her father, and is holding the phone by pressing it up against her ear using only her index finger. At the moment of the beep, she is aware of a strong pain and pressure in her index finger, which feels almost like it is being poked, and is tingly in the tip. She is listening to her father, and at the moment of the beep, he is saying “a little.” She knows he is talking about a gift, but can’t recall the exact details of everything he is saying. She is also scanning the room, looking for her teacher, but is not looking at any one person or thing in particular. She is also feeling anxious and rushed to get off the phone at the moment of the beep. These two feelings are not felt separately; instead, they are kind of mixed up in each other. She is experiencing this anxious/rushed feeling as a slight tensing of her muscles throughout her body.

6. She is eating corn nuts covered in hot sauce. She is chewing all the corn nuts on the left side of her mouth. At the moment of the beep, she is simultaneously feeling the sensation of the heat of the hot sauce on the right side of her mouth, and is sucking in air through her teeth to try to cool off her mouth. She is also aware of the crunchiness of the corn nuts on her teeth and tongue, as well as the flavors of lime, hot sauce and corn nuts. At the moment of the beep, she is also watching TV, and is paying attention to a
morbidly obese Rottweiler on the TV screen. She is noticing the dog’s weight, as well as the wobbly manner in which it was walking.

7. She is eating a piece of pizza. At the moment of the beep, the slice of pizza is just touching her tongue, and she is feeling a hot sensation in her mouth, but mostly on her tongue. This heat is coming from the pizza. She is also feeling the bottom part of the pizza on her tongue, and it feels kind of soft, but also toasted and hard.

8. She has just parked her car at school and is walking from the parking lot to her class. The sun is beating down on her, and at the moment of the beep she is thinking, “My left arm is burning.” This thought is so vivid that when looking back on it, she is not sure if it was a thought or whether she actually spoke this out loud to herself. At the same moment she is feeling the sun beating down on her upper left arm, and she feels a burning sensation.

9. She is in class watching a PowerPoint presentation and listening to her professor lecture about behavior therapy. She is looking at the professor, who has just said the word “encourage.” Her professor has a French accent, and so the word “encourage” sounded like “Anchorage.” At the moment of the beep she is saying to herself, “Anchorage?” in an inquisitive voice.

10. She is looking at the salad she is eating. She is thinking about how nutritionally useless the iceberg lettuce in her salad is, which prompts her to think about a TV show she had seen a while back. At the moment of the beep she is having a flashback image of a woman she had seen on this TV show. The still image is of the blond lady wearing workout clothing. Only the top half of her body is visible. She is standing next to a
treadmill, and there is a man on the treadmill. The treadmill is to the woman’s right, and the woman is facing the man on the treadmill.

11. He is sitting on the couch, contemplating how to block a counter-play (in football). He is running through different ways in his mind. He is trying to decide if he’s going to tell the players to block the way they’re used to, or to try a new way. At the moment of the beep he is has an image in his head of all “the guys” at practice, lined up in front of him, facing him. This image is kind of like a daydream, and is occurring in the first person perspective and contains no motion or sound. In his image, it is nighttime, and the 5 guys are standing on the grass of the practice field where they usually play. They are all wearing matching black jerseys and different colored helmets, which is strange, because this is not what their “real life” uniforms look like. The faces of the 5 players are blurry. At the same moment, he is thinking to himself, “Should we do it the new way, because everyone might get confused” [beep]. He is saying this to himself, using his ‘inner voice’ which is the same as his speaking voice, only with no sound.

12. He is still on the airplane, and it has just taken off from New York City. He is trying to find the Chrysler building as they take off. At the moment of the beep he is scanning across the Manhattan skyline, but he also has a mental image of the Chrysler building. He was picturing the Chrysler building from the same angle that he was seeing the other buildings; kind of from the top, but at an angle. He was picturing the top half of the building, as well as the arched top of the building. The air in his image was hazy, and the sun was shining on the building, similar to the real weather and time of day (“I was taking my image and making it match everything else in the city, the weather, the time of day, the angle.”). At the same time, he is hearing the people behind him talking, and is
also hearing the hum of the airplane, but this is all more in the background of his awareness.

13. He is driving on the 215 freeway and is thinking about a session he had had the previous night with a subject. He and the subject had been joking around about withdrawing consent and participation at any time, and the subject jokingly said he was withdrawing right then. He was thinking about how he would have persuaded the subject to stay had the subject really wanted to leave. At the moment of the beep he is having a fuzzy image [again, much like a blurry video] of that earlier interaction. He is picturing the subject getting up halfway out of his chair to leave. The subject is facing him at a 45 degree angle. He is speaking to the subject in the image, but is unsure what he is saying at the time of the interview. This image is in the first person perspective. At the same time he is looking at the highway exit sign for Buffalo. He is seeing the green sign with the white writing on it, but is not paying particular attention to any one part of the sign. He is also listening to music, and is aware of the words being said in the song, but can not recall them during the interview.

14. He is leaving the DES lab at 9:05 am, following his first expositional interview. He is walking toward his girlfriend’s classroom, and is passing by the construction site near the student union. He is approaching the building he wants to enter when the beep sounds. At the moment of the beep he is noticing the color of the double doors he is about to walk through. They are a blue color, whereas everything around them is grey, so the blueness stands out. He is also hearing the loudness of the construction site that is now to his right. He hears clinking metal sounds as well as the sounds of hammers pounding. He
is also aware of the heat of the sun on the back of his neck, and the blowing wind all
around his body.

15. It is 9:33 am and he is still walking with his girlfriend. They have decided to
take a different route to class and have just turned around to take the “left route” instead
of their usual right route. His girlfriend is walking alongside of him, and she is holding
his DES notepad in front of her, flipping through the pages of it. At the moment of the
beep his attention is focused on the page of the notepad which is being turned by his
girlfriend.

16. It is 8:16 pm and he is lying in his bed, reaching into his pocket to clean it out.
He has just pulled his hand half-way out of his pocket and has noticed that he has two
hair-clips; belonging to a little girl he worked with during the day. At the moment of the
beep, he is shrugging his shoulders and saying to himself, “Oh well, I’ll just give them
back tomorrow.” The beep came someplace around the middle of the sentence but he is
not sure where. At the same time, he is picturing the girl’s face and upper body. She has
long blond hair, and is looking up at him because she is short. Her face is clear in the
image, but this clarity begins to fade down her body and the image ends at her waist. Her
hands are missing from the image. The image is in his head, and has a black background.

17. She is sitting in Spanish class, drinking a Starbucks drink. She is watching the
teacher writing up on the board. The teacher has just written “a + el” and “de + el” on the
white board. She’s missed the explanation the teacher has given for why she’s writing
these letters on the board. At the moment of the beep she’s trying to figure out why the
teacher wrote what she wrote. This figuring out is not associated with any specific words
or images, but is more of a general thought process.
18. She is talking to her boyfriend on the phone and thinking about what she needs to take to school with her. At the moment of the beep, she is saying to herself, in her inner voice, “bring notes” and is having an associated image, in her head. This image is of several pieces of loose-leaf paper with writing; the writing is not clear, but she can tell that it is in her hand-writing.

19. She is in the library, thinking about what she needs to get done tonight for her English class. She is thinking about the paper that she has to read. At the moment of the beep, she is picturing the paper in her head. She can see the whole page, including the borders of the piece of paper, but most of the type on the page is illegible — it looks like scribbles. There are one or two words that are legible, but she can’t remember what they are at the time of the interview.

20. He is drinking a soda and reading a psychology textbook. At the moment of the beep he is somewhat aware of sucking-in with his mouth closed, kind of as if he was sucking on a lollipop, only there is no lollipop present. At the same moment, he is immersed in what he is reading (something about psychotherapy).

21. He is on the computer, looking at the website ThinkGeek.com. At the beep he is just reading what is written on the website, specifically, “Timberwolf [beep] FPS keyboard.”

22. He is in his room, and has just looked at the light coming through the blinds. At the moment of the beep he is just looking at the clock, not really paying attention to any specific aspect of it.

23. He is thinking about a comment he had made to his girlfriend, about his ex-girlfriend’s new boyfriend: that he wears a lot of weird hats. At the moment of the beep,
he is imagining how he would have felt had his girlfriend told him what he had told her. 
There are no images or words present, it was more of a general imagining. He can’t say 
how he knows he was imagining it, he just knows. He also had a general thought 
regarding the pettiness of his hat comment.

24. He is in the kitchen, cleaning the counter. He is holding a sponge in his right 
hand and a spray bottle in his left hand. At the moment of the beep he is wiping down the 
counter, and is zoned out.

25. He is listening to a rap song by Aceyalone. He has just heard a line in the song 
that goes something like, “Party all night and sleep in like Laverne and Shirley.” At the 
moment of the beep he is having an image out in front of him, of Laverne and Shirley, 
and they are smiling, and riding a forklift. He is seeing this image from about a 45 degree 
angle – he is seeing the image from the right side, looking toward the left. Laverne and 
Shirley are in a factory, and there are rows of empty 12-oz, green, glass bottles in the 
background – there are two rows of bottles on the ground, and then above those, two 
more rows of bottles, moving from left to right on a conveyor belt, and finally, five more 
rows of unmoving bottles above those. He can hear the bottles clinking in his image. 
Laverne and Shirley are wearing orange coveralls, and he can see their hairstyles, but not 
the hair colors; their faces are not clear. The forklift they are standing on is not being 
driven by anyone, but is moving slowly from the left side of his image to the right. There 
is some music occurring in his image, but he’s not sure what the music is. He is seeing 
this image as though it is on TV, but there is no TV screen visible, and the image is life-
sized.
26. He is in his dorm room, sitting at his desk. He is thinking about his car and whether or not it is safe in its current parked location. At the moment of the beep he is talking to himself in Korean. He is saying what translates to “Is my car safe or do I have to move it?” He is saying these words in his own voice, only with no sound.

27. He is trying to decide what time to go to the Dining Commons for dinner. He has an image of the inside of the dining commons about 2 seconds before the beep. At the moment of the beep the image has been replaced by the thought, “Is there a special food today?” He is thinking this to himself, in his own voice, in Korean.

28. He is laying in his bed, listening to music. He is listening to “Stronger” by Kanye West. At the moment of the beep, he is having an image of an African-American man. The man in the image is facing him, and has no face, only a head and body. The image is slightly blurry, and the man is only about 3 inches high. The background of the image is blue.

29. He is in class, taking notes about the human brain. His teacher is lecturing about how the right side of the brain controls the left side of the body. At the moment of the beep, he is aware of his teacher speaking. He is hearing her, but he is not listening to the words that she is saying.

30. He is in the Commons, and is going to eat lunch. He is wondering about what he should eat. At the moment of the beep he is putting salad on his plate. There is nothing else in his awareness; he’s just putting salad on his plate.

31. He is on MySpace, sending messages back and forth with his mother. They are talking about his trip home next week. At the moment of the beep he is just reading a
message from his mother. The message is about having friends and family over next
Saturday. He knows the beep occurred when he was reading "friends and family."

32. He is playing *Welcome to the Jungle* by Guns N' Roses on his guitar. At the
moment of the beep he is playing this song, and is focused on this.

33. He is sitting at the computer, working on his résumé for a mock interview for
his class. At the moment of the beep, he is looking at his name in large bold letters at the
top of his résumé. He is paying attention to the boldness and the blackness of the font.

34. He is sitting at his computer, looking at a messaging board on a website about
guitars. At the moment of the beep, he is reading a blog on the website; specifically he is
reading the words, "they're still there." He is just reading, and there is nothing else in his
awareness.

35. She is still in her room, lying on her bed. She is thinking about food and feeling
hungry. At the moment of the beep she is thinking, "I'm hungry but I don't wanna eat."
This thought is occurring in words, in her normal speaking voice but with no sound. She
is also aware of having a headache. She is experiencing this headache as "hurtness" in the
left temple, as if someone was pinching her temple from the inside

36. She is having a conversation with her sisters about their boyfriends. At the
moment of the beep she is into the conversation and listening to her sisters.

37. She is at the hospital, talking with her brother. He keeps talking to her and
acting stupid, and this is annoying her. At the moment of the beep she is thinking in her
head to herself, in her normal voice, "Shut up, grow up." She is also feeling annoyed at
the moment of the beep. This feeling is described as an "ugh" feeling.
APPENDIX C

SAMPLE SUMMARIES FROM DAY 5

Jenny – Control Participant #1

1. Silence of the Lambs

She is watching a clip from the Silence of the Lambs, seeing the weird body in the tub. At the moment of the beep, she is inhaling a long breath, she is feeling her heart race fast, and she is experiencing a feeling of disgust, which she is expressing by furrowing her eyebrows and letting her mouth hang open a little but. She is also feeling nervous. The feeling of nervousness is experienced as tightness in her stomach, and curling of her toes.

2. Cry Freedom

She is watching a clip from Cry Freedom. At the moment of the beep, she is looking at the little boy's white shirt. Her mouth is open and she is holding her hand over her mouth. She is thinking (in her head, words are present) “No no no no no” in relation to the young boy who is about to be shot, and this thinking is accompanied by a feeling of sadness. She is feeling this sadness in the front of her head, as a kind of pressure, and also felt the sadness in her eyes, as a drooping, lack-of-tenseness in her eyelids. She is simultaneously feeling nauseous at the sight of all the blood, and is experiencing the nausea as a tenseness/tightness in her stomach.
3. When Harry Met Sally

She is watching a clip from When Harry Met Sally. She is excited because she really likes this film and knows it very well. At the moment of the beep, she is smiling at the funny scene, and she is mouthing the words along with the film. She is saying “I’ll have what she’s having [beep].” Her mouth is moving, but she is not making any sound. She is also feeling a giddy feeling in her stomach, like a “Yay!” because she likes this film.

4. The Champ

She is watching a clip from The Champ. She is feeling generally bored because she doesn’t like boxing films. The remote for the TV is on a chair to her right. At the moment of the beep, she is looking to her right. She is looking at the remote, and specifically is looking at the pause button. Her hand is hovering over the remote control. At the same moment, she is feeling irritated at the sound of the kid saying “CHAMP CHAMP” over and over again, and is experiencing this irritation in the front of her head and her ears, as a kind of pressure. It is sort of like a headache, but not as intense. She is also aware of the movement on the TV screen switching to a blank stillness in the corner of her eye, but is not sure if this occurred just before or just after the beep.

Lisa – Control Participant #2

1. Silence of the Lambs

She is looking at the screen, which has just gone blank. At the moment of the beep, she is disgusted by the last scene [dead body in bathtub] and is experiencing this disgust in her, like a thought, but with no clear words. She is also feeling uncomfortable
and weird in relation to the clip. This uncomfortableness is described as a feeling that she does not really like. At the same time, she is feeling a little but suspenseful, experienced as an urge or a feeling of wanting something more. She is also feeling somewhat tense throughout her entire body.

2. Cry Freedom

She has just watched the man in the car shoot the young boy in the leg. At the moment of the beep she is feeling sadness, kind of like a sympathy for the little boy. She is also mad at the man who just shot the boy. She knows she is mad, and it is more of a thought than a feeling, but there are no clear words present – it is like an idea of being mad. At the same moment, she is experiencing confusion over why the man shot the boy, and is saying to herself “why would he do that [beep]?” She is saying this in her head, in her normal voice, only with a sadder tone.

3. When Harry Met Sally

At the moment of the beep, she is focused on looking at the older lady with the grey curly hair, and the waiter in the corner of the screen, and is hearing the lady say “I want what she’s having [beep]!” She feels herself being a little more happy at the moment of this beep, but this is not the focus of her attention at the moment of the beep.

4. The Champ

She is looking at the little white-haired boy back away from the old man. At the moment of the beep she is hearing him say “No he’s not gone, no he’s not [beep].” She is also noticing the boy look away from the old man, and she is noticing that he looks sad. At the moment of the beep, she is feeling sad. She can not describe the sadness, only that she knows she is experiencing it right at the moment of the beep.
Tina – Control Participant #3

1. Silence of the Lambs

She is watching the film clip from *The Silence of the Lambs*. At the moment of the beep she is focused on the screen, trying to figure out what was on the right side of the screen, in the tub. She is seeing the dissolved body and is looking for any sign of facial features. She is saying out loud, “What is that?”

2. Cry Freedom

She is watching the film clip from *Cry Freedom*. She is feeling disgusted by all the killing, and also sad. At the moment of the beep she is feeling very sad. She describes this sadness as a dull aching feeling in her heart and chest area, almost like a mild chest pain.

3. When Harry Met Sally

She is watching the film clip from *When Harry met Sally*. She has seen this film, and in particular this clip, many times before. At the moment of the beep she is just talking along with the film, saying (out loud), “I’ll have what she’s having” at the same time the older lady is saying it. There is no emotion present at the moment of the beep.

4. The Champ

She is watching the film clip from *The Champ*. She is watching the young boy, and is feeling very sad. At the moment of the beep she is looking at the young boys eyes and is feeling very sad. She is aware of her eyes “filled up” with tears, but is also aware of trying to fight these tears (she does not want to cry). She was unable to describe the fighting tears process, it was not a thought process, nor was it a feeling. It was just trying not to cry.
Tony – Control Participant #4

1. Silence of the Lambs

He is watching the film-clip and thinking that the person in the tub is the previous owner of the house and is trying to remember her name. At the moment of the beep he is visually trying to picture an earlier scene in the movie which included the house-owner's name, but this image is not fully formed at the moment of the beep; it is hazy.

2. Cry Freedom

He is watching the film clip and thinking about the little boy being shot. At the moment of the beep he is thinking to himself, “_____ horrible_____. “ His thought is along the lines of “That’s horrible that he did that” but only the word horrible is clear and present. He is also experiencing a general feeling of anger. This anger has physical components that include increased heart rate, tensing of his arms and a warming sensation throughout his whole body.

3. When Harry Met Sally

At the moment of the beep he is replaying the lady saying “I’ll have what she’s having” in his head. He is hearing her say this in the same way she had said it just before the moment of the beep. He is also trying to remember the name of the movie by relating what the lady said to an old Simpson’s episode that may have referenced the movie. At the moment of the beep he is having a very fuzzy and not fully formed image, located in his head, of the Simpson’s characters sitting on a couch, much as they do during the rolling credits of each episode.
4. The Champ

He is watching the kid say “He’s not gone” over and over. At the moment of the beep he is trying to remember the theme song of Silver Spoons [the young actor in The Champ was also an actor on Silver Spoons]. He is having an image of the beginning of a Silver Spoons episode. He is seeing the brown mansion on the show from the outside, and the green grass in front of it. This image is located in his head and is accompanied by sound: the soundtrack from the Facts of Life [another television show from the same time-period].

Dan – Control Participant #5

1. Silence of the Lamps film clip

He is watching the film clip, but also glancing around the lab room, looking at everything in the room. At the moment of the beep, he is very focused on the head of the dead body, and the blond hair hanging over the edge of the tub. At the same time, he is expecting at any moment to see the ‘bad’ guy jump out with a gun. He is experiencing an interest in seeing what will happen next.

2. Cry Freedom film clip

He is watching the film clip, watching the cop with the big round sunglasses stick his head and arm out of the window, and start shooting the kid. At the moment of the beep he is noticing that the kid is wearing a white shirt and black pants, and is expecting to see blood on the kid’s white shirt, but there is no blood. He is just watching what is happening on the screen.
3. When Harry Met Sally film clip

He is watching the film clip, and listening to what is being said. At the moment of
the beep he is noticing the old lady's grey/white hair, and noticing that it is tied up,
possibly in a bun. He is also aware of the off-green/light blue color of her shirt, but is
more focused on her hair. He is also noticing that her hand is gesturing, pointing at Sally.

4. The Champ film clip

He is watching the film and at the moment of the beep he is feeling very sad, and
is tearing up. He is experiencing this feeling of sadness mostly in his head and mind. He
is aware of a tear running down his face, and his eyes are very watery.

Nicole – Control Participant #6

1. Silence of the Lambs

She is thinking about the fact that there is a red theme in movies that involve a lot
of death/murder. She has just noticed that there is a red cloth item on the left side of the
room in the film-clip and at the moment of the beep she is thinking about the movie The
Sixth Sense. She is thinking about the red door-knob that the protagonist is trying to open
in that film. This thinking is general, and not associated with specific images or words.

2. Cry Freedom

At the moment of the beep she is remembering the previous scene of the film. She
is thinking about the kids falling to the ground. She is picturing them in her head. The
kids have scared looks on their faces, and are falling to the ground, but there image
contains no sound.
3. When Harry Met Sally

At the moment of the beep she is just watching the film.

4. The Champ

At the moment of the beep she is hearing the little boy say “wake up [beep]” just like he had been saying it in the film clip. She is hearing his voice in her head. At the same moment she is thinking that she can tell that he is in denial about what was happening.

When asked about feelings: She reported that she was actually sad at the moment of the beep, but that she forgot to write it down in her notepad and therefore forgot to mention it to me. This sadness was occurring to her “kind of like a thinking” and was not accompanied by any physical sensations.

Adam – Alexithymic Participant #1

1. Silence of the Lambs

He is thinking about what was in the tub. At the moment of the beep he is saying “UGH” out loud, and is thinking about how repulsive the stuff in the tub is. There are no associated feelings or specific thoughts that he can describe, only that he had a general sense of repulsion.

2. Cry Freedom

At the moment of the beep he is experiencing a feeling of shock/empathy/disbelief (all words were used and said to encompass the same feeling). It is difficult for him to describe how he is experiencing this feeling, only that it is there at the moment of the beep.
3. When Harry Met Sally

He is thinking that the faked orgasm is very convincing. At the moment of the beep he is feeling a little embarrassed for himself and for the people in the restaurant. Again, he can not say how he is experiencing this feeling.

4. The Champ

Throughout the clip he is thinking to himself, “this kid’s going to need therapy.” At the moment of the beep he is pretty sure that he is saying this to himself, in his normal speaking voice, only in his head. He believes that there were probably words present, but is unsure.

Jason – Alexithymic Participant #2

1. Silence of the Lambs

He is feeling tension at the moment of the beep (this tension was present throughout the clip, and he is still aware of it at the moment of the beep). At the moment of the beep, he is also thinking about the smell that would likely be emanating from the bathtub, thinking that the smell would be bad. This is a general thought, and is not occurring in words or images.

2. Cry Freedom

He knew when the beep was coming, and was thinking about the beep when it did come. He’s unsure what else, if anything, was in his awareness at the moment of the beep because he was so focused on knowing that the beep was coming.
3. When Harry Met Sally

   He is speaking out loud, along with the lady, saying “I’ll have what she’s having” and then he “beeped” out loud (beeeeeeep) along with the beep. At this point, he already knows that the beep happens at the climax of each clip, and so he is having trouble not focusing on the beep, at the moment of the beep.

4. The Champ

   At the moment of the beep his is talking at the actor on the screen, saying, out loud, “Mm-hmm, he is” in a sarcastic tone (in response to the child actor saying “No, no, no, no [he’s not dead]”). He is also having the general thought that he’s rather funny and clever. This thought is not occurring in words or images.

John — Alexithymic Participant #3

1. Silence of the Lambs

   He is watching the film clip, and could not clearly see into the bathtub. He thought that the man (the actor) had killed someone and put them in the bathtub, and he thought that the water is dirty. At the moment of the beep he is thinking that the man must have killed someone and buried him in the water, which is why the water is so dirty. This is just a general thought, and there are no words present.

   When asked about feelings: He reported that at the moment of the beep he was a little scared and interested, and also somewhat nervous. These feelings started well before the beep, but were present at the moment of the beep.
2. Cry Freedom

He is watching the clip, and noticing that the child who has been shot is laying face-down, but there is no blood around him. At the moment of the beep he is saying to himself, in Korean, what is translated as, “Oh, why does he lie down on ground? Does he pretend [beep] to die in order to avoid the situation?” He is thinking this in his own words, only with no sound.

3. When Harry Met Sally

He is thinking that the actor (Meg Ryan) is pretty, but also asking himself, “Is she crazy?” He is also thinking that the male actor is ugly compared to Meg Ryan. At the moment of the beep he is empathizing (“if I was him, I would be shy”) with the male actor’s character; he is feeling “shy” for the character. This shyness is not associated with any words, thoughts or physical sensations.

4. The Champ

He is thinking that the child actor is cute. At the moment of the beep, he is saying to himself, in Korean, “He acts well [beep].” This thought is occurring in his own voice, only with no sound.

Mike – Alexithymic Participant #4

1. Silence of the Lambs

At the moment of the beep he wanted to know what happened to the person in the tub, how did the person get there, was the person murdered or did the person commit suicide. He was wondering about all these things and they were sort of jumbled in his head. There were no clear words present, only a general wondering.
2. Cry Freedom

He is feeling a feeling of "Oh my God, he just shot that baby for no good reason."

He had difficulty describing this feeling. The feeling was kind of personal, as if that
could have been his niece or nephew. He was unsure what the exact feeling was, but there
was a feeling present at the moment of the beep. ["I don’t know what I was feeling
actually, I guess I was mad or angry or something, but I don’t really know"].

3. When Harry Met Sally

He is remembering the part of the clip in which Meg Ryan was at the table,
moaning and faking an orgasm. At the moment of the beep he is having an image of that
part of the clip, exactly as it appeared on the TV a few seconds earlier. He is not aware of
anything else in his awareness.

4. The Champ

At the moment of this beep he is a little sad, and is crying. He is feeling sad for
the little boy, who will no longer have a father. This sadness is being expressed through
the tearing up of his eyes. He is also feeling like he can relate to the little boy because he
has some friends who have lost their parents.

Nick – Alexithymic Participant #5

1. Silence of the Lambs

He is watching the clip, and at the moment of the beep he is saying to himself, in
his head, "Wow, that’s gross [beep]." This thought is accompanied by an anxious feeling
of wanting the clip to be over. He is experiencing this anxiety physically: his heart is
racing.
2. Cry Freedom

He is watching the clip, and at the moment of the beep he is mumbling (under his breath), “Why are they still shooting [beep] when the gathering is dispersing?”

3. When Harry Met Sally

He is watching the clip, and at the moment of the beep he is smirking. He is also aware of a shivering sensation in his arms. The shivers start at his shoulder, and travel down his arms. These shivers are unrelated to the clip, and they “just happened” for no particular reason.

*When asked about feelings:* At the moment of the beep, he was feeling nervous that someone would walk in the room. He was unsure why he was nervous about this, and also speculated that the shivers in his arms may have been related to this nervousness. He reported that the nervousness was not at all related to the film clip, and the feeling faded after a couple of seconds.

4. The Champ

He is watching the clip, and at the moment of the beep he is having a ‘mental thought.’ He is thinking, in his head, “Why is it that when Jackie tells the little boy he’s gone does he calm down [beep]?” He is hearing himself speaking this question as if he were in a seminar, or critically analyzing the movie. At the same time, he is also experiencing shivers in his arms again. These shivers were present throughout the entire film clip, but were still present in his awareness at the moment of the beep. The shivers were associated with a feeling of sadness for the boy in the clip, but this sadness was not in his awareness right at the moment of the beep.
Megan – Alexithymic Participant #6

1. Silence of the Lambs

   At the moment of the beep she is saying to herself, out loud, “yuck!” She is also feeling shocked, excited, curious, and kind of scared. All these feelings came at the same time, but she can not describe the experience of these feelings, other than she is aware of goosebumps on her arms.

2. Cry Freedom

   At the moment of the beep she is feeling angry and sad at the same time. She is breathing hard and wants to cry but can’t. She is saying to herself, in her head, “Frikking idiots!”

3. When Harry Met Sally

   At the moment of the beep she is thinking to herself, in her head, “She’s frikking stupid!” She is simultaneously saying the word “frikking” out loud, but is not saying the rest of the thought out loud. She is also aware of laughing and smiling at the moment of the beep.

4. The Champ

   At the moment of the beep she is crying and feels really sad. This sadness has a physical component: chills running up and down the left side of her body. At the same time she is thinking to herself “poor kid, so cute.” This thought is not occurring in words or in images, but she is sure that these are the exact words she is thinking.
APPENDIX D

INSTRUCTIONS FOR RATERS

Instructions for Raters: Please rate each of the sampled moments on each of the scales provided below. If you have any questions, please feel free to contact me. Thank you.

1. Emotion: To what extent is any emotion/feeling present in this moment of experience?

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2. Externally Oriented Focus – To what extent is the focus of this moment on the external world?

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3. Negative Bodily Sensations – To what extent is there a focus on negative or unpleasant bodily feelings or sensations in this moment of experience? These include, but are not limited to, aches, pains, soreness and illness-related inner experience.

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4. Daydreams – To what extent is there fantasy or day-dream content present in this moment of experience?

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APPENDIX E

EMOTION-RELATED SAMPLE SUMMARIES

Adam – Alexithymic Participant #1

1. He is sitting at his computer, making plans with his friend online. They are planning to go Go-Kart racing. At the moment of the beep, he is in the process of typing something about how fast Go-Karts go to his friend. He is feeling happy, and picturing a bunch of people on a Go-Kart race track. He is unable to describe how he is experiencing this feeling or to describe the image he is picturing. *happy*

2. He is on the computer, and is on the UNLV WebCT website. He has just clicked on the Course Content menu and is wondering about his research credit on Experimetrix. At the moment of the beep he is worried that he may have signed up incorrectly in order to obtain research credit. This worry is not associated with any thoughts, sensations, images, etc., and he can not describe what the experience of the worry is like. *worry*

3. He is drifting back and forth between watching TV and reading. At the moment of the beep he is aware of the TV, but is not sure what he was watching. He is also aware of having a sensation of a dull, mild headache localized to the area of his right temple, and just above his right eyebrow. He is experiencing a mild sensation of annoyance, which he can not describe. *annoyance*
Jason – Alexithymic Participant #2

1. He is washing the dishes and his hands and nails are soft from extended exposure to the water. There is a hard, crusted piece of old food stuck to one of the dishes he is washing. At the moment of the beep, he is having an image (described as more like a video than a picture) of his left hand holding the dish with the crusted food on it. In his image, he can also see the whole sink, and 2 bowls, a plate, 3 forks and a coffee mug piled in the bottom of the sink. Water is gathered in the bottom of the sink. He can also see the faucet (no water running) and a bit of the surrounding countertop. In the image, he is using the thumb of his right hand to scrape the crusted food off the dish. While he is scraping, his thumbnail rips off of his thumb completely and is connected only on the inner corner of his nail-bed. Droplets of blood appear on his thumb. This image is accompanied by a “nails on a chalkboard” sensation of discomfort. *discomfort*

John – Alexithymic Participant #3

1. He is in his dorm room, and is thinking about the quarrel he had over the phone with his mom the previous day. The quarrel was concerning a purchase he had made on his credit card a few months prior. At the moment of the beep he is thinking about how sorry he is that he quarreled with her. This thinking is accompanied by an image of his mother. In the image, only her head and shoulders are visible, and her face is blurry (but he knows it is his mother in the image). She is facing him head-on and is holding the receiver of a phone to her ear. The image is about 4 feet in front of him. In addition to this, he is also feeling a “not so good” feeling at the moment of the beep which he can not describe. *bad*
2. He is in his dorm room, and is reading the syllabus for his American Politics class. He sees that his essay for the course is due on October 19th, and is worried because he does not know how to start his essay. He is thinking about dropping the class. At the moment of the beep he is thinking “I would take history course rather than American Politics.” He is saying this to himself, in his own words, in Korean. The beep came toward the end of the sentence. At the same time, he is feeling somehow worried about not being able to complete his essay. *worry*

3. He is at home in his dorm room, thinking about what had happened at church earlier that morning. His pastor had asked him to stay at church and hang out for a while longer, but he had said he wants to go home, and had left. The pastor was displeased with him. At the moment of the beep he is feeling angry, which feels like something inside him rising, but he can not clearly say what. He is also having the general idea that if his pastor does this again, he is going to change churches. There are no specific words present. *anger*

4. He is on the computer looking at Cyworld, which is the Korean version of Myspace. He is looking at the pictures of his friends back in Korea and remembering the past. He is thinking back to high school, and is having a series of images of the structure of his high-school building and his classroom. At the moment of the beep he is having an image of himself and his friends wearing their school uniforms. They (he and his friends) are lined up as if facing a camera (there is no camera present in his image); he can not see any faces, only uniforms. The uniforms consist of grey pants and bluish-purple suit jackets. There is no background in his image. At the same time, he is having a positive
feeling of missing his friends, but can not say what this feeling is or how he is experiencing this positive feeling, it’s just there. *positive feeling*

5. He is watching TV and eating food. He is watching a TV interview with the manager of the New York Yankees. At the moment of the beep he is looking at the manager and saying to himself in Korean, “What the hell is he talking about?” [He can’t understand what the manager is saying because he is speaking in rapid English]. At the same time he is wishing he could understand what the manager is saying, and is feeling jealous of his roommate who can understand English. *jealousy*

Mike – Alexithymic Participant #4

1. He is on the phone with his mother, and she has told him she bought him something. At the moment of the beep, she is repeating that she bought something for him. He is wondering what this something could be, and also feeling happy and excited. There are no specific words, images connected with his wondering, and no sensations associated with his feeling. He is unable to describe how he knows he’s feeling happy/excited. *happy/excitement*

Nick – Alexithymic Participant #5

1. He is still watching football on TV. At the moment of the beep he is aware of being anxious. This anxious feeling is like butterflies in his heart (not stomach). He does not know what this anxiety is related to, and was not aware of it until right at the moment of the beep. *anxiety*
2. He has just returned from church and is sitting on the couch, resting. At the moment of the beep he is aware of feeling sleepy. This sleepiness is kind of physical, and his body is limp, and his arms are tingling or “falling asleep.” *tired/sleepy*

3. He is watching the World Series baseball game on TV, and has just watched the Redsox win. He is thinking about how unjust it is that the Redsox beat out Colorado in front of all of Colorado’s fans. At the moment of the beep he is feeling bad for the CO team. This feeling was more mental than physical, and has a sarcastic aspect to it. He is unable to describe the feeling any further. *bad*

4. He is remembering a field trip he took with his senior high school class, to Huntington Beach. He is remembering specifically his male friend, who was wearing a Speedo (bathing suit bottoms). At the moment of the beep he is feeling disgusted that he still remembers this, and also disgusted that his friend wore a Speedo. There are no words or images associated with this feeling of disgust, and he is unable to describe it further. *disgust*

5. He is sitting in his room and at the moment of the beep he is looking into his closet at his new blue Oilers hockey jersey. He is thinking that the jersey is cool looking, but is unsure whether this thought is occurring in specific words, or if it is more general. He is simultaneously feeling proud of the jersey. He is unable to describe his experience of this feeling of pride. *pride*

Megan – Alexithymic Participant #6

1. She is in her room, lying on her bed and thinking about how much work she has to do, but not wanting to do any of it. At the moment of the beep she is aware of feeling
sleepy. This sleepiness is experienced as a sense of her body feeling dead. This dead feeling is being experienced as a tingly sensation in the sides of her arms and legs. Her legs also feel heavy. Her body feels warm and hot all over as if she has a fever. *sleepy/tired*

2. She is having a conversation with someone online, using a chat program. She is feeling irritated and at the moment of the beep and is aware of how irritated she is. She is experiencing this irritation as wanting her chat companion to stop chatting. There are no physical feelings or thoughts accompanying this irritation. *irritation*

3. She is having a conversation with her mother about her sister, who was recently diagnosed with Leukemia. The two are discussing potential ways to raise money to help them pay for the treatment of the leukemia. At the moment of the beep she is thinking about her sister’s face. This thinking is very fleeting and brief, and consists of a representation of her sister’s face. It is not an image of her sister’s face, but instead a blurry vision of her sister’s face, kind of a flash, the way she looked before getting cancer. In this flash, her sister is smiling. She can only see the front of her sister’s face, not her body. Accompanying this flash is a feeling of sadness, kind of like a heaviness on her chest. *sadness*

4. She is at her brother’s friend’s house, lying on his bed, and listening to him and her brother mixing music. She is bored, and at the moment of the beep is aware of wanting to go to sleep. This wanting is not accompanied by any specific thoughts. *bored*

5. She is in the car with her brother, and they are driving to her girlfriend’s house. They are laughing and joking around. She has just told her brother, in a joking way, that
he can not rap in their new song, because he is not very good at it. Although she is joking, she can tell she hurt his feelings because he has stopped talking. At the moment of the beep she is feeling bad. She is pressing her lips together, and looking outside, and is quiet. She can not describe how she is experiencing this "feeling bad." *bad*
Figure 1. Mean Frequencies of Main Five Characteristics of Inner Experience
Figure 2. Mean Frequencies of Main Five Characteristics of Inner Experience, Day 5
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