TWENTY ITEM TORONTO ALEXITHYMIA SCALE: CONSTRUCT VALIDITY IN A COLLEGE STUDENT POPULATION

By

TODD C. EIDEN

Bachelor of Science
University of Wisconsin-Oshkosh
Oshkosh, Wisconsin
1989

Master of Science
University of Wisconsin-Oshkosh
Oshkosh, Wisconsin
1994

Submitted to the Faculty of the
Graduate College of the
Oklahoma State University
in partial fulfillment of
the requirements for
the Degree of
DOCTOR OF PHILOSOPHY
December, 1998

TWENTY ITEM TORONTO ALEXITHYMIA SCALE: CONSTRUCT VALIDITY IN A COLLEGE STUDENT POPULATION

Thesis Approved:

Thesis Advisor

Dean of the Graduate College

ACKNOWLEDGEMENTS

I would like to use this space to express my most sincere appreciation to Dr. Carrie Winterowd, my doctoral dissertation director, advisor, mentor, and friend. Her influence exceeded the customary requirements of director, due in part I think, to her genuine concern for the welfare of her students, and her commitment to professional excellence. Her outstanding qualities will continue to be a personal and professional inspiration to me.

I would like to express my heartfelt appreciation to Dr. Dale Fuqua, my doctoral dissertation chair, for his help in conceptualizing and analyzing this study. I would also like to highlight the solid support I received from Dr. Boswell, the thoughtful consideration of ideas from Dr. Carlozzi, and the practical encouragement from Dr. Chaney.

I would like to end this process by thanking my family. My children, Nicholas and Emily, have constantly been there to "help Daddy" by providing lots of comic relief, hugs and kisses. I would also like to thank my parents, Chet and Diane who provided endless encouragement throughout my academic career. I wish to express my deepest love and appreciation to my wife, Sarah, for her confidence in me. Her love, patience and support were instrumental in my coming to and completing graduate school.

TABLE OF CONTENTS

Chapter Page

Chapter Page

LIST OF TABLES

LIST OF FIGURES

Chapter 1

INTRODUCTION OF STUDY

Prelude

Principle E of the American Psychological Association's Ethical Principles of Psychologists and Code of Conduct (1992) implicitly warns, "*primun non nocare*" or "first do no harm." Psychological ethicists consider this principle (whose origins lie in the Hippocratic oath) the most important admonishment in the code, and suggest that this admonition guides all sections of the code, including research and practice. There were non-malicious circumstances that occur for practicing therapists in which this mandate was broken, and although the intent was not malevolent, it was possible to do harm to clients.

One condition under which *primum non nocare* may be violated occurs when the therapist becomes bored with the client. Parenthetically, it should be noted that philosophers have long discussed boredom as the root of all evil (Kierkegaard, 1944). Kottler (1993), in his timely book on the pitfalls of being a therapist, devoted several pages to avoiding boredom. His contention was that nothing was more difficult for the therapist than the challenge of staying invigorated about therapy. Interestingly, he did not specifically address boring clients, a topic that has been called taboo or denied among psychotherapists and psychoanalysts, possibly due to feelings of guilt or incompetence about this counter-transference reaction that some claim was occurring (Altshul, 1977).

It was important to differentiate that this study targeted one group of clients that were at risk for or already have been considered boring by therapists. Taylor (1984) typified three potential psychological profiles that occur with boring clients, as he

postulated they were much more complex than simply boring people. Some clients were viewed by their therapists as boring because they relied excessively on neurotic defenses, especially repression and isolation. Other clients would be considered narcissistic and elicit boredom resulting from both transference and counter-transference problems.

The third profile typified the most troublesome and intractably boring clients due to their communication problems. More specifically, their communicative style was boring because their speech lacked the nuances of expressivity, and wanted for the use of metaphor and/or the regular expression of affect. They exhibited a marked difficulty in describing feelings in general, occasionally mustering simple emotional outbursts of rage or weeping. Sessions were rarely more than an endless recounting of symptoms, or the preoccupation with the details of their external world. This preoccupation with symptoms occurred in the physician's office as well, where groundless or exaggerated physical complaints confused diagnoses and wasted resources. When therapists perceived their clients as boring, the reaction often resulted in termination, as the client was seen as being not psychologically minded, lacking clear goals, or not motivated for therapy. Taylor (1984) also noted having disturbing second thoughts about terminating boring patients, to the point that he was unable to sleep at night.

Presentation of the Alexithymia Concept

The condition described above was known as *alexithymia* (literally defined as no words for feelings), a name which concisely described Sifneos' frequent observations of unexpected emotionally bereft behavior among psychosomatic (persons who have an existing, demonstrable, organic condition that was exacerbated by co-occurring

psychological factors) patients (Nemiah & Sifneos; 1970, Sifneos, 1973). More specifically, patients with alexithymia were noted to have the following characteristics; (a) an inability to describe feelings, (b) the lack of a fantasy life (most notably lacking the ability to use their imagination to cope with anxiety or overpowering emotion), (c) the inability to reproduce or recall primary process types of dreams), and (d) thought content that is marked mainly by a preoccupation with minute details of external events and/or bodily symptoms, a condition known as externally oriented thinking (Taylor, 1994).

This display of behavior had been described in the literature (Ruesch, 1948) for at least twenty five years before being labeled as alexithymia (Sifneos, 1973). Establishing this new construct sparked interest in the scientific community, with subsequent increases in the amount of investigation in this area. Several descriptors of *alexithymic* behavior have been identified, including but not limited to the tendency: to resort to actions to express internal conflicts (Lesser & Lesser, 1983), to assume rigid postures and have poor interpersonal relationships (McDonald & Prkachin, 1990), to lack imagination, insight, are socially conforming, utilitarian, are humorless, and feel meaningless, anxiety, and tension (Haviland and Reise, 1996), and to generally feel ill at ease (Taylor, 1992). Further observations have led clinicians and researchers to describe many other characteristics of these patients, including: unsuccessful attempts at high social conformity, resulting in unsatisfactory social relationships (Norton, 1989); the ability to express negative emotion to some extent; little self-awareness and self-reflection (Norton, 1989); and the predominant use of somatic means to discharge tension or anxiety (Apfel & Sifneos, 1979), which would result in difficulty regulating emotion.

Evidently this kind of ambiguity surrounds theorizing, especially when the theory regards the human persona. Therefore, personality theorists Costa and McCrae (1987), recommended that new personality constructs need to be investigated in a normal population, in order to establish relationships between any new construct and what would be considered the normal state. This work has been attempted (Bagby, Taylor & Parker, 1992; Bagby, Taylor & Parker, 1993) using the self-report version of the NEO-Personality Inventory (Costa & McCrae, 1985) and a self-report alexithymia scale. Results of these studies suggested that alexithymia was related to a reduced ability to experience pleasurable emotions. Alexithymia was also related to an increased susceptibility to experience poorly differentiated emotional distress. Persons described as alexithymic in that study were additionally found to be unanalytical and factually oriented, to cope poorly with stress, and to have a narrow range of interests.

Results of research and theorizing such as this led some theorists to designate alexithymia as a complex personality construct encapsulating many types of thoughts, feelings and behaviors (Taylor, 1994). Not surprisingly, attempts were soon made, and continue to be submitted to more fully explain the construct. What had initially been an a-theoretical description of behavior (Sifneos, 1973), now has numerous theoretical positions offering explanations for the observations.

Etiological Explanations of Alexithymia

Several theoretical schools of thought produced elaborate theories to explain the constellation of behaviors known as alexithymia. These included psychodynamic (Krystal, 1988; McDougall, 1985; Nemiah, 1984), cognitive (Martin & Pihl, 1985; Haviland, Shaw,

Cummings & MacMurray, 1988; Hendryx, Haviland & Shaw, 1991; Haviland, Hendryx, Cummings, Shaw & MacMurray, 1991; Haviland, Hendryx, Shaw & Henry, 1994), neurobiological (Hoppe & Bogen, 1977; Sifneos, 1988; Taylor, 1992; Parker, Taylor & Bagby, 1993; McDonald and Prkachin, 1990), sociocultural (Borens, Grosse-Schulte, Jaensch & Kortemme, 1977; Kirmayer, 1987; Parker, Taylor & Bagby, 1989; Kauhenan, Kaplan, Julkunen, Wilson & Salonen, 1993), genetic (Heiberg & Heiberg, 1978), family systems (Berenbaum & James, 1994; Lumley, Mader, Gramzow & Papineau, 1996), and emotion theory (Buck, 1985). In the interest of brevity and adhering to the major interest areas of this investigation, this segment of the proposal will discuss only the psychodynamic and cognitive. The other formulating theories are summarized in the literature review along with a more in depth review of psychodynamic and cognitive positions on alexithymia.

General psychodynamic proposals. Psychoanalysts were the first to advance conceptualizations (Sifneos, 1974) about the etiology underlying alexithymia. Many paradigms have been employed to explain alexithymia including conversion, specific dynamic conflict denial, deficit model, Neo-Freudian developmental models, psychoanalytic learning theory, and the pathogenic mother-infant relationship (Nemiah, 1977). Many other theoretical articles exist (Ruesch, 1948; McDougall, 1985; Krystal, 1979; 1988; Weinryb, 1995) however recent psychodynamic theory incorporated modern psychoanalysis with developmental biology, the neurosciences, and the bio-medical sciences to conceptualize alexithymia (Taylor, 1992). This theory, known as psychobiological dysregulation, incorporated knowledge about affect development and

affect regulation, thereby shifting away from intrapsychic models to a two-person relational model of psychic structure, psychopathology and psychic function. What Taylor was discussing was the possibility that many forms of psychopathology arise due to "trait vulnerability" and life stressors. The existence of "trait vulnerability" was used as a conceptual basis for discussing the "disease-prone individual." Taylor noted that the etiology of alexithymia was not known for certain, but evidence exists to support the conclusion that alexithymia was likely the result of lesions or deficits in the right cerebral hemisphere and/or left cerebral lateralization combined with early social relationships wherein the primary caregiver was emotionally unavailable (Taylor, 1992).

Psychodynamic deficit theory. A second psychodynamic theory was advanced, known as the deficit model of alexithymia, which hypothesized that the ego is variably (based on the individual) incapable of modulating distressing affects through symbolic processes and/or the use of complex ego defense mechanisms (Nemiah, 1984). Support was garnered for alexithymic individuals' use of primarily immature defenses, such as isolation, which was postulated to represent a more rudimentary developmental state for alexithymic persons' egos. Several authors have provided affirming evidence for this etiological view of alexithymia (Bagby, Taylor & Parker, 1992; Taylor, Bagby, Ryan & Parker, 1990; Taylor, Parker & Bagby, 1990; Wise, Mann & Epstein, 1991).

Both of the psychodynamic models of alexithymia considered alexithymia to be a stable and persistent personality trait. It has been theorized that alexithymia can manifest as a transitory or temporary personality state. In both instances, terms have been applied to typify the form of alexithymia being discussed. These are; *primary*, the term affixed to

trait alexithymia, and (b) *secondary*, the moniker attached to state alexithymia. A discussion of current usage and opinion surrounding modifying the alexithymia concept into primary and/or secondary types follows in the literature review of this investigation (Lesser, 1981).

Cognitive theory. The second major avenue of research referred to alexithymia as a cognitive defense enlisted to protect the ego from the effects of depression and anxiety. Alexithymia's role as a defense mechanism has been supported (Haviland, Shaw, Cummings and MacMurray, 1988; Hendryx, Haviland and Shaw, 1991; Haviland, Hendryx, Cummings, Shaw and MacMurray, 1991; Haviland, Hendryx, Shaw and Henry, 1994). Among newly sober alcoholics, alexithymia scores were noted to be positively correlated with emotional distress. The relationship was discussed as secondary because of the fluctuations with emotional distress. If alexithymia were a primary process, TAS scores would have remained constant despite changes in emotional distress (Haviland, Shaw, Cummings and MacMurray, 1988). Further, Krystal described the use of alexithymia as a defense mechanism among trauma survivors he interviewed (1979).

Correlates of Alexithymia

Research reviewed in this section highlights the relationships between alexithymia and other constructs, including affect (e.g. depression, state/trait anxiety, state/trait anger) and cognitive processes (e.g. need for cognition, psychological mindedness).

Alexithymia and depression. The research findings have been mixed regarding the relationship between alexithymia and depression. The majority of studies have noted a significant correlation between alexithymia and depression (Prince & Berenbaum, 1993;

Haviland, Hendryx, Cummings, Shaw & MacMurray, 1991; Hendryx, Haviland & Shaw, 1991; Haviland, MacMurray & Cummings, 1988; Haviland, Shaw, Cummings & MacMurray, 1988; Haviland, Shaw, MacMurray & Cummings, 1988; de Groot, Rodin & Olmstead, 1995; Saarijarvi, Salminen, Tamminen & Aarela, 1993; Taylor, Parker, Bagby & Acklin, 1992; Kuczmierczyk, Labrum & Johnson, 1995; Wise, Jani, Kass & Sonnenschein, 1988; Bradley, 1987). Many of these authors reported data that is correlational in nature, describing positive relationships between the two constructs. The most precise of these researchers noted correlations between depression and difficulty identifying and describing feelings (Haviland et al. 1991).

Other studies found no significant relationship between alexithymia and depression (Wise, Mann & Shay, 1992; Prince & Berenbaum, 1993; Fukunishi, Ichikawa & Matsuzawa, 1992; Wise, Mann & Randell, 1995; Wise, Mann & Hill, 1990; Bourke, Taylor, Parker & Bagby, 1992). Parker, Bagby and Taylor (1991) found a correlational relationship between alexithymia and depression using the self-report data. Further analysis with factor analysis showed the combined items from the Toronto Alexithymia Scale and the Beck Depression Inventory occupy two distinct factors.

Alexithymia and anxiety. It has been noted that alexithymia also co-occurs with anxiety (Myers, 1995; Cox, Swinson, Shulman & Bordeau, 1995; Ushiroyama, Ueki, Orino & Ikeda, 1994; Parker, Taylor, Bagby & Acklin, 1993; Taylor, Parker, Bagby & Acklin, 1992; Zeitlin & McNally, 1993). Anxiety is discussed by Spielberger (1983) as an emotion state characterized by the subjective report of tension, apprehension, nervousness, and worry, as well as arousal of the autonomic nervous system. Anxiety was

differentiated by Spielberger into state and trait dimensions. State anxiety was described as an unpleasant emotional condition made up of the above noted symptoms. Trait anxiety was discussed as a condition of anxiety-proneness that was relatively stable and manifested differently across individuals (Spielberger, 1983).

Alexithymia and anger. Others have noted co-occurrences between anger and alexithymia (McDonald & Prkachin, 1990; Berenbaum & Prince, 1994; Keltikangas-Jarvinen, 1982). Anger was defined here by examining two dimensions of the emotion, state anger and trait anger. State anger was defined as temporary hostile feelings arising from situational stresses. Trait anger was defined as a more stable predisposition to react to stresses with hostile responses (Spielberger, 1988).

Berenbaum and Prince (1994) found that individual's with higher alexithymia scores were more likely to label an emotion-eliciting story with the emotion word "disgust," whereas persons with lower alexithymia scores chose "anger" to describe the same story. This study indicated alexithymic persons have difficulty identifying other's emotions as well as their own. It was hypothesized that difficulty identifying anger was associated with alexithymia. Further, alexithymic individuals may be noted for difficulty with anger because anger is generally considered to be a socially unacceptable emotion, hence making problems more noticeable. Keltikangas-Jarvinen (1982) found that violent offenders lacked the ability to fantasize about aggression and scored higher on assessments of alexithymia than non-violent offenders. This supported the hypothesis that among persons with antisocial personalities, violent offenders are less likely to be able to

discharge negative emotions like anger (via thought), and are more likely to act out those negative emotions.

Alexithymia and need for cognition. The need for cognition has been defined as the tendency to engage in and enjoy thinking (Cacioppo & Petty, 1982). These authors note that such a tendency has a relatively long history in both applied and social psychology. Murphy (1947) described "thinkers" as persons who engaged in such mental activity because it was experienced as pleasurable. Cohen, Scotland, and Wolfe (1955) described more specifically a "need for cognition" which is derived from goal-directed tensions to attain relative and meaningful structure. In examining the alexithymia literature, it was found that alexithymic persons tended to score lower on need for cognition than did their non-alexithymic counterparts. (Bagby, Taylor & Parker, 1988; Bagby, Taylor & Parker, 1993).

Alexithymia and psychological mindedness. Psychological mindedness, interpreted as the disposition and motivation a client has to seek relationships among thoughts, feelings, and behaviors (Applebaum, 1973; Farber, 1985), was a concept that originated in psychodynamic theory. Psychological mindedness has been examined with respect to predicting psychotherapy outcome along with other variables like the willingness to trust, positive attitudes towards the self and therapist, and relatively high anxiety and depression (Conte, Plutchik, Jung, Karasu & Lotterman, 1990). Conte et al. successfully predicted the outcomes of psychodynamically oriented psychotherapy for individuals.

Alexithymic individuals were thought to be deficient in psychological mindedness by definition, and as such, this variable has been employed in earlier research to assess the

cognitive domain of alexithymia (Bagby, Taylor & Parker, 1988; Bagby, Taylor & Parker, 1993). Findings from the latter investigation support the hypothesis that alexithymic clients make poor candidates for psychotherapy. Support was also generated for the following characterizations of alexithymic persons. They are (a) unwilling to talk about their problems, (b) unable to access feelings, (c) lacking in the capacity for behavioral change, and (d) uninterested in the motivation for human behavior. Alexithymia was concluded to be related in an inverse manner with psychological mindedness.

In sum, disagreement existed regarding the unique nature of the alexithymia construct. Overlap has been described here between the construct of alexithymia and depression, anxiety, anger, need for cognition, and psychological mindedness. Further, depression and anxiety were discussed as causing alexithymia or alexithymic behaviors. Evidence suggested that alexithymia was a state construct, a trait construct, or a combination of the two. The occurrence of disagreement is not surprising given the fact that alexithymia existed for 25 years without a name, ten of which generated much thought and many articles.

Measurement of Alexithymia

Paralleling the trend towards operationalization in the fields of psychology and psychiatry (eg. the Diagnostic and Statistical Manual (DSM-III, 1980, where diagnostic criteria began to shift away from theory generated descriptions of pathology to criteria defined through observation), clinical interviews began to be examined and modified to a more structured format with the introduction of interviewer-rated questionnaires. Recently, clinicians have been cognizant of specific areas of inquiry related to the

alexithymia construct and modified their interviews to fit those questions. In essence, providing structure to the interview process worked to remove ambiguity from the construct as well. More accurate identifications of alexithymia led to the operationalization of the alexithymia concept, resulting in a more conjunctive construct. In addition to clinical interviews, many other means have been developed to assess alexithymia including several projective and objective measures.

Toronto Alexithymia Scale. The Toronto Alexithymia Scale (TAS, Taylor, Ryan and Bagby, 1985) has been identified as the most popular measure of alexithymia given the number of researchers that have used it. The TAS has been referred to as the best self-report *and* the best overall instrument for assessing alexithymia (Bagby, Taylor & Atkinson, 1987; Taylor, Bagby, Ryan & Parker, 1990). Generally, self-report measures have been criticized with respect to assessing alexithymia, on the grounds that it was paradoxical to ask persons with deficits in affective insight and fantasy to rate affective or symbolic experiences that they do not comprehend (Krystal, 1988). This criticism has been refuted with hard data, where the TAS scores have correctly identified clients who were independently rated either alexithymic or non-alexithymic by clinical observers (Taylor, Bagby, Ryan, Parker, Doody and Keefe, 1988; Rubino, Grasso, Sonnino and Pezzarossa, 1991). This criticism has also been countered by the documentation of the ability of alexithymic individuals to experience negative affect, including anger and disgust (Berenbaum & Prince, 1994).

The factor structure of the TAS was made up of four factors (Taylor, Ryan & Bagby, 1985). These were: (1) difficulty identifying and distinguishing between feelings

and bodily sensations, (2) difficulty describing feelings, (3) reduced daydreaming, and (4) externally-oriented thinking. Until 1991, no studies challenged the factor structure of the TAS. Then, Parker, Bagby, and Taylor (1991) found significant correlations between alexithymia and depression, which introduced doubt about the integrity of the TAS.

Parker, Bagby, and Taylor (1991) conducted a factor analysis of the BDI and TAS to examine the overlapping nature of these instruments (e.g. Haviland et al., 1994; Haviland et al. 1991; Hendryx et al. 1991). Other studies had also found a relationship between depression and alexithymia, (e.g. Haviland et al. 1988; Haviland et al., 1988; de Groot, Rodin & Olmstead, 1995; Saarijarvi, Salminen, Tamminen & Aarela, 1993; Taylor, Parker, Bagby & Acklin, 1992; Kuczmierczyk, Labrum & Johnson, 1995; Wise, Jani, Kass & Sonnenschein, 1988). Parker, Bagby and Taylor (1991) assessed 406 undergraduates, and 164 psychiatric outpatients with the combined items from the BDI and TAS. Subsequent factor analysis accounted for 27% of the variance among students, and 35% in the psychiatric sample. Four factors were found. Factor (1) included 19 of the 21 BDI items. Factor (2) included TAS items concerned with identifying and distinguishing between feelings and bodily sensations. Factor (3) included TAS items assessing imagination and daydreaming. Factor (4) included TAS items assessing externally oriented thinking. Item factor loadings and high coefficient alphas were cited to support the conclusion that alexithymia and depression as measured by the TAS and BDI are different constructs.

As noted above, the occurrence and findings of this research introduced doubt about the TAS and its usefulness in assessing alexithymia. Further, using causal modeling,

statistical procedures, Haviland et al. (1991) found negative correlations between factor three (daydreaming) and factors one (identifying and distinguishing between feelings and bodily sensations), two (describing feelings) and four (externally-oriented thinking). This suggested that daydreaming may have literal theoretical congruity with the other aspects of the construct. To Taylor and his colleagues, there was enough data questioning the usefulness of the TAS for them to build a revised instrument.

Revised Toronto Alexithymia Scale. The Revised Toronto Alexithymia Scale (TAS-R, Taylor, Bagby and Parker, 1992) was constructed to reduce the limitations of the instrument. These limitations included: (1) a high correlation between the first two factors (difficulty identifying and distinguishing between feelings and bodily sensations versus difficulty describing feelings), (2) items assessing daydreaming were not theoretically correlated with other dimensions of the alexithymia construct, and (3) the domains of alexithymia (cognitive with one factor versus affective with 3 factors) were not represented equally in the compositional structure of the TAS. The TAS-R had a two factor structure: (a) the inability to distinguish and describe feelings as different from bodily sensations and (b) the reliance on externally oriented thinking. The two factor structure accounted for 25% of the total variance, notably less than that of the original TAS.

Twenty Item Toronto Alexithymia Scale. The TAS-R was not seen as successful in achieving the goals set for a revised version because its factor structure was not a good representation of the data from which it was derived (most likely due its accounting for only 25% of the variance). Consequently, another attempt at revision was conducted,

whereby seventeen new items were generated and added to the original 26 items. From the 43 questions, an analysis was conducted using archival data, with special attention paid to social desirability (as measured by the Marlowe-Crowne Social Desirability Inventory, SDI, Crowne & Marlowe, 1960) because social desirability was seen as the pitfall of the daydreaming factor of the TAS. Additionally, items were also analyzed for homogeneity of content with regard to the content domain of alexithymia (identifying feelings, communicating feelings, imaginal processing, and externally-oriented thinking) they were slated to assess, and were examined for inter-correlations. The items that survived these proceedings, were grouped into the 20-item, self-report questionnaire known as the TAS-20 (Bagby, Taylor and Parker, 1993). Items surviving final selection procedures were given to 965 undergraduate students. Factor analysis of the results followed using principal axis factoring, where a three factor, varimax rotated solution indicated the most variance, at 31% of the total variance.

Factor one included items that assessed the ability of an individual to identify feelings as well as the ability to distinguish between feelings and bodily sensations felt when emotionally aroused. This factor accounted for 12.60% of the total variance and 40.60% of the common variance in alexithymia scores. Factor two included items that reflect an individual's inability to communicate feelings to other people. This factor accounted for 9.63% of the total variance and 31.1% of the common variance in alexithymia scores. Factor three was reported to measure externally oriented thinking, and accounts for 8.75% of the total variance and 28.2% of the common variance in alexithymia scores.

Bagby et al. (1994) conducted a second investigation to ascertain whether or not a unidimensional factor structure would be more appropriate for their revised instrument. Results indicated that the three-factor model better represented the data of a new sample of 401 university students, as well as that of 218 adult psychiatric outpatients who had also taken the TAS-20 than did a unidimensional model. A two-factor pattern was also examined (where factors one and two were collapsed) to test goodness of fit for both samples. Again the three-factor model was superior for both samples because it accounted for more variance than the two-factor model. The two factor model was considered acceptable when compared to a four factor model, as adding another two factors produced only trivial increases in the total amount of variance.

Contradictory results were documented by Haviland and Reise (1996). They employed full-information item factor analysis to evaluate the factor structure of the TAS-20 across two discrete samples, 219 medical students and 204 chemically dependent inpatients. Three research questions were evaluated: (1) did the data fit the model identified by Bagby et al. (1994), (2) were the factor patterns similar across these groups and, (3) did the TAS-20 factors correlate with one another? Item response theory was used because of their belief that individual variables were not normally distributed, which leads to underestimates of factor loadings and overestimates of the number of significant dimensions. Neither sample resulted in a easily identifiable factor structure. The authors reported different three-factor structures for each sample using the full-information factor analysis. They also suggested that three factor solutions poorly fit the data using a

confirmatory factor analysis (this was done to compare to earlier studies and because the full-information technique was considered exploratory in nature.

Haviland and Reise reported results indicating that the three factors of the TAS-20 did not correlate with one another, supporting their theory that alexithymia was not a trait condition, but rather a defensive strategy against anxiety and depression, for which they proposed a model. Their data supported the theory that alexithymia as measured by the TAS-20 was multidimensional, and disputed the usefulness of a global severity score. Their recommendations included re-examining the factor structure of the TAS-20, tabulating scores for the subscales, and being very wary in using scores from the externally-oriented thinking subscale, as it does only a "fair job" in assessing the cognitive component of alexithymia.

Purpose of the Study

The purpose of this study was to examine the factor structure of the TAS-20 using an adequately sized college student sample. Previous studies have used both college students and clinical samples when investigating the factor structure of the TAS-20. It was also the purpose of this study to investigate and clarify the relationship between alexithymia and other well-defined constructs, including state depression, state/trait anxiety, state/trait anger, psychological mindedness, and need for cognition. As noted in the section on correlates of alexithymia, disagreement existed in the literature on the relationship between alexithymia and these variables.

Significance of the Study

Factor analyses of previous versions of the Toronto Alexithymia Scale have shown that the factors of the TAS accounted for approximately 30-40% of the total variance (Taylor, Ryan & Bagby, 1985; Bagby, Taylor & Atkinson, 1987; Haviland, Shaw, MacMurray & Cummings, 1988), which was a level that most psychological researchers would describe as unacceptable. Despite this, many citations identified the original TAS as the most robust and popular measure of alexithymia of its time (Taylor, 1992).

One of the aims of revising the TAS was to clarify the factors. It was also hoped that revisions of the TAS would lead to a decrease in the amount of error variance. Initial analyses of the TAS-20 indicated little improvement. This investigation used exploratory factor analysis instead of confirmatory factor analysis because defining the factor structure of a revised instrument was viewed as an exploratory problem. The TAS-20 factor structure was also investigated due to the relative recency of its publication, and to the relative lack of information defining its factors. Particular attention was paid to the percentage of variance accounted for, and the degree of agreement between factors identified. Simply put, this investigation was an exploration of the factor structure of the TAS-20.

As noted earlier, there has been disagreement about the relationship between alexithymia and other well known constructs. In addition to questions about alexithymia with respect to depression and anxiety, convergent and discriminant validity have been examined comparing global scores on the original version of the TAS to the Need for Cognition Scale and the Psychological Mindedness Scale (Bagby, Taylor & Parker, 1988;

Bagby, Taylor & Ryan, 1986). This study represented a unique contribution by comparing derived factor scores against other well established constructs (depression, anxiety, anger, need for cognition, psychological mindedness). Using derived factor scores adds to the exploratory nature of this investigation, and is expected to contribute greatly to the understanding of the construct.

Definition of Terms

Alexithymia: This concept was a hypothetical personality construct characterized by the following; (a) an inability to describe feelings, (b) the lack of a fantasy life (most notably lacking the ability to use imagination to cope with anxiety or overpowering emotion, (c) the inability to reproduce or recall primary process types of dreams, and (d) thought content that was marked mainly by a preoccupation with minute details of external events and/or bodily symptoms, a condition known as externally oriented thinking (Taylor, 1994).

Alexithymia was assessed in this study with the Twenty Item Toronto Alexithymia Scale (TAS-20, Parker & Taylor, 1993). The TAS-20 was noted in the literature to be the most frequently used instrument to assess alexithymia. The TAS-20 is a 20-item, self-report questionnaire, which had a range of potential scores from 0-100. A score of 61 or above indicated a positive diagnosis of alexithymia; a score of 51 or below indicates a negative diagnosis or no alexithymia. Bagby, Taylor and Parker (1993) reported established the cutoffs via consensual validation between independent interviewer ratings of alexithymia and scores on the TAS-20.

Need for Cognition: This concept was defined as a person's preference to engage in and enjoy complex thought. The short form of the Need for Cognition Scale (NCS, Cacioppo, Petty & Kao, 1984) consisted of 18 statements that were designed to assess a person's need for cognition.

Psychological Mindedness: This construct referred to a person's disposition and motivation to seek relationships between thoughts, feelings, and actions (Applebaum, 1973). The Psychological Mindedness Scale (PMS, Conte, Plutchik, Jung, Picard, Karasu & Lotterman, 1990) was a 45-item self-report questionnaire designed to measure whether or not the client is appropriate for dynamic psychotherapy, e.g. are they willing to introspect on their thoughts, feelings and behaviors.

Depression: For the purposes of this study, depression was defined as low mood or the loss of interest or pleasure in nearly all activities. Additionally, depressed persons were expected to experience changes in appetite, body weight, sleep, and psychomotor activity. Oftentimes there were reports of decreased energy, feelings of worthlessness or guilt, difficulty thinking, and sometimes suicidal ideation. The Beck Depression Inventory (BDI, Beck, 1978) was a 21-item, self-report questionnaire designed to assess depression severity in adolescents and adults who have been independently diagnosed as depressed. The BDI was a state instrument, which asked the examinee to consider how they felt during a seven day period when answering each question.

Anxiety: The concept of anxiety was conceptualized as a heightened state of autonomic arousal that was subjectively experienced as worrisome, with co-occurring feelings of apprehension and nervousness. Anxiety was considered to have state and trait

components. State anxiety was defined as transitory feelings of fear that most people feel occasionally, whereas trait anxiety was defined as a stable tendency of an individual to respond to a stressful situation with anxious behavior. The State-Trait Anxiety Inventory, Form Y (STAI, Spielberger, 1983) assessed both state and trait anxiety. The STAI was a 40-item, self-report questionnaire that measures state and trait anxiety, which could be administered in groups or individually, to adults or high school students.

Anger: The concept of anger was defined as a feeling of extreme displeasure, hostility, indignation or exasperation at someone (Berube, Neely, & DeVinne, 1982). Anger was conceptualized in this investigation in Spielberger's (1988) tripartite manner, where state anger (a temporary condition invoked by characteristics of the immediate situation), trait anger (more stable, dispositional style of reacting to a wider range of stimuli with angry responses), and anger expression [seen as anger-in (anger suppression), anger-out (the outward expression of anger), and anger-control (which is the person's ability to contain their anger)] contributed most to the anger construct. Spielberger's State-Trait Anger Expression Inventory (STAXI, 1988) was the instrument chosen to assess the components of anger. The STAXI was a 44-item instrument designed to assess state and trait anger as well as anger expression.

Research Questions

The following research questions were tested in this inquiry:

1. What is the factor structure of the TAS-20?
2. Is there a significant linear relationship between the psychological measures (State/Trait Anger Inventory, State/Trait Anxiety Inventory, Beck Depression

Inventory, Need for Cognition Scale, and Psychological Mindedness Scale) and the derived factor scores from the TAS-20?

Chapter 2

LITERATURE REVIEW

Opening Statement

The literature review section scrutinizes in more detail the definitions, ideas, theoretical underpinnings, constructs, discrepancies and deficiencies noted in the introduction. This discussion begins with a summary of the original observations of alexithymic behaviors, moves on to describe how an alexithymic person approaches interpersonal relationships, and discusses several different authors views on "primary" and "secondary" alexithymia. More detail is provided on the etiology of alexithymia, and the measurement of alexithymia. Measurement focuses specifically the Toronto Alexithymia Scale (TAS) in all three of its versions, as well as the factor analyses that have been conducted on those versions. The literature review section ends with a more in-depth examination of the correlates of alexithymia, including depression, anxiety, anger, need for cognition, and psychological mindedness.

Historical Background and Definition of Alexithymia

Some clinicians have noted that therapy with alexithymic clients tends to be dull or boring (Sifneos, 1973; Taylor, 1984). Alexithymia was defined here as occurring in persons who; (1) have difficulty identifying and describing feelings, (2) have trouble differentiating feelings from bodily sensations, (3) think in an externally focused manner, (4) have an inability to fantasize with subsequent deficits in daydreaming as well as night dreams that are noticeably deficient in primary process thoughts. Continued therapy with clients that promote a reaction of boredom in the therapist can place the therapist at risk

for doing harm to the client. Practicing therapy with clients that elicit counter-transference reactions of boredom in the therapy session must be addressed, otherwise a case of harm to the client could be made if therapists provide substandard counseling services to such clients. Although boredom and burnout among therapists was a topic addressed in the popular literature (Kottler, 1992), actual boredom with specific clients remained a taboo or guilt-ridden topic. Specific recommendations for therapy with alexithymic individuals were identified later in this paper. Emphasis remained on the point that alexithymic persons typified and displayed a series of behaviors that were much more complex than simply being tedious.

Systematic study of what was to become alexithymia began when Nemiah and Sifneos (1970) re-examined tape recordings of psychiatric interviews they had made over the preceding 15 years. Salient aspects of this work were listed as an inability in the person to express affect when it normally would have been expected. Instead, those persons exhibited a total unawareness of feelings or almost a complete incapacity to recount their experiences. Other aspects included a noticeable lack in the amount of fantasizing the clients were capable of producing. What was produced was a detailed, laborious report of the circumstances in the client's environment. These authors note that the "flat, lifeless, emotionally shallow quality of their productions not uncommonly makes these patients appear dull and boring," (p. 32). As indicated above, others have noted the boredom felt when working with alexithymic patients (Sifneos, 1973; Taylor, 1984).

The work of Nemiah and Sifneos led to Sifneos' (1973) introducing a formal label, *alexithymia* (which literally means a lack of words to describe mood or emotion) for the

characteristics they had depicted in the earlier publication. Psychodynamic theorists have produced evidence for the existence of alexithymic behaviors in the psychoanalytic literature long before the construct was introduced. These characteristics were formerly attributed to the description of the infantile personality (Ruesch, 1948), which was viewed as the excessive use of defenses against neurotic conflicts. Ruesch wrote, "Although both mature and immature persons tend to handle emergency situations with physical symptoms, the mature person reverts only temporarily to somatic expression, while in the immature personality this type of expression persists" (p. 142). Ruesch viewed the reliance on externalization of feelings as distrust, and the discussion of outside experiences as a manipulation. Therapy proceeded by challenging the client's "manipulation" through years of psychoanalysis. Taylor (1984) recommended that alexithymic patients were generally unresponsive to psychoanalysis or psychodynamic psychotherapy, and should be dismissed or referred out for other kinds of treatment.

The first contact Nemiah and Sifneos had with alexithymic clients occurred in 1964, when they expanded on work done the previous year by the French Psychosomatic School (Marty & de M' Uzan, 1963). The French had written about the tendency of their psychosomatic patients to think in a operative manner, which they denoted, *la pensee operatoire*. Nemiah and Sifneos (1970) published their findings from 1964, listing evidence that 16 of 20 psychosomatic patients had marked difficulty verbally expressing their emotions, difficulty with fantasy and imagination, and tended to use operatory thinking.

Alexithymia and Interpersonal Relations

Others such as McDougall (1985) became aware of the alexithymia construct and began to hypothesize about the effects of alexithymia on interpersonal relationships. McDougall hypothesized that alexithymic persons cannot understand others' emotional states and wishes in addition to being unaware of their own emotional states and wishes. She wrote that alexithymics have difficulty in comprehending what other's feel about them nor do they recognize what they mean (emotionally) to others. Practicality and reasoning were listed as the main strategies people with alexithymia use to conceptualize interpersonal relationships. McDougall also wrote that socialization norms and the misunderstanding of social rules contributed to the alexithymic person's tendency to relate to others in a pragmatic, affectless manner.

More recently, it has been suggested that interpersonal relationships with alexithymic persons may be marked by the inappropriate expression of negative affect. The ability of the alexithymic individual to experience negative affect has been supported (Berenbaum & Prince, 1993). They found that certain emotions like anger and disgust, may be commonly felt by persons with alexithymia. This finding was contrary to what early theorists observed in clinical descriptions of alexithymia, but received support in other investigations (Berenbaum & Irvin, 1996, Taylor, Bagby & Parker, 1994).

Further, Keltikangas-Jarvinen (1982) found that among offenders diagnosed with antisocial personality disorder, differentiation between violent and non-violent offenders was possible following a structured interview that focused on the presence or absence of alexithymia. Findings supported the hypothesis that alexithymic individuals act out their

anger due to an inability to fantasize or create mentally more legally appropriate methods of dispelling their anger. Conversely, offenders convicted of non-violent crimes were hypothesized to be able to remove the need to release anger from their offense, a hypothesis that also was supported by the results of the study.

A more recent investigation into anger expression among persons with alexithymia (Berenbaum and Irvin, 1996) explored anger-provoking behaviors. Results indicated high-alexithymia participants were more interpersonally avoidant and exhibited more nonverbal anger, but later described their lab experience as more pleasant, compared to low-alexithymia participants.

Similarly, Fukunishi (1994) reported that students scoring "high" on alexithymia scales were more likely to score highly on the MMPI Hostility scale compared to students scoring "low" on alexithymia scales. Fukunishi suggested that alexithymic persons may be highly prone to the expression of hostile feelings. However, Fukunishi was not able to support the hypothesis that alexithymic individuals tend to act out in a hostile manner.

Primary and Secondary Alexithymia

Prior to discussing the etiological theories about the genesis of alexithymia, another characterization commonly seen in the alexithymia literature will be discussed. Several authors have adopted the use of the qualifiers, "primary" and "secondary" when writing about alexithymia. The usage of these qualifiers is not universal, varying from author to author. Sifneos (1988) wrote that primary alexithymia is caused by one of many possible biological defects. These include, communication problems between the neocortex and the limbic system, and other problems which would hamper hemispheric

specialization. He attributed the cause of secondary alexithymia to four other etiological factors; (1) massive psychological trauma as an infant, (2) massive regression, (3) sociocultural factors, and (4) psychodynamic factors.

Gage and Egan (1984) defined primary and secondary alexithymia not in terms of causation, but in terms of alexithymia's relation to the person's physical health. They couch their discussion of alexithymia in somatizing patients. Primary alexithymia was viewed contributing to the development of physical illness. Secondary alexithymia was described in persons who use alexithymic language to discuss their physical condition. Gage and Egan support this by noting that physical complaints are treated more readily than psychological complaints. Gage and Egan's definition of secondary alexithymia suggests unconscious suppression of emotions for secondary personal gain, or what could more appropriately be referred to as emotional conversion.

Lesser's (1981) definitions of primary and secondary alexithymia were similar to Gage and Egan's. Primary alexithymia was described as a life-long, dispositional factor which could lead to psychosomatic illness. Secondary alexithymia was seen as the result of a primary medical illness or other stressor. Lesser and Lesser (1983) later warned that without further validation, calling a medically ill person alexithymic may be an overextension of the concept in an attempt to broaden its applicability. They thought the construct needed more empirical support before qualifiers like "primary" and "secondary" are used with alexithymia.

Etiological Theories Advanced to Explain Alexithymia

Theories of the causation of alexithymia have been advanced from the psychoanalytic, cognitive-behavioral, social learning, neurobiological and neuropsychological, genetic, and family systems schools of thought (Lesser, 1981). Although some dispute exists among individual theorists, most agree the interaction of two or more of the perspectives best describes the alexithymic personality and explains the appearance of alexithymia in diverse populations. The general systems theory of von Bertalanffy (1968) has been advanced as integral to future psychodynamic conceptualizations of alexithymia, which hints that further integration of ideas may follow. Notable overlap of ideas is found between the different schools of thought. A summary of these hypotheses follows below.

Psychodynamic theory. The psychoanalytic tradition has a rich history of interest in psychosomatic illness, the pursuit of which was the genesis of the concept of alexithymia. Early writings of Freud (1895) separated the actual neuroses (today's psychosomatic disorders, which were conceptualized as instinctual tensions due to a lack of sexual satisfaction) from the psychoneuroses (which were psychological conflicts that were considered treatable with psychoanalytic therapy). His later theory of signal anxiety (Freud, 1926) discarded the concept of actual neurosis, favoring instead the idea that panic attacks, hypochondriasis, etc. would eventually come to be understood as an ideograph of intrapsychic conflict. Followers of Freud adopted the drive-conflict model of psychopathology to psychosomatic illness, especially in regards to what are known as the

"holy seven" psychosomatic diseases (bronchial asthma, essential hypertension, peptic ulcer, ulcerative colitis, thyrotoxicosis, rheumatoid arthritis, and neurodermatitis).

Psychodynamic application of the interpretation and working through of conflicts for persons with psychosomatic illnesses was reported as unsuccessful. Although the drive-conflict model was useful for persons with classical psychoneurotic problems like conversion and hysteria, conflict-based treatment of psychosomatic illness was not experienced as effective. The inability of traditional psychoanalysis to treat psychosomatic problems was a distinct deficit in the usefulness of psychodynamic theory. Many dynamic hypotheses were advanced to attempt to explain how to remediate psychosomatic illness including, attachment theory, object relations theory, and self psychology. Little success in treatment or conceptualization was realized, leading critics such as Cremerius (1976) to question the validity of the whole construct of psychosomatic illness (Cremerius was especially critical of the social class effect he had noted in reviewing the literature).

While psychosomatic illness was not understood conceptually in psychodynamic terms, persons with (what would later be known as) alexithymic behaviors continued to be observed. Early psychoanalytic perspectives, (Ruesch, 1948) placed the genesis of alexithymia in the Oedipal stage, where the individual was thought to have suffered a traumatic experience, leaving the person with a punitive superego. The effect of this rigid superego was that it allowed the person to show a pseudo-maturity during casual conversation, but this facade of maturity decompensated with more in-depth inquiry. This description was very consistent with the current conception of an alexithymic, who communicates in a superficial manner but is unable to label or express emotion.

Krystal (1988) cited trauma as the primary cause of alexithymia. The trauma model suggested that disruptions in the normal occurrence of the processes of differentiation, desomatization, and verbalization of emotion, hindered the ability of the individual to use emotion as a signal to themselves. The above noted processes were thought to occur generally in the latency period, which incidentally was also the time period when affect tolerance was thought to form. The ability to use emotion as a signal for bodily arousal and the capacity to tolerate affect join in adolescence, enabling the person to mourn, and to drop infantile self- and object-representations.

More behavioral conceptualizations of emotion and bodily arousal would posit that emotion is the result of the rational interpretation of bodily arousal. Psychodynamically, this was a very conservative estimate concerning children's reaching emotional milestones. For example, Mahler (1975) described mourning in 18 month to 24 month old children when she outlined behavior in the practicing subphase of separation-individuation process. Catastrophic trauma was also thought to result in a regression of affective function, potentially leading to an alexithymic personality.

A more recent psychodynamic model of psychosomatic illness and disease was known as psychobiological dysregulation (Taylor, 1992). This model was based on general systems theory, wherein the organism was conceptualized as a continuum of hierarchically arranged subsystems which become more and more complex as one moved from cells to tissues and so on until the level of society was reached (von Bertalanffy, 1968). Psychobiological dysregulation applied the cybernetic model to illness and disease, where physical health was interrupted when feedback loops that self-regulate individual

systems were broken or otherwise altered. Interruptions were said to create a domino effect, producing dysregulation at more levels of bodily functioning, potentially leading to changes in structure.

Psychobiological dysregulation differed from earlier models in that there was no contending with the idea of mind versus body, as all were placed on a continuum. Second, there was no need to distinguish between diseases, all were seen as influencing the regulation of the system. Lastly, all illness was viewed psychosomatically, with no breaks between traditional medical and psychiatric disorders (Taylor, 1992). All potential factors were reviewed when a disorder was diagnosed. The probability that a presenting problem manifested only psychological sequelae and psychological etiology was remote. This approach was viewed as a meta-theory, encapsulating all areas of dysregulation.

An enduring hypothesis from theories of the mother-child dyad was that the family in general (but mainly the mother), could establish a pathological ego-ideal, which would increase the likelihood of psychological or physical difficulties in the future. As traditional psychodynamic views of alexithymia sometimes accused the quality of mothering as being the impetus behind the alexithymic person's inability to identify or describe feelings, Berenbaum and James (1994) attempted to assess the association between alexithymia and retrospectively reported aspects of the person's childhood environment. Alexithymia was found to be associated with discomfort and ambivalence over the experience and communication of emotion. Correlational support was given to the hypothesis that individuals from homes where they were not permitted to act openly and express their feelings directly, or in which they felt emotionally unsafe, might be at increased risk of

developing alexithymic traits later in life. The best predictor of alexithymia was found to be growing up in a family in which there was little positive communication. This study provided evidence for family influence in the alexithymia construct, and provided evidence for the learning of alexithymic behaviors.

Family Systems theory. Berenbaum and James (1994) theorized that one factor which could influence the development of alexithymia in adulthood was the child's comfort level with experiencing and expressing emotion. Children from environments where they felt physically and emotionally unsafe or insecure as well as environments in which the expression of emotion is discouraged, might be more likely to exhibit alexithymic behaviors as adults. Coping with emotional states was predicted as difficult at best, and experiencing emotions was predicted to be unpleasant. Difficulties were postulated as resulting from the lack of appropriate role models, which would have impeded the vicarious learning of emotional coping skills. Socially acceptable expressions of emotion were less likely to be learned, possibly leading to an ambivalence of or even discomfort in expressing emotion. In support of family systems approaches to alexithymia, evidence exists that shows alexithymia occurs in families across one generation (Berenbaum & James, 1994; Lumley, Mader, Gramzow & Papineau, 1996).

Cognitive theory. Martin and Pihl (1985) introduced the construct of alexithymia to the literature on stress. They noted that the alexithymia construct could represent an important advance is stress research. They reported that alexithymic characteristics have a greater prevalence in individuals with stress-related illnesses when compared to other patient groups and normal controls (Martin & Pihl, 1985). Alexithymia's relationship to

somatic illness in clinical and non-clinical samples was seen as an important factor for the inclusion of alexithymia in stress research.

Martin and Pihl (1985) hypothesized that alexithymic defects were responsible for the appearance of psychological conflicts when persons were subjected to interpersonal stressors. Elaborating this point, they postulated that in the presence of a stressful event or situation (interpersonal or not), alexithymic characteristics in an individual would influence responses in specific ways. It was cautioned that alexithymic characteristics may prevent an individual from coping effectively with the stressor, due to a lack of affective awareness, which would hamper the identification of a particular event as stressful. Martin and Pihl noted effective coping could also be jeopardized because of the tendency to use action as a primary, generalized behavior response.

Martin and Pihl contended that alexithymic characteristics should augment or amplify somato-visceral arousal in response to perceived stress. It was proposed that the influence of alexithymic characteristics on the somato-visceral response will exacerbate and promote the development of a stress-related disorder *beyond* what would normally be expected. Eiden (1994) warned that stress is related to perception. Alexithymia may influence a person's ability to diffuse a stressful situation, but the perception of the situation as stressful was viewed as independent of the person's status as an alexithymic.

Taylor (1992) discussed why alexithymia was more than an overuse of defense mechanisms against anxiety or depression. He advanced the idea that alexithymics displayed some evidence of emotion because they were able to verbalize an emotion word they thought was correct for the situation. Martin and Pihl (1985) wrote that alexithymia

was more than an overuse of repression and denial. In their hypothetical comparison of alexithymia to a repressive coping style, it was suggested that despite superficial similarities, the two constructs are different. Similarities include the cognitive lack of subjective awareness of affect, and physiologically, an increased arousal level. The major difference was behavioral in nature, alexithymic persons lacked affective expression, whereas persons with a repressive coping style actually had increased affective expression.

Newton and Contrada (1994) used the Marlowe-Crowne Social Desirability Scale (MCSDS; Crowne & Marlowe, 1960) and Taylor Manifest Anxiety Scale (TMAS; Taylor, 1953) to investigate repression, as the authors note that contemporary research hypothesizes that repressors score at high levels on the MCSDS and at low levels on the TMAS. High anxious scorers had significantly greater alexithymia scores than did either low anxious or repressing individuals. Alexithymia was found to be most similar to the emotional, sensitizing style of high-anxious subjects, rather than the emotionally avoidant style of repressors. The authors postulated that a major difference may be that the alexithymics can understand that they experience emotional upset and negative emotional states, whereas repressors convince themselves that they are not and do not despite conflicting data from physiological and behavioral monitoring. They continued to speculate that on the TMAS responding positively to the lack of emotional control may indicate alexithymia. Conversely, repressors were unwilling to give up any sense of control and would potentially deny the lack of emotional control.

Neurobiological/Neuropsychological theory. Neurobiological theory has been used to explore differences in brain structure (Hoppe & Bogen, 1977) specifically in

hemispheric specialization. Their findings led to speculation that alexithymia was the actually a "functional commisurotomy" as alexithymic persons were noted to be very much like split-brain patients. Further neurobiological research was predicted in the areas of hormonal concentrations and neurotransmitter anomalies which were expected to provide information needed to more fully understand the etiology of alexithymia (Sifneos, 1988). This research was not conducted as of this writing.

Neuropsychological testing has been used to investigate the hypothesis that alexithymia reflects deficits in the cognitive capacity to process and modulate emotions (Sifneos, 1988; Taylor, 1992; Parker, Taylor and Bagby, 1993). Support for the deficit hypothesis exists across several methodologies, eg. using a modified Stroop task (Parker, Taylor and Bagby, 1993), and using more standard means of psychological assessment to test the expression of and the ability to recognize the facial expression of emotion (McDonald and Prkachin, 1990; Parker, Taylor, and Bagby, (1993). Generally, it was concluded that alexithymia was a trait component of personality, which was termed, "primary alexithymia." Support for the trait nature of alexithymia is documented by stable alexithymia scores over time periods of five days (Wise, Mann and Randell, 1995) and one year (Salminen, Saarijarvi, Aairela and Tamminen, 1994) compared to score decreases for constructs that were considered more state-like (depression and psychological distress).

Sociocultural theory. Some authors have written that alexithymia was nothing more than a sociocultural phenomenon. While Kirmayer (1987) conceded that it was possible that there were people who could not connect emotions with dreams, fantasies, and imagination, he concluded that these people must suffer, "very pervasive

developmental defects since such capacities emerge in infancy and early childhood and are probably necessary for most general cognitive functioning" (p. 122). Kirmayer also wrote that the whole concept of alexithymia was grounded in two clinical observations. First, many patients with somatic symptoms of supposed psychosomatic origin lacked insight into the psychosocial nature of their problems, and were unimaginative and unexpressive. Second, Pennebaker's (1988) findings that psychotherapy relieves tension and reduces later distress led researchers to believe that a lack of emotional expression was a cause of physical illness. Kirmayer wrote that these clinical observations were, "provocative but remain largely unconfirmed" (p. 120). He proposed that alexithymic behavior was the result of, (a) a low level of self-consciousness, (b) a reticent or restrained style of verbal and non-verbal affective expression, (c) guardedness or denial of inner conflict owing to concern about deviant emotional experiences, (d) use of metaphors unfamiliar to the interviewer, and (e) associating distress with social or somatic events rather than intrapsychic emotional experience. He questioned whether or not the whole construct persisted beyond the psychiatric and/or medical interview (both of which are non-egalitarian in nature), or if it was driven by the state of being in physical pain. It was Kirmayer's view that alexithymia was the outcome of the unequal social interaction found in the psychiatric interview. The asymmetric context of the interview was thought to lead a patient (that was unaware of the "patient" role in an introspective monologue) to assume a defensive, alexithymic stance.

Borens, Grosse-Schulte, Jaensch, and Kortemme (1977) also criticized the early work in alexithymia for soliciting a defensive stance from the interviewee. They wrote

about their astonishment at the atmosphere which pervaded the interviews conducted by de M' Uzan and Nemiah and Sifneos. Psychosomatic patients were forced to undergo an "odyssey" of interviews in a psychiatric hospital following a referral from their general practitioner. Kirmayer concurred, citing a comment made by a blue collar worker during an introspective monologue conducted by de M' Uzan. The worker told the impassive de M' Uzan, "You're a strange one, eh?" (p. 126). Kirmayer warned that if the doctor was perceived as insensitive to somatic concerns, the patient would discuss emotion even less.

Kirmayer regarded a healthy suspicion of authority among the lower socioeconomic classes in North America as one of the major reasons they are over-represented in the alexithymia literature. When the clinician was a cultural outsider, "he may not be able to read the social context to supply the information absent in speech and may miss the implied parts of speech which then disable an eloquent narrative into a terse commentary on the self" (p. 127).

These views of alexithymia were subsequently tested by Parker, Taylor and Bagby (1989). They criticized earlier work for using scales of dubious reliability and validity, and used the original version of the Toronto Alexithymia Scale (TAS) to measure alexithymia in their investigation. The purpose of their study was to re-evaluate the relationships between alexithymia and the variables of age, gender, education, socioeconomic status, and intelligence in a normal adult sample. Subjects included 101 males and females recruited from public transportation lounges, who completed a demographics sheet known as the Blishen Index (Blishin, Carroll & Moore, 1987), the TAS, the vocabulary subtest of the Shipley Institute of Living Scale (Zachary, 1986) and the Standard Progressive

Matrices-Short Version (Raven, Court & Raven, 1977). Both the Shipley and Raven's Matrices were used in an attempt to measure intelligence in a culturally fair manner. Chi square analyses were performed to check for differences in inclusion across gender, resulting in non-significant findings. Separate regression analyses across demographic categories and intelligence scores yielded also non-significant results. This investigation supported the hypothesis that TAS measured alexithymia was unrelated to age, gender, educational level, socioeconomic status, vocabulary skills, and general intellectual ability. No direct predictions were made regarding alexithymia and sociocultural variables, but other researchers were warned about reflexivity and the possibility of generating a self-fulfilling prophecy.

Sociocultural theorists hypothesized that alexithymia was a behavioral artifact resulting from differences in education and financial status across social and economic classes. That hypothesis was evaluated in the more recent work of Kauhanen, Kaplan, Julkunen, Wilson, and Salonen (1993). These authors investigated 2,682 Finnish adult males for TAS defined alexithymia, with the purpose of examining whether alexithymia was related to social relationships, and whether alexithymia varied by socioeconomic factors. Using a backward elimination procedure, step-wise linear regression yielded a model with education, income, occupational status, total social contacts, and marital status as statistically significant independent predictors of alexithymia. Special note was made of the increasing gradient of alexithymia as social class decreases. The authors criticized the alexithymia construct for pathologizing lower class persons, who may not have utilized the

expressive style of interaction found in highly educated persons, whom they denoted as the "Western Elites."

Final conclusions were that social environment of childhood, especially education, seemed to have an independent effect on how people express their emotions. Alexithymia was accounted for by specifying the conditions of social context during childhood, as they thought the conditions of childhood began the shaping process that governed interactions for the rest of an individual's life, an idea not unlike that postulated by McDougall (1985) from the psychodynamic school (alexithymia originates in traumatic relationships of early infancy and childhood, where the family milieu may consider it weak, foolish, or even dangerous to express emotion, and may condemn either the psychological or physical aspects of feeling states.

Heritability. Genetic theory has been cited as a potential contributing factor to the manifestation of alexithymia. Only one study examined the occurrence of alexithymic characteristics in 15 monozygotic and 18 dizygotic twins. Heiberg and Heiberg (1978) designed a 22 item semi-structured interview and had an independent psychologist administrate it to all participants. Notably, only eight of the 22 questions referred directly to alexithymia and the interviewer was kept blind to the alexithymia questions. Separate raters were used for scoring, who had no knowledge of twin zygosity. The results indicated a significantly higher degree of total variance in the dizygotic twins, pointing to possible genetic influence in the manifestation of alexithymia. However, insufficient sample size, significant skew, and kurtosis problems limited the usefulness of the data (Heiberg & Heiberg, 1978).

Alexithymia in the Context of Emotion Theory

Buck's prime theory of emotion (1985) provided a theoretical basis for alexithymia that has been cited by other authors as useful in conceptualizing alexithymia. This theory represented an integrated approach to the concepts of motivation and emotion, combining three major approaches to emotion theory. The first considered approach is the idea of primary affects, encapsulating three assumptions; (a) emotion is based on neurochemical systems in the central nervous system, (b) these systems evolved to meet the needs of the particular species, and the systems activity can be modified by learning. These assumptions date to Darwin and continue to be influential today. The second approach attempts to explain emotions based on the subjective role of cognition interacting with physiological factors, which dates back to the James/Lange theory of emotion. Lastly, the idea that central nervous system mechanisms are changed by emotional stimuli which can t produce subjective emotional experience itself was first advanced by Cannon.

These theories have been assembled into a meta-theory, which is considered to be a more comprehensive way of understanding motivation and emotion. For Buck, PRIMES represents PRImary Motivational/Emotional Systems which are thought to evolve with respect to adaptation and homeostatic needs, to involve internal active processes, to require either internal or external stimuli to activate, to be located in innate mechanisms of the sub and paleocortical areas of the brain, and to serve a specific function for the species.

Primes are said to represent an irreducible minimum that is the biological basis for the systems and an active internal process that requires external stimuli to reach

expression. It is reasoned that primes are the systems of behavior that species use to respond to challenging stimuli in adaptive ways. Primes range in levels of complexity, from reflexes and fixed action patterns to effectance motivation, which is the need or desire to understand our world. Primes are then viewed as a hierarchy in which learning, cognition, and environmental factors play an increasingly large role.

Each prime is said to be linked to a physiological system. Variations exist in the arousability of these systems, which functions to limit the expression of psychophysiological, subjective, and/or overt responses of emotion. Buck believes that motivation is present in the primes, as potential energy is in a coiled spring. Motivation is the potential for the activation of the specific prime responses. Information from the primes is then used in higher levels of the nervous system. From the primes then motivation is the potential for behavior that is programmed in the neurochemical structure of the brain whereas emotion is the realization of that potential. This view then postulates that emotion is always occurring, differing from the view that emotion only occurs when motivation is interrupted. Emotions such as satisfaction or satiation become accustomed to, but in this theoretical framework, are part of the continuous, ever occurring, cybernetic loop.

Buck postulates the there are three different routes by which the realization of emotion can occur. He terms them Emotion I, II, and III. Emotion I influences bodily functioning via the endocrine, immune, and autonomic nervous systems in an attempt to maintain homeostasis. For example, environmental stressors such as acute heat are reacted to by withdrawal in the form of a reflex. Emotion II is the external realization of

motivation and emotion, or more simply, the overt expression of behaviors between members of the same species for communication. Emotion III is the internal representation of motivational-emotional states, which is limited to species that cognitively can represent their own reality.

Buck notes that there are differences in person's ability to use emotional information, especially that social learning has been found to influence the expression of all three types of emotion. Further, defense mechanisms like repression are thought to cause a person to rely on only Emotion I, as Emotion II and III are suppressed unconsciously by the ego. Martin and Pihl (1985) hypothetically compared alexithymia to a repressive coping style, suggesting that despite superficial similarities, the two constructs are different. Both repressors and alexithymics were thought to lack subjective awareness of affect, and both were thought to have increased physiologic responding to stress. Martin and Pihl viewed the difference between alexithymics and repressors as being one of deficits, where alexithymics have a deficit in both expression of and awareness of affect (Emotion II and III), and repressors are only unaware of the affect (Emotion III). For example, in the presence of a stressor, both would show a decrease in cognitive awareness and a concurrent increase in physiological responding. The repressor would also show increased behavioral expression of affect, while the alexithymic will not show affect behaviorally, hence the difference in interpersonal communication. Other emotion theorists have advanced similar theories to account for the development of alexithymia (Dodge & Garber, 1991; Lang, 1984).

Measurement of Alexithymia

Early, observer-rated questionnaires. Taylor, Bagby, Ryan and Parker (1990) wrote that one method of ascertaining validity for a construct was through the development of an instrument that measured the construct. Alexithymia originated more than 25 years of clinical observation, from which many behavioral descriptors were generated. Taylor was addressing not only the validity of the construct, but also the operationalization or instrumentalization of the construct, which was crucial for recognition as an entity or alternately even a set of behaviors that can be measured. The first step towards standardized measurement of the alexithymia construct was the development of an interviewer-rated questionnaire that would assess alexithymia with some degree of reliability. That questionnaire was the Beth-Israel Hospital Psychosomatic Questionnaire (BIQ; Sifneos, 1973).

The BIQ was developed by Apfel and Sifneos (1979) following Sifneos' frustration with attempting to document prevalence data (Sifneos, 1973) about the behavioral characteristics he had named alexithymia (Sifneos, 1970). The questions on the BIQ were originally used by psychiatrists to compare patients responses to the loose constellation of behaviors denoted as alexithymia. The questionnaire contained 17 true/false style questions, of which 8 were considered "key' in sorting out the alexithymic attributes. A positive rating for six or more of these eight items was considered to be in the alexithymic range. In the initial sample, 25 psychosomatic patients were compared with 25 controls, with results focusing only on grand totals for both the psychosomatic and control groups. Anecdotal support for the instrument was related in the article, based on the clinical

experience of Sifneos. No further statistics were computed in this initial article. Since that time, the BIQ received moderate attention, and was found to have a factor structure congruent to the theoretical domains of alexithymia (Apfel & Sifneos, 1979). Others have noted the internal consistencies of the derived factor scales were generally considered poor (Gardos, Schniebolk & Mirin, 1984). The issue then became whether or not the BIQ was reliably sampling the domains of alexithymia, especially after it was learned that inter-rater reliability was poor, because of its dependence on experience, style, and biases of the interviewer (Lolas, de la Perra & Aronson, 1980; Taylor, Doody & Newman, 1981).

Structured interviews for assessing alexithymia. Krystal, Giller and Cicchetti (1986) designed the Alexithymia Provoked Response Questionnaire (APRQ), based on the questions of the BIQ, but administered as a structured interview. This scale also consisted of 17 items that the interviewer asked, carefully avoiding the use of affect laden words. The goal was to assess the person's capability in using affective language, while visualizing themselves in a variety of stressful situations. According to Krystal et al., the APRQ has good inter-rater reliability and positive correlations with the BIQ. However, other measurements of validity have not been conducted with the APRQ as of this writing.

Projective techniques for assessing alexithymia. McClelland, Brown and Kelner (1991) listed two reasons why Murray's Thematic Apperception Test (TAT, 1943) was an especially attractive method to measure alexithymia. First, the TAT was designed to reveal unconscious material, based on the assumption that important material often lies beyond conscious awareness. Second, imagination was drawn upon heavily with the TAT and lack of imagination was a hallmark characteristic of alexithymia. The use of projective

tests to measure the alexithymia construct has some drawbacks, which may explain why the TAT was rarely used to assess alexithymia.

The TAT was a projective test consisting of 30 cards. Murray recommended that 20 of the 30 cards be given to each examinee, in two sessions of ten cards each. Murray's recommendation of 20 cards over two sessions has been narrowed for clinical and research use. Current clinical practice is to give approximately ten cards in one session when using the TAT. Keiser and Prather (1990), in their review of ten years of TAT research, noted that some studies use only one card, and most studies did not follow Murray's recommendation of 20 cards over two sessions.

Lundy (1988) explained that for the past 40 years, the TAT has been one of the most used personality assessment devices. Piotrowski and Keller (1984) found that clinical program directors mentioned the TAT most frequently as the projective measure with which a doctoral candidate should be familiar. Lundy observed that advocates of the TAT claim it was useful and valid, while critics discourage its use. Lundy found that the major reason for poor success with the TAT was the conditions under which the TAT is administered. The controversy over the clinical use of the TAT continued as of this writing.

In their ten year review of the TAT research literature, Keiser and Prather also found problems with validity and reliability of the TAT. Primarily, these impediments occurred because researchers did not clarify what TAT they are actually using, as a wide range of stimulis materials was accepted under the title TAT. Stimulis cards were so varied that generalization from one study to another or to clinical practice was hardly

possible. Further, many studies reviewed did not list what cards they had used. Only 26 of 66 studies reviewed listed the specific cards they used from Murray's sequence. The actual number of cards given, as well as agreement between studies over cards to be given, was very low. To partially rectify this problem, Keiser and Prather called for clear labeling of procedures and materials used. Vane and Guarnaccia (1989) said the TAT and psychodynamic theory were viewed as unscientific, because both are not empirically derived or nor are they able to be subjected to instrumental research. Though the value of the indirect method of collecting data with the TAT was undisputed, and praised by Abramson et al. (1991) for assessing alexithymia, little of the research in alexithymia assessment uses the TAT.

There are two major reasons why projective measures such as the TAT were not used to measure alexithymia more frequently. Specifically, the TAT was time consuming to administer and score, and its use required a qualified examiner. Parenthetically, it should be noted that the technique for scoring the TAT when looking for alexithymia was much simpler than its scoring for traditional applications. Scoring for alexithymia involved keeping a tally of the number of affect words used by the individual in their imaginative story divided by the total number of words in the story. (Taylor, Doody & Newman, 1981).

Acklin and Bernat (1987) proposed the study of alexithymia using the Rorschach comprehensive system. They constructed a Rorschach alexithymia index from these Exner categories: (1) low response productivity (R) and; (2) low human movement (M), both to correspond with the fantasy component of alexithymia; (3) restricted affective response

(low weighted sum C) and; (4) poorly integrated affect (low FC), both to correspond with the affective dimension of alexithymia; (5) concrete cognition (low blends); and (6) perceptual stereotypy (high lambda), both to correspond with the cognitive/perceptual component of alexithymia; and (7) deficient ideational and affective assets Low EA), which assesses ability to tap adaptive resources.

Participants included 33 low back pain clients of a multidisciplinary pain control and rehabilitation program, 210 depressed individuals, and 200 persons with mixed personality disorders. Following a series of descriptive statistics and Chi square procedures, the authors concluded that this preliminary research indicated that persons with high lambdas, especially when associated with ambitence and low EA are likely to be alexithymic. Limitations to this investigation were duly noted including, a small sample size of low back pain clients and the absence of matched controls. Despite these limiting factors, Taylor and Bagby (1988) reported the Rorschach Alexithymia Index appeared valid but recommended further replication.

The Objectively Scored Archetypal Test with nine items, (SAT9, Cohen, Auld, Demers, & Catchlove, 1985) was derived from the work of Gilbert and Yves Durand (1969; 1970), who had attempted to quantify symbolic processes. This test purported to assess the use of fantasy of symbolic function to relieve anxiety, a function hypothesized to be lacking in alexithymic persons. Participants were directed to create and illustrate a myth containing nine items (a fall, a sword, a refuge, a devouring monster, something cyclical that turns or progresses, a character, water, an animal, and fire). This illustration was to be integrated to the participants best ability. Persons paralyzed by anxiety or

alexithymia were postulated not to be able to integrate their illustrations. The test was scored using Cohen's (1983) system, which was correlated with the scoring system for the AT9 (Gilbert, 1969) producing a .91 correlation between the two systems. Additionally, inter-rater reliability of .93 was demonstrated. Overall correlations with the BIQ but not with the MMPI-A were described.

Self-report measures of alexithymia. The Schalling-Sifneos Personality Scale (SSPS, Apfel & Sifneos, 1979) and its revision, the SSPS-R (Sifneos, 1986) were self-report measures of alexithymia. The original instrument was found to have extremely poor internal consistency, reflected by low mean inter-item correlation coefficients, and low Cronbach's alpha coefficients. The original SSPS suffered the criticism that it was not adequately sampling the theoretical domain of the alexithymia construct. The SSPS-R has been criticized in the same way, as a measurement-based approach to building the instrument was not utilized, the issue cited as causative for the problems of the original version (Bagby, Taylor, Atkinson, 1988).

Alexithymia has been assessed with the Minnesota Multiphasic Personality Inventory, not surprisingly with a scale known as the MMPI-A (Kleiger & Kinsman, 1980). The MMPI-A was created using correlations between the BIQ and MMPI, following the administration of both to 100 hospitialized respiratory patients. The resulting scale was made up of 22 items, which had demonstrated a 82% accuracy in discriminating alexithymic from non-alexithymic persons, as previously determined by the BIQ. The authors noted that the MMPI-A lacks face validity, however they suggested that it measures a pervasive sense of denial, which has ben discussed as a key element of

alexithymia. This scale has been criticized for having the same limitations as the SSPS and SSPS-R, and may have the additional problem of being strongly biased by social desirability (Taylor, Bagby, Ryan & Parker, 1990). Use of this instrument requires caution as it may not generalize beyond the population it was normed on.

Toronto Alexithymia Scale. Bagby, Taylor, Atkinson (1988) claimed that other instruments purporting to measure the alexithymia construct were not able to withstand the scrutiny of contemporary standards of test construction. Limitations of the SSPS, MMPI-A, and APRQ led them to construct their own self-report questionnaire that would meet the requirements of construct validity. This questionnaire, known as the Toronto Alexithymia Scale (TAS, Taylor, Ryan, & Bagby, 1985), was shown to be reliable, valid, and internally consistent, with both clinical and non-clinical samples (Bagby, Taylor, & Atkinson, 1987), (Taylor, Bagby, Ryan, Parker, Doody, & Keefe, 1988), and (Bagby, Taylor, Parker, & Loiselle, 1990). The 1988 reference established cutoffs of 74 and above for alexithymic individuals and 62 and below for non-alexithymic individuals (possible scores range from 0-130). Taylor continually refined his instrument, in an attempt to find what the most critical factors were for identifying alexithymia.

The Revised Toronto Alexithymia Scale. These continual refinements produced the TAS-R (Taylor, Bagby, & Parker, 1992) or the first revision of the Toronto Alexithymia Scale. The TAS-R was shorter than the TAS by three questions (23 vs. 26 questions) and the factor structure was simplified from four to two. The first factor was a combination of, "the ability to distinguish between feelings and the bodily sensations associated with arousal and the ability to describe feelings to others." Factor two was,

"externally oriented thinking." Questions assessing the imaginal processes domain were dropped because of potential bias from social desirability. The two factor structure was generated by testing a sample of 965 college undergraduates, where 25.1% of the total variance was accounted for. Internal consistency was demonstrated at r = .82 using Cronbach's alpha, and inter-item correlation was r = .16, indicating acceptable item homogeneity. Removing questions dropped the range of scores to 0-115, and lowered the positive diagnosis of alexithymia to 66 (with non-alexithymics scoring 56 and below).

Twenty Item Toronto Alexithymia Scale. Subsequent work made it apparent that a two factor structure was not a sufficient representation of the data, meaning that the TAS-R did not compare favorably to the content domains established for alexithymia by Bagby et al. (1993). The TAS-R was further revised, eventually paring the total number to 20 questions. This focusing of the questions helped Taylor to generate the three factor structure for his third version of the TAS, known as the Twenty-Item Toronto Alexithymia Scale (TAS-20; Bagby, Taylor, & Parker, 1993), which had a range of 0-100. New cutoffs were suggested by Bagby, Taylor and Parker (1993) with the positive diagnosis of alexithymia lowered to 61, and the positive diagnosis of not alexithymic lowered to 51 and below.

By recalculating the data derived from the work on the TAS-R, Taylor (1992) was able to claim that the TAS-20 is internally consistent (Cronbach's alpha = .81) and reliable in a test-retest format r = .77. Convergent validity has been shown via comparison to several scales which measure individually the factors that make up the alexithymia construct. The three factor structure of TAS-20 was theoretically congruent with the

alexithymia construct (as proposed by Taylor in 1993). Factor one was denoted "difficulty identifying feelings", factor two was denoted "difficulty describing feelings to others", and factor three was denoted "externally-oriented thinking." All items assessing daydreaming and other imaginal activity were eliminated because they were not theoretically consistent with the other facets of the alexithymia construct, and because, "several investigators observed a social desirability response bias for the daydreaming items and/or a high potential for subjects to misinterpret the intended meaning of these items" (p. 14).

Factor analyses of the TAS. The TAS was the subject of several factor analyses, which will be described below, followed by the only TAS-R factor analysis (analyses of the TAS-20 are described in subsequent sections on depression and alexithymia). Agreement over what the factor structure should be for the instrument has not always been obvious or forthcoming, prompting some disagreement in the literature.

Taylor, Ryan, and Bagby (1985) performed the initial factor analysis on the TAS when they introduced the instrument within this publication. The TAS was developed with the goals of maintaining theoretical congruence with the alexithymia construct, independence of social desirability response bias, and internal consistency. These goals were noted limitations in other alexithymia instruments discussed earlier (SSPS, SSPS-R, MMPI-A, etc), but were used to guide item selection in the development of this instrument. Five content areas discerned from the alexithymia research were also used to focus item selection. Items (41) were either created or taken from existing instruments, randomized and rewritten where necessary for uniform style and acceptability to the Likert format. Items that loaded significantly on factors (after factor analysis with 542

participants) related to the construct and had sufficient item-total correlations were kept and subjected to a second factor analysis, which was also conducted on 542 undergraduate college students. A four-factor solution accounted for 31.8% of the total variance. Factor one, accounted for 12.3% of the variance was listed as the ability to identify and describe feelings and to distinguish feelings and bodily sensations. Factor Two, represented 7.0% of the variance, concerned the ability to communicate feelings to other people. Factor three, accounted for 6.3% of the variance, was the daydreaming factor. Finally, factor four accounted for 6.1% of the variance and reflected a preference for focusing on external events. Much future research was proposed, attesting to the heuristic value of the instrument.

Bagby, Taylor, and Atkinson (1987) evaluated and compared the reliability and validity of the TAS, SSPS, and MMPI-A, with the objective being the pursuit of internal consistency data, correlations across measures, replication of factor structures, sensitivity to somatic symptoms, and independence of socially desirable responses. It was suggested that the TAS was psychometrically superior to the SSPS based on peripheral information concerning psychometric adequacy (tests of sphericity, sampling adequacy, and the anti-image co-variants matrix). The TAS was found to have a factor structure similar to the one noted directly above (Taylor et al., 1985) and accounted for 38.8% of the variance (Bagby, Taylor, and Atkinson, 1987).

Haviland, Shaw, MacMurray, and Cummings (1988) conducted a factor and item analysis of the TAS to examine correlations between the TAS score and depression as measured by the Beck Depression Inventory (BDI). Substance abusing persons were

tested, notably in this investigation 125 consecutive male alcoholics, the majority of whom had been sober between 1 and 21 days. All but one participant received a diagnosis of substance abuse, which varied in severity across clients. The sample was considered heterogeneous across racial and ethnic parameters. Following a factor analysis, extraction and rotation procedures confirmed that a three factor solution best fit the data. This factor structure accounted for 35% of the variance using the varimax rotation procedure. Item analysis showed coefficient alphas of 0.68 for the TAS, with eighteen items correlating at 0.15 or higher. TAS and BDI scores were found to correlate moderately, at $r = 0.39$, $p < 0.001$. Haviland et al. conclude that the TAS appears to be reliable and valid for measuring alexithymia, but note that the TAS may be a more useful instrument if broken up into three or four subscales. The authors findings replicate those of earlier research wherein alexithymia was found to correlate moderately with depression. Explanations were given including: (1) alexithymia was a predisposing factor for depression, and (2) alexithymia was a defense against depression.

Loiselle and Dawson (1988) examined the construct validity of the TAS by asking 333 students to complete the TAS and other measures dealing with patient self-disclosure and patient self-consciousness. Confirmatory factor analyses describe a four factor solution as the best fit for the data. Following Varimax rotation, all items were found to contribute adequately, resulting in a solution that accounted for 46% of the total variance. The authors concluded that the TAS is internally consistent and yields a 4-factor structure very similar to that reported in previous studies (Bagby et al., 1988; Taylor et al.,1985).

Morrison and Pihl (1989) conducted a factor analysis to examine whether or not the TAS and the SSPS were assessing the same construct. A total of 178 undergraduates were examined, and their results were evaluated using the principal components method with varimax rotation criterion. It must be noted that these authors used the original item pool generated by the TAS authors, notably more questions (43) were then asked of participants than the 26 making up the published TAS. This resulted in retaining five factors to best account for the variance of the TAS, which incidently reached a level of 34.49% of the total variance. The first factor was named difficulty describing feelings, and accounted for 9.47% of the variance. The second factor, concerned with daydreaming, accounted for 7.27% of the variance. The third factor, concrete thought, covered 6.34% of the variance. The fourth factor, indicative of the capacity to discriminate and understand emotions, accounted for 6.10% of the variance, and the fifth factor, dealing with the importance of emotions, accounted for 5.31% of the variance. The authors conclude that the factor structure found in this investigation is similar enough to that of Taylor, Ryan, and Bagby (1985) to support the structure as robust, and to support the TAS as a measure of alexithymia.

Hendryx, Haviland, and Shaw (1991) used the TAS to examine the multidimensional nature of alexithymia. Their research utilized a factor analytic procedure to illuminate the inter-relationships between alexithymia, depression, and anxiety. The feelings factor of the TAS was hypothesized to be related to and predicted by depression and anxiety. The investigators recruited 110 freshman medical students, who were administered the TAS, BDI, and STAXI. Factor analysis with oblique factor rotation

produced a four factor structure, in which only 20 of the TAS' 26 items were used, and which accounted for 55.3% of the variance. The authors found alexithymia as measured by the TAS is be made up of unique dimensions, and that total scores from the TAS are not useful without knowing which factors make up the majority of the total. LISREL modeling was used to establish associations between the different constructs. Two final models were produced: the first in which depression was related only to the alexithymia feelings factors, and alexithymia factors were unrelated to each other; and the second, wherein anxiety directly influences alexithymia and can indirectly influence alexithymia by first influencing depression. Direct effects of anxiety on alexithymia were noted to be greater than the direct effects of depression on alexithymia. Cautionary statements are appropriate in reviewing this study due to the limited sample size and to the homogeneous consistency of the population investigated.

Hendryx, Haviland, Gibbons, and Clark (1992) examined a sample of 130 substance abusing men in order to (1) determine the number of dimensions tapped by the TAS, and (2) evaluate the performance of individual TAS items at high and low levels of alexithymia severity. A three dimensional factor model was found to be optimum for the data inquired into. These three factors were consistent with three alexithymia features, (a) emotional awareness deficits, (b) lack of imaginative ability, and (c) external, operative cognitive style. Total percentage of variance accounted for was not reported, which is not surprising as it was not the focus of this publication. Of note was the argument that because a three dimensional model was the best fitting model, a unidimensional solution was not expected to include items from each dimension. That expectation was realized, as

picking the top ten items based on factor loadings shows that 9 of the 10 came from the emotional awareness deficits factor and 1 of the 10 came from the external, operative cognitive style factor. Authors conclude that TAS alexithymia dimensions are distinct and independent.

Correlates of Alexithymia

The purpose of examining the correlates of alexithymia was to differentiate alexithymia from other similar constructs that either predate it, or have been discussed in the literature due to a degree of overlap between the concepts. This dissertation intended to clarify questions of overlap between alexithymia and the affective constructs of depression, state/trait anxiety, and state/trait anger. This portion of the investigation is considered discriminant in nature. Need for cognition and psychological mindedness were expected to correlate negatively the TAS-20. This segment of the investigation was also regarded as discriminant in character. As noted earlier in this review, further review of these comparable constructs was important to advance not only the discriminant validity of the TAS-20, but to add to it's construct validity as well.

Alexithymia and depression. The first notable mention of a relationship between alexithymia (TAS) and depression (BDI) occurred with the reporting of "unexpectedly high" positive correlation ($r = .60$) between these two variables among a group of 81 college students (Bagby, Taylor & Ryan, 1986). Attempts were made by those authors to explain the correlation in noting that mean depression scores were substantially below that which would be assessed as clinically depressed (mean = 7.49). Their finding had heuristic value in that it sparked interest in the TAS and its relationship to depression.

Several studies investigating the relationship between depression and alexithymia followed, some supporting a positive correlation between the construct and others not able to support the finding of correlation between depression and alexithymia. Those in studies that found a positive correlation include: (Haviland, Hendryx, Cummings, Shaw & MacMurray, 1991; Hendryx, Haviland & Shaw, 1991; Haviland, MacMurray & Cummings, 1988; Haviland, Shaw, Cummings & MacMurray, 1988; Haviland, Shaw, MacMurray & Cummings, 1988; de Groot, Rodin & Olmstead, 1995; Saarijarvi, Salminen, Tamminen & Aarela, 1993; Taylor, Parker, Bagby & Acklin, 1992; Kuczmierczyk, Labrum & Johnson, 1995; Wise, Jani, Kass & Sonnenschein, 1988; and Cohen, Auld & Brooker, 1993).

Notably many of the studies noted above that provide evidence for the positive relationship between alexithymia and depression were limited in the conclusions they were able to draw because of the use of correlational statistics. However, the studies listed below attempted to clarify the relationship, testing hypotheses that were specifically looking for a relationship between alexithymia and depression. The first of these, Haviland, Hendryx, Cummings, Shaw & MacMurray (1991), proposed a model to explain the relationship between alexithymia and depression in 130 male alcoholics. The results of a pilot study suggested that the BDI consistently predicted a noted TAS feelings factor (made up of the inability to identify feelings and distinguish them from bodily sensations). Further review of 55 of the original 130 male participants was not able to suggest a directional relationship between the TAS feelings factor and the BDI.

The second study to examine the relationship between depression and alexithymia was conducted by Haviland, Shaw, Cummings, and MacMurray (1988) who examined 55 inpatient alcoholics over a three week period to ascertain the degree of change in total TAS scores and derived subscale scores on the TAS. The BDI was also used to examine the inter-relationship between the TAS and the BDI. The author's expected that change in the BDI scores would be reflected in changes in the TAS factor scores which correspond with the ability to identify feelings and to distinguish feelings from bodily sensations. Participant BDI scores were found to drop almost nine points over treatment (statistically significant), but TAS scores dropped an insignificant amount. Moreover, alexithymia was noted to move from the extremes to the midrange over the three week treatment period. Examining subscale differences in scores for the TAS, it was noted that the feelings factor decreased over treatment, and the externally oriented thinking and daydreaming factors tended to increase over treatment for the participants. Haviland, et al. interpreted the findings by suggesting TAS alexithymia is interacting with BDI depression in two ways. First, alexithymia might be a type of defense used to fend off the painful mood and cognitive states associated with the emotional distress of depression. Second, the emotional distress of depression may be able to overwhelm the defensive ability of alexithymia. These authors concluded that alexithymia might be linked to stress in their alcoholic sample.

The third study that investigated the relationship between alexithymia and depression was conducted by Haviland, Hendryx, Cummings, Shaw, and MacMurray (1991) who assessed 130 male alcoholics to determine whether alexithymia is a

unidimensional or multidimensional construct, and to build a model that best typifies the occurrence of alexithymia (TAS) and depression (BDI) among this clientele. Using LISREL modeling, the authors were able to determine a model where the BDI factors, "Cognitive-Affective" and, "Somatic-Performance" predicted TAS-Feelings. No other links between alexithymia and depression reached significance. This finding indicated a directional relationship between depression and alexithymia, so 55 of the initial subjects retook the TAS and BDI at the end of their third week in treatment. Over the two week period, BDI scores dropped significantly, while TAS scores dropped insignificantly. Further analysis showed that mean TAS feelings subscores dropped, and TAS subscores on daydreaming and external thinking increased, but neither of these changes in the TAS reached significance. Haviland, et al. pointed out that in their sample of newly abstinent alcoholics, alexithymia seemed to be a multidimensional construct. Recommendations for assessing for alexithymia were made, with the notation that depression might be a possible confound in alexithymia assessment. Limitations about sample size were noted, and caution was urged with respect to drawing inferences and/or making predictions from this investigation.

Finally, the last study to discuss a relationship between depression and alexithymia was conducted by Haviland, Hendryx, Shaw, and Henry (1994) who assessed 204 chemically dependent adults for alexithymia (TAS-20), depression (BDI), and state anxiety (STAXI), to address four specific aims. Most notable in the context of this paper is the path analysis of the data to test a previously described model which illustrates the inter-relationship between alexithymia, depression, and state anxiety. State anxiety was

found to predict both depression factors and all three alexithymia factors, and the depression factors were both found to predict alexithymia's difficulty identifying feelings factor. The authors posited that this was the first causal model in which all dimensions of alexithymia were found to be linked to anxiety. Further, they noted the implication that the alexithymia construct was subject to the influence of situational stress. It was important to note that Haviland et al. finally used an adequate number of subjects.

Other researchers have not found a significant relationship between alexithymia and depression (Wise, Mann & Shay, 1992; Prince & Berenbaum, 1993; Fukunishi, Ichikawa & Matsuzawa, 1992; Wise, Mann & Randell, 1995; Wise, Mann & Hill, 1990; Bourke, Taylor, Parker & Bagby, 1992). For example, Wise, Mann and Randell (1995) found that over a five day hospital visit, depression and anxiety scores dropped (as measured by visual analog scales), while alexithymia rates remained consistent, which suggests that alexithymia is a trait construct, independent from others.

Parker, Bagby and Taylor (1991) confronted the controversy concerning alexithymia's independent status as a construct. They designed a study that would investigate this discrepancy in the literature by conducting a combined factor analysis using all items from both instruments. The TAS and the BDI were administered to 406 undergraduate university students and to 164 psychiatric outpatients. For both samples, a four factor solution best represented the data, accounting for 27.3% of the total variance. Factor one explained 14.4% of the variance, and consisted only of BDI items. Factor two contributed another 5.0% to the total variance, and was made up of items assessing the ability to identify, describe, and distinguish (from bodily sensations) feelings. The third

factor, added 4.8% to the total variance, contained items that tap imaginal activity and daydreaming. The last factor explained another 3.1% of the total variance, and was primarily made up of items that assess externally oriented thinking. Although the authors described a significant but moderate correlation between the TAS and the BDI in both clinical and non-clinical samples, they discussed alexithymia as a separate and unique construct from depression. They supported this conclusion with data from the factor analysis. High coefficient alphas are cited in this study for each instrument to further buttress the hypothesis that TAS alexithymia is distinct from BDI depression.

Alexithymia and anxiety. Alexithymia has been discussed as co-occurring with anxiety (Myers, 1995; Ushiroyama, Ueki, Orino & Ikeda, 1994; Parker, Taylor, Bagby & Acklin, 1993; Taylor, Parker, Bagby & Acklin, 1992; Zeitlin & McNally, 1993; Lane, Sechrest, Reidel, Weldon, Kaszniak & Schwartz, 1996). Again, as in the alexithymia/depression citations, many of these authors noted above found correlational data that was not presented as central to their original research questions. However, Cox, Swinson, Shulman and Bordeau (1995) assessed the relationship directly. They asked 146 participants to complete a state anxiety measure, the Beck Anxiety Inventory (BAI; Beck, Epstein, Brown & Steer, 1988), in comparison with the TAS-20, and found a strong positive correlation between alexithymia and state anxiety. They concluded that there appears to be conceptual and psychometric overlap between alexithymia and the psychological aspects of panic, in which they include anxiety.

Newton and Contrada (1994) had somewhat different findings, indicating that highly alexithymic persons were similar but different from highly anxious persons.

Similarities included both had difficulties in distinguishing feelings from bodily sensations of emotion and difficulty verbally describing feelings (as noted also by Hendryx, Haviland and Shaw, 1991). Newton and Contrada suggested that highly alexithymic persons notably have problems with fantasy life and imagination, and rely on an externally oriented thinking style, whereas these are not problematic areas for highly anxious persons.

Alexithymia and anger. Including a specific emotion may seem out of character for this proposal, as anger does not have specific diagnostic criteria as do depression and anxiety. However, including anger was appropriate in the opinion of the author, because it has to do with interpersonal relations, a forum where alexithymic persons have been discussed as being deficient, even boring. There is a research precedent for assessing anger among alexithymic persons, which will be discussed in the following paragraphs. Keltikangas-Jarvinen (1982) found that violent offenders lacked the ability to fantasize about aggression and scored higher on assessments of alexithymia than non-violent offenders. This supported the hypothesis that among persons with antisocial personalities, violent offenders are less likely to be able to discharge negative emotions like anger (via thought), and are more likely to act out those negative emotions. More recently, McDonald and Prkachin (1990) noted a co-occurrence between anger and alexithymia, wherein they found alexithymic persons seem to have a deficit in expressing negative emotion, especially anger. Bagby, Taylor and Parker (1988) found that alexithymia was positively correlated with anger suppression and negatively correlated with anger towards other people.

Prince and Berenbaum (1993) suggested that alexithymia was most consistently associated with the emotion anger, although their study was not directly concerned with alexithymia. In their investigation, Prince and Berenbaum found that social hedonic capacity and alexithymia were related, especially with respect to the ability to communicate emotion (a content domain of alexithymia). Alexithymic persons were found to be able to experience physically pleasurable stimuli, but were not able to enjoy socially pleasurable stimuli.

Berenbaum and Prince (1994) found that individual's with high alexithymia scores were more likely to select disgust than anger after reading an emotion-eliciting story, indicating that these persons have difficulty identifying others emotions as well as their own. It was hypothesized therein that difficulty identifying anger is associated with alexithymia, and further that alexithymic individuals were noted for difficulty with anger because anger is generally considered to be a socially unacceptable emotion, hence making problems more noticeable. Finally, Berenbaum and Irvin (1996) found that alexithymic participants were more interpersonally avoidant and exhibited more non-verbal anger than non-alexithymic controls.

Alexithymia and need for cognition. Need for cognition has been defined as the tendency to engage in and enjoy thinking (Cacioppo & Petty, 1982). These authors noted such a tendency has a relatively long history in both applied and social psychology. Murphy (1947) described a quality in person's he denoted as "thinkers," whom engaged in such mental activity because it was experienced as pleasurable. Cohen, Scotland, and Wolfe (1955) described more specifically a, "need for cognition," which is derived from

goal-directed tension to attain structure that is relative and meaningful. In examining the alexithymia literature, results from investigations that included a need for cognition instrument were that alexithymic persons tend to score in a deficient manner in this capacity (Bagby, Taylor & Parker, 1988; Bagby, Taylor & Parker, 1993).

Alexithymia and psychological mindedness. Psychological mindedness, interpreted as the disposition and motivation a client has to seek relationships among thoughts, feelings, and behaviors (Applebaum, 1973; Farber, 1985), was a concept that originated in psychodynamic theory. Along with other variables such as: the willingness to trust, positive attitudes towards the self and therapist, and relatively high anxiety and depression, psychological mindedness has been examined with respect to predicting psychotherapy outcome (Conte, Plutchik, Jung, Karasu & Lotterman, 1990). Alexithymic individuals were thought to be deficient in this ability by definition, and as such, this variable had been employed in earlier research to assess the cognitive domain of alexithymia, (Bagby, Taylor & Parker, 1988; Bagby, Taylor & Parker, 1993). Findings from the latter investigation were that not only do alexithymic clients make poor candidates for psychotherapy, but that alexithymic clients are relatively; (a) unwilling to talk about their problems, (b) unable to access their feelings, (c) lacking in the capacity for behavioral change, and (d) uninterested in the motivation for human behavior. Alexithymia was concluded to be related in an inverse manner with psychological mindedness (Bagby, Taylor & Parker, 1988; Bagby, Taylor & Parker, 1993).

In examining the correlates of alexithymia, it was evident that disagreement existed concerning the unique nature of this construct. The above noted research suggested that

positive relationships might exist between alexithymia and the constructs of depression, anxiety, and anger. Conversely, the constructs of psychological mindedness and need for cognition seem to have been negatively correlated in previous research. Additionally, some authors have implicated the correlates of alexithymia as being causative in nature to alexithymia or alexithymic behaviors. Other researchers suggested that alexithymia was a trait construct, independent of any co-morbid disorders or conditions. Disagreement on this topic was not surprising given the fact that alexithymia existed for 25 years without a name, ten of which generated much thought and many articles. Continuing research in this area is seen as important to further define the construct of alexithymia.

This review of the literature highlights the ambiguity surrounding this construct. It discussed the historical background and definition of alexithymia, further defined how an alexithymic person behaves interpersonally, and examined the qualifiers, "primary" and "secondary" as applied to alexithymia. Etiological theories surrounding the construct were listed and explained, and an account was given concerning the measurement of alexithymia. The total contents of the factor analytic literature concerning the TAS, TAS-R and TAS-20 was reviewed. Lastly, the correlates of alexithymia were further explicated where there was available information to do so. What follows is a description of the methodology of this study.

Chapter 3

METHODS

Introduction

This investigation examined the factor structure of the TAS-20. In accord with earlier construct validity studies, differences among the identified factors and previously established constructs were measured using accepted instruments that were designed for those constructs. The derived TAS-20 factors were correlated with: depression as measured by the Beck Depression Inventory (BDI), anxiety as measured by the State-Trait Anxiety Inventory (STAI), anger as measured by the State-Trait Anger Expression Inventory (STAXI), psychological mindedness as measured by the Psychological Mindedness Scale (PMS), and need for cognition as measured by the short form of the Need For Cognition Scale (NCS).

Participants

The participants in this investigation included 245 college students who were enrolled in a introduction to psychology course at a large, southwestern university. The sample included 154 females (62.9%), 85 males (34.7%), and 6 persons (2.4%) who did not identify their gender. Marital status among those sampled included, 216 single (88.2%), 18 married (7.3%), 6 divorced (2.4%), and 5 partnered (2.0%). One hundred fifty five students (63.3%) were in their first year of college, 61 (24.9%) were in their second year, 13 (5.3%) were in their third year, 6 (2.4%) were in their fourth year, 5 (2.0%) were in their fifth year, 3 (1.2%) described themselves as post baccalaureate, and 2 (0.8%) described themselves as graduate students. Ethnicity among the sample was

reported as, 15 (6.1%) African-American, 6 (2.4%) Asian-American, 196 (80.0%) Caucasian-American, 5 (2.0%) Hispanic, 13 (5.3%) Native American, and 9 (3.7%) described themselves as "other." The ages of the participants ranged from 18 years to 46 years. Most of the participants (84.1%) were in the traditional college age range of 18-22 years.

Measures

The participants completed seven questionnaires and/or subscales including: the Twenty Item Toronto Alexithymia Scale (TAS-20; Bagby, Parker & Taylor, 1993), the State-Trait Anxiety Inventory, Form Y (STAI; Spielberger, 1983), the State-Trait Anger Expression Inventory (STAXI; Spielberger, 1988), the Beck Depression Inventory (BDI; Beck, 1978), the Psychological Mindedness Scale (Conte, Plutchik, Jung, Picard, Karasu & Lotterman, 1990), and the Short Form of the Need For Cognition Scale (NCS; Cacioppo, Petty & Kao, 1984). A one-page demographics sheet (Appendix E) and an informed consent form (Appendix C) were also completed.

Twenty Item Toronto Alexithymia Scale (TAS-20). The TAS-20 (Bagby, Parker & Taylor, 1993) was a 20-item, self-report questionnaire. The TAS-20 was scored in a five point (1-5) likert manner, with a range of potential scores from 0-100. Questions on the TAS-20 included, "I am often confused about what emotion I am feeling" or " When I am upset, I don't know if I am sad, frightened, or angry." A score of 61 or above indicated a positive diagnosis of alexithymia; a score of 51 or below indicated a negative diagnosis (no alexithymia), which illustrated that greater scores are indicative of greater levels of alexithymia. By recalculating the data derived from the work on the TAS-R,

Taylor (1992) was able to claim that the TAS-20 is internally consistent (Cronbach's alpha r = .81) and reliable in a test-retest format (r = .77). Convergent validity has been shown via comparison to other scales that measure similar constructs.

State-Trait Anxiety Inventory, Form Y (STAI). The STAI (Spielberger, 1983) was a 40-item, self-report questionnaire that measured state and trait anxiety. The STAI could be administered in groups or individually, to adults or high school students. State anxiety was defined as transitory feelings of fear that most people felt occasionally; trait anxiety was defined as a stable tendency of an individual to respond to a stressful situation with anxious behavior. Instructions differed for each scale, where the state scale asked how the person felt right now (e.g. "I feel calm"), and the trait scale asked how the person generally felt (e.g. "I am calm, cool, and collected"). The state and trait subscales were each made up of 20 questions, and were responded to in a four-point Likert format. Likert responses ranged from, "almost never" to "almost always." with questions written so that some items required reverse scoring. The state and trait anxiety subscale scores ranged from 20-80, with higher scores reflected greater levels of anxiety.

Reliability data of the state anxiety portion was expected to change regularly, but the trait scale had been shown to have adequate test-retest reliability (Chaplin, 1984). In the test manual, Spielberger (1983) made the same comment about expecting variability in a state measure, but did report ranges of r = .16 to .62 over 30 and 60 day intervals, with a median reliability for State Anxiety at r = .33. Spielberger reported the median reliability coefficient for college students was r = .765 when looking at test-retest data for 1 hour, 20 days, and 104 days for the Trait Anxiety scale. In regards to internal consistency

reliability, Spielberger reported the median coefficients for State Anxiety (r = .93), and for Trait Anxiety (r = .90). Chaplin noted the construct validity of the STAI has been assessed through comparisons with the Taylor Manifest Anxiety Scale (r = .80), PAT Anxiety Scale (r = .75), and the Multiple Affective Checklist (r = .52). Finally, Chaplin wrote that the Trait scale positively correlated with the MMPI clinical scales, the Personality and Research Form Aggression and Impulsivity scales, the Multiple Affective Adjective Checklist Hostility scale, and the Mooney Problem Checklist, further adding to concurrent validity to the instrument.

State-Trait Anger Expression Inventory (STAXI). The STAXI (Spielberger, 1988) was a 44-item instrument that assesses state and trait anger as well as anger expression. This instrument was organized into three parts. Greater scores on this instrument indicated greater levels of anger. State anger, defined as a temporary condition invoked by characteristics of the immediate situation, made up part I. Items were rated on a four point Likert scale based on the following response choices: (1 = "not at all" or 2 = "somewhat" or 3 = "moderately so" or 4 = "very much so"). Some examples of statements from part I included, "I am furious," or "I feel like swearing."

Part II included trait anger items, which referred to a more stable, dispositional style of reacting to a wider range of stimuli with angry responses. Items were also rated on a four point Likert scale: (1 = "almost never" or 2 = " sometimes" or 3 = "often" or 4 = "almost always"). Examples of part II statements included: "I am very quick tempered," or "I fly off the handle." Factor analyses further differentiated Part II into angry temperament (the propensity to experience express anger without provocation), and angry

reaction (the inclination to express anger when criticized or treated unfairly by other persons).

Part III consisted of items that measure anger expression, which could have occurred as anger-in (suppression), anger-out (outward expression), and anger-control (anger expression is controlled somehow by the person). Items were rated using a four point Likert scale (1 = "almost never" or 2 = "sometimes" or 3 = "often" or 4 = "almost always." Statement examples include; "I can control my temper" and "I express my anger."

The manual (Spielberger, 1988) reported internal consistency coefficient alphas for the STAXI ranges from .84 to .93, with reported coefficient alphas for trait temperament ranging from .84 to .89, and for the three anger expression scales ranging from .73 to .85. Fuqua, Leonard, Masters, Smith, Campbell, and Fischer (1991) noted that the alpha levels cited in the manual were considered to be relatively strong given there were only four item scales. The anger expression scale (with anger-in, anger-out, and anger-control) had a coefficient alpha of .58, which Fuqua et al. (1991) noted was too low for practical uses, but would be expected due to the complex nature of the factor structure.

Face validity has been cited as good, but validity data due to experimental manipulation was lacking according to Biskin (1992). Retzlaff (1992) noted that validity was implied due to the manual's inclusion of item-remainder correlations for within and across scales.

Beck Depression Inventory (BDI). The BDI (Beck, 1978) was a 21-item, self-report questionnaire designed to assess depression severity in adolescents and adults who

have been independently diagnosed as depressed. The BDI was a state instrument which asked the examinee to consider their feelings over the past week when endorsing a statement that best describes how they feel. Statements were arranged in a four point Likert format. An example of statements to choose from included:

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

When used clinically, scores from endorsed items were tallied, and the total score (which ranged from 0 - 63) was used to support clinical judgments and treatment decision concerning the person who took the test. In regards to depression severity, higher scores represented more extreme levels of depression than did lower scores.

Test-retest reliability estimates for psychiatric patients ranged from .48 to .86, and for non-psychiatric sample ranged from .60 to .90. Internal consistency was also high, (r = .86 with the psychiatric group, r = .88 with outpatients, and r = .81 with non-psychiatric persons) as noted by Beck and Steer (1993) in their assessment of previous publications.

Many studies have shown the BDI to correlate adequately with clinician ratings of depression, the depression subscale of the MMPI, the Zung self-rating Depression scale, and the Hamilton Depression Scale, adding to the concurrent and construct validity of the instrument. The BDI had also shown the ability to discriminate between three groups of people, those considered to have normal mood, those with dysthymia, and those with major depressive disorders.

Psychological Mindedness Scale (PMS). Psychological mindedness refers to a person's disposition and motivation to seek relationships between thinking, feelings, and actions (Applebaum, 1973). The PMS (Conte, Plutchik, Jung, Picard, Karasu & Lotterman, 1990) was a 45-item self-report questionnaire designed to measure whether or not the client was appropriate for dynamic psychotherapy, e.g. are they willing/have the ability to introspect on their thoughts, feelings and behaviors.

The PMS was a shortened version of the original, unpublished version, which was developed by Lotterman in 1979. The 45 item PMS was arranged in a four point Likert format, where the respondent chooses between: "strongly agree, mostly agree, mostly disagree, and strongly disagree." Conte et al. (1990) recommended the Likert items be scored 4, 3, 2, or 1 for positively written items and 1, 2, 3, or 4 for negatively written items. A scoring key was included to clarify which items were positively or negatively written. Examples of PMS items include; "I like to do things the way I've done them in the past. I don't like to change my behavior much" (one item), "There are some things in my life that I would not discuss with anyone." Twenty one of the items were reverse scored, and total scores were secured by adding item weights. On the PMS, higher total scores were indicative of greater psychological mindedness, whereas lower total scores suggested lower levels of psychological mindedness.

As this was a new scale, with only limited usage, internal consistency data was all that was noted in the literature. The coefficient alpha was .86, which indicated good internal consistency based on the Conte, Plutchik, Jung, Picard, Karasu and Lotterman's (1995) preliminary findings.

The short form of the Need for Cognition Scale (NCS) . The short NCS (Cacioppo, Petty & Kao, 1984) consisted of 18 statements that were designed to assess a person's preferences to engage in and enjoy complex thought. Half of the 18 statements were worded positively and half are worded negatively. Respondents indicate agreement or disagreement based on a 5-point Likert scale (1 = "extremely uncharacteristic" to 5 = "extremely characteristic"). Some examples of statements included; "I would prefer complex to simple problems," and "I find satisfaction in deliberating hard and for long hours." Higher scores were indicative of a greater engagement in and enjoyment of complex thinking.

The NCS short form was a reliable measure, with test-retest reliability estimates of .88, and internal consistency Cronbach alphas of .86 (Sadowski, 1993), and .90 (Watt & Blanchard, 1994). Additionally, Sadowski and Gulgoz (1992) found test-retest correlations ranging from .91 to .92. Watt et al. (1994) found that the NCS possessed adequate convergent validity based on correlations with measures of curiosity, and discriminant validity, based on non-significant associations with measures of social desirability and anger.

Demographics Sheet. The demographics sheet used in this investigation sought information about the participants, but did so in an anonymous manner. Participants were asked to indicate their age in years, gender, marital status, education level, their ethnicity, and their college major.

Procedures

Participants for this validation study were recruited from the subject pool in introductory psychology classes at a major southwestern university. Introductory psychology was mandatory for all incoming students at the university, providing a broad spectrum of individuals from which a sample could be drawn. The Psychology department had established a subject pool to the joint benefit of the students, who earned extra credit towards their class grade, and the researchers, who accessed a large group of willing students for research purposes.

To recruit individuals for this investigation, contact was made with the instructors of general psychology to establish a time when their classes could be solicited for participation. On the agreed upon date, the student investigator attended the class, described the study (see Appendix F, solicitation), and passed sign-up sheets around to potential participants.

Several group administration sessions were held in classrooms capable of seating 25 students. A brief explanation of the study was provided using standardized instructions (Appendix D). The student participants were told there was no penalty for early withdrawal, but that they needed to complete the study to earn extra credit towards their class. The Psychology department did not view this policy as penalizing to the students, because many other alternatives for extra credit existed.

The participants read and signed an informed consent (Appendix C) form and completed the following randomly collated instruments: the Twenty Item Toronto Alexithymia Scale, the State-Trait Anxiety Inventory, the State-Trait Anger Inventory, the

Beck Depression Inventory, the Need for Cognition Scale, the Psychological Mindedness Scale, and a demographics sheet (Appendix E). After completion of all instruments, test forms were collected and stored separately from consent forms.

Participants were debriefed of the study following each group administration session. Dates of several scheduled debriefing sessions were distributed, where interested students were informed of the general results of the investigation. Individual appointments were scheduled as necessary. Further, student participants were given a list of available university resources, where assistance was available for further discussion of any disturbing issues (see Appendix G).

Research Questions and Design

This investigation was designed to assess the construct validity of the TAS-20 and utilized exploratory factor analysis to establish the factors underlying the TAS-20. This investigation was prompted by both the recency of publication and the current debate in the literature over the unitary nature of the instrument.

The following research questions were tested in this inquiry:

1. What is the factor structure of the TAS-20?
2. Is there a significant linear relationship between the psychological measures (State/Trait Anger Inventory, State/Trait Anxiety Inventory, Beck Depression Inventory, Need for Cognition Scale, and Psychological Mindedness Scale) and the derived factor scores from the TAS-20?

Exploratory factor analysis was used to answer the first question. Question two was answered using forward multiple regression. Additional analyses were conducted

using a series of one way ANOVAS to compare the extracted factors across male and female students. Any differences were further examined with the Newman-Keuls post-hoc technique.

Chapter 4

RESULTS

The results presented in this chapter include the factor analysis of the TAS-20, the multiple regression of significant predictors onto the derived factors, and how these analyses answered the research questions.

Descriptive Statistics

The means and standard deviations for the items of the TAS-20, BDI, STAI, STAXI, NCS, and PMS for the total sample are presented in Appendix L, M and N. The means of TAS-20 items ranged from 1.63 to 2.98, and standard deviations (items) ranged from 0.94 to 1.38.

Research Question #1:

"What is the factor structure of the TAS-20?"

Principal axis factor analysis, an exploratory factor analytic procedure, was used to derive a factor structure for the TAS-20. This derived structure was used to address the first research question and to reduce the number of variables for subsequent data analysis.

One of the underlying assumptions with factor analysis is that the variables in the population correlation matrix are not uncorrelated. If it is determined that these variables are correlated, there is no reason to conduct a factor analysis. Therefore, prior to proceeding, the assumption was tested in two ways using the correlation matrix of the TAS-20. First, it was determined via visual inspection of the correlation matrix that the size of the correlation coefficients ranged from low to medium, which suggested that variable reduction through factor analysis was proper. Second, the entire correlation

matrix of the TAS-20 was checked with Bartlett's test of sphericity, which produced a Chi-Square of 1640.04 ($p < .01$). This significant finding coupled with the results of the visual inspection further supported the finding that proceeding with the factor analysis was proper. The factor analysis was conducted using SPSS PC.

Principal axis factor analysis produced potential factor structures of three, four and five factors. Visual inspection of the scree plots suggested that solutions representing three to five factors could represent the factor solution of the TAS-20, so all solutions were rotated both orthogonally and obliquely in an effort to produce the most interpretable factors. All solutions were evaluated using a combination of methods, which included Kaiser's eigenvalue test, Cattell's scree test, the amount of variance accounted for, the number of item loadings on each factor, and the application of theoretical considerations. The criteria for deciding how many components to retain were described below.

Kaiser (1960) suggested that only those factors whose Eigenvalues are greater than one should be retained when conducting a factor analysis. This study produced five factors with Eigenvalues greater than one, which was the first indicator that a more complex structure than the original author's three-factor model would best fit this data. The Kaiser rule has been shown to be accurate when the number of variables is small (10-15) or moderate (20-30) with high communalities (greater than 0.70).

The Scree test was a graphical method where eigenvalues were plotted against their ordinal numbers. It suggested it was appropriate to retain all components whose eigenvalues were in the steep descent before the first component on the line where the

components start to level off. When applied to the results of this data set, this rule suggested five factors should be retained.

Halstead, Rogers and Cattell (1982) reviewed clear limits concerning the accurate limits of combinations of the Kaiser and Scree rules, which worked to provide a more specific application of the criteria. They reported that when N was greater than 250 and the mean communality (communalities are the squared multiple correlation of each variable with all the others, and the mean communality is the average of these communalities, which was in this case was 0.394) greater than or equal to 0.60, both Kaiser and the Scree test would yield an accurate estimate for the number of factors. Additionally, a Q/P ratio less than 0.30 (where P = the number of variables and Q = the number of factors) added to the credibility of the estimate. When mean communalities were less than or equal to 0.30 or Q/P was greater than 0.30, Kaiser was less accurate and the Scree test was said to be much less accurate.

This data from this investigation tested the boundaries established above. Here, N = 245 (vs. 250), mean communality = 0.394 (vs. greater than or equal to 0.60), and Q/P ration = 0.25 (vs. less than 0.30). These results suggested the Kaiser rule was accurate, and the Scree test was moderately accurate.

The five factor model, rotated using Oblimin rotation with Kaiser normalization produced the most interpretable factors (see Appendix A, Tables 12 and 13 for pattern and structure matrices). This model demonstrated consistency with descriptors found in the alexithymia literature, and was considered better than the prototypical three factor model described in the original research. The five factors, with eigenvalues greater than

1.0, accounted for 59.3% of the total variance, and were named the Confusion Factor, the Communication Factor, the Description Factor, the Externalization Factor, and the Internalization Factor.

The Confusion factor described the inability to distinguish emotions from cues of bodily arousal, and accounted for 29% of the total variance. An example item from the Confusion factor was, "When I am upset, I don't know if I am sad, frightened, or angry." The Communication factor suggested a preference to avoid discussing feelings, focusing instead on activities. The Communication factor accounted for 12% of the total variance. An example of the Communication factor was, "It is difficult for me to reveal my innermost feelings even to close friends." The Description factor outlined an inability to easily describe or explain feelings. The Description factor accounted for 7% of the total variance. An example of the Description factor was, " I am (un)able to describe my feelings easily." The (un) was added to indicate the item was reverse scored.

The Externalization factor was related to de M'Uzan's (1963) operational thinking, which was defined here as a cognitive superficiality and a preference for avoiding deep thought. The Externalization factor accounted for 6% of the total variance. An example of the Externalization factor was, "I prefer to just let things happen rather than to understand why they turned out that way."

Swiller (1988) discussed the alexithymic persons lack interest in introspection, leading him to describe the alexithymic as distant and boring in therapy, and distant and boring to everyone they meet. This characterization fit well with the Internalization factor, which was defined here as a denial of the usefulness of examining feelings and a

denial of the ability to feel close to other people. The Internalization factor accounted for 6% of the total variance. An example of an item from the Internalization factor was, "I (don't) find examination of my feelings useful in solving personal problems. Again the (don't) was added because this item was reverse scored. A summary of the five rotated factors is reported in Table 1.

Similar to earlier factor analyses, a multi-factorial structure was advanced to best describe the data (e.g. Haviland, Hendryx, Shaw & Henry, 1994; Bagby, Parker & Taylor, 1993). The referral to the earlier literature and the number of factors derived therein was important because it demonstrated others have found alexithymia to be multi-dimensional. Therefore, a multi-dimensional finding in this study was in line with previous findings. The five factor model was clearly multi-dimensional, and could be said to roughly represent the cognitive and affective domains of alexithymia. However, the structure was complex in nature, and notable correlations existed between some factors and not between others. For example, Factor 1 and Factor 2 were noted to be moderately correlated ($r = .458$), whereas correlational relationships among the other factors were judged to be weak to extremely weak (see Appendix A, Table 11). Further, the item count per factor was vastly different, (see Appendix A, Table 1) indicating an unequal representation of the domains of the construct on the TAS-20, a finding that has also been reported by Kooiman (1998). These complex findings suggested revisions of the items of the TAS-20 were in order.

Research Question #2:

"Is there a significant linear relationship between the psychological measures (State/Trait Anger Inventory, State/Trait Anxiety Inventory, Beck Depression Inventory, Need for Cognition Scale, and Psychological Mindedness Scale) and the derived factor scores from the TAS-20?"

Multiple regression analyses were conducted to investigate the relationships between the five extracted factors from the TAS-20 and the constructs of anger, anxiety, depression, need for cognition, and psychological mindedness. The anger and anxiety indices produced subscale scores rather than total scores. These subscale scores (Anger Expression In and Out, State Anger, Trait Anger, Anger Control, State Anxiety, and Trait Anxiety) were used in the regressions rather than computing artificial total scores. The inclusion of subscale scores with the total scores meant ten predictor variables were entered into the equation. Zero-order correlations were examined to further discuss the relationship.

The first regression equation was obtained by regressing the ten psychological variables on the Confusion factor. The regression equation with all variables entered was significant (alpha = .01 level) and accounted for approximately 48% of the variance in the Confusion Factor. This indicated that a significant linear relationship existed between some of the psychological measures and the first derived factor from the factor analysis. Trait anxiety, psychological mindedness, depression, and "anger expression in" were the significant descriptor variables of the TAS-20 Confusion Factor scores ($p < .01$). Notably, trait anxiety accounted for approximately 32% of the variance in the Confusion factor

scores. No other variables (other than those already mentioned) accounted for significant increments in variance. The four significant descriptor variables accounted for about 46% of the variance in the Confusion factor scores.

With respect to correlational data, the zero-order correlations suggested that trait anxiety was significantly correlated ($r = .56$, $p < .01$) with Confusion factor. Psychological mindedness was significantly correlated with Confusion factor ($r = -.49$, $p < .01$). Depression was significantly correlated with Confusion factor ($r = .53$, $p < .01$). Finally, anger expression inward was significantly correlated with Confusion factor ($r = .47$, $p < .01$).

The second regression equation was obtained by regressing the ten psychological measures on the Communication factor. The regression equation with all predictor variables entered was significant ($p < .01$) which suggested a linear relationship existed between the psychological measures and the Communication factor. The regression equation accounted for approximately 46% of the variance in the Communication factor scores. Psychological mindedness and "anger expression in" were the most significant descriptors of the TAS-20 Communication factor scores ($p < .01$). Notably, psychological mindedness accounted for approximately 37% of the variance in Communication factor scores. No other variables accounted for significant increments in variance. The two significant psychological measures described about 44% of the variance in Communication factor scores.

The zero-order correlations provided some further information about the linear relationship between the Communication factor and the psychological measures.

Psychological mindedness correlated significantly ($r = -.61$, $p < .01$) with the Communication factor as did anger expression inward ($r = .49$, $p < .01$).

The third regression equation was obtained by regressing the ten psychological measures on the Description factor. The regression equation with all variables entered was significant ($p < .01$) which suggested that a linear relationship existed between the ten variables and the Description factor. The regression equation accounted for approximately 8% of the variance in Description factor scores, which was considered to be small and not very substantively significant. None of the scales or subscales used in this regression made significant contributions to predicting TAS-20 Description Factor at the .01 alpha level. "Anger expression in" and trait anger accounted for significant increments in the explained variance (4% of the 8% total) at ($p < .05$). Correlational data provided some further evidence about this relationship. Zero-order correlations suggested that a significant relationship existed between "anger expression in" and the Description factor ($r = -.14$, $p < .05$). The correlation between trait anger and the Description factor was not statistically significant.

The fourth regression equation was obtained by regressing the ten psychological measures on the Externalization factor. The regression equation with all variables entered was significant (alpha = .01 level) and accounted for approximately 16% of the variance in Externalization Factor. That information suggested that there was a linear relationship between the psychological measures and Externalization. Need for cognition and trait anxiety were the significant predictors ($p < .01$). Notably, need for cognition uniquely accounted for 9% of variance in Externalization scores. Further, at the alpha = .05 level,

psychological mindedness accounted for a statistically significant increment of the variance, but the substantive contribution to the variance was suspect. The three significant descriptors described about 14% of the variance in the Externalization Factor.

Factor four, the Externalization factor, was significantly correlated ($r = -.30$, $p < .01$) with need for cognition. Trait anxiety was not significantly correlated with the Externalization factor. Psychological mindedness was significantly correlated with the Externalization factor ($r = -.14$, $p < .05$).

The fifth regression equation was obtained by regressing the ten psychological measures on the Internalization factor. The regression equation with all variables entered was significant ($p < .01$ level) and accounted for approximately 16% of the variance in the Internalization factor scores. Psychological mindedness was a significant predictor to TAS-20 Internalization factor scores and accounted for 10% of the variance ($p < .01$). Further, at the alpha = .05 level, need for cognition and anger expression inward accounted for significant increments of variance (approximately 2% each), which although statistically significant, was not a very substantive contribution to explaining variance. Overall, these descriptors explained about 14% of the variance.

Zero-order correlations suggested that the Internalization factor was significantly correlated with psychological mindedness ($r = -.32$, $p < .01$). Further, the Internalization factor was significantly correlated with need for cognition ($r = -.20$, $p < .01$). Finally, "anger expression inward" was not significantly correlated with the Internalization factor.

Addendum: Sex and TAS-20 Factor Structure

The research question, "Does the gender of the student influence the derived factor structure of the TAS-20?" was examined with this sample of college students. This question was not initially hypothesized by the author, but was examined as an addendum following the expressed interest of other researchers. The preliminary statistics were viewed with caution because the sample size was too small to produce independent factor analyses for each gender. The null hypothesis was, "The factor structure for the TAS-20 does not significantly differ by sex (male vs. female) of the participants." The alternative hypothesis was, "The factor structure for the TAS-20 does significantly differ by sex (male vs. female). The null and experimental hypotheses were graphed as follows:

H0: Factor 1 (males) = Factor 1 (females)

Factor 2 (males) = Factor 2 (females)

Factor 3 (males) = Factor 3 (females)

Factor 4 (males) = Factor 4 (females)

Factor 5 (males) = Factor 5 (females)

H1: Factor 1 (males) =/= Factor 1 (females)

Factor 2 (males) =/= Factor 2 (females)

Factor 3 (males) =/= Factor 3 (females)

Factor 4 (males) =/= Factor 4 (females)

Factor 5 (males) =/= Factor 5 (females)

A series of one-way ANOVAs were conducted comparing men to women across the five extracted TAS-20 factors. Significant differences were found between factors two

and three (Communication $F(1, 237) = 5.60$, $p < .02$ and Description $F(1, 237) = 4.15$, $p < .04$). No significant differences were found for the other three factors [Confusion $F(1, 237) = .28$, $p < .60$; Externalization $F(1, 237) = .07$, $p < .79$; Internalization $F(1, 237) = .01$, $p < .94$]. These findings suggested sex influenced the factor structure of the TAS-20 for this sample, especially the Communication and Description factors.

Chapter 5

DISCUSSION

A summary of major findings with discussion of results, social implications/clinical recommendations, limitations, and conclusions are presented in this chapter.

TAS-20 Factors

Confusion, Communication, Description, Externalization, and Internalization were the five TAS-20 factors identified using an obliquely rotated principal axis factor analysis procedure. One of the original objectives of this study was to maximize the amount of variance explained for this sample of university students with respect to the construct of alexithymia. This study was able to describe 59% of the variance in TAS-20 scores, markedly more than previous factor analysis studies (Bagby, Taylor, & Parker, 1993; Haviland, Hendryx, Shaw & Henry, 1994; Haviland & Riese, 1996) and much closer to the benchmark of 70%, which has been described as minimally acceptable (Stevens, 1996). Several decision rules were followed in determining which components to retain (Stevens, 1996). Maximizing variance, empirically derived decision strategies, and theoretical considerations were equally important in choosing this solution. The level of dimensional complexity in the factor structure was unprecedented in the research literature on the TAS-20. The factor structure was notably different from that of the original authors (Bagby, Parker, and Taylor, 1993). The prototypical factors of the TAS-20 were rearranged by this data set. Appendix B, Figure 1 provides a visual representation of the rearrangement.

The identified factors of Confusion, Communication, Description, Externalization, and Internalization were consistent with the cognitive and affective content domains of alexithymia as described in the literature. However, these findings did not support the use of a single or global score for assessing alexithymia with the TAS-20. This conclusion was based on the relatively poor correlation between the derived factors in this study (see Appendix A, Table 13), and on the uneven distribution of items across the factors (see Appendix B, Figure 1). Further discussion follows below.

Haviland and Reise (1996, p. 117) noted that in order to "justify the use of a common higher order dimension, all features must be correlated sufficiently; otherwise a summary TAS-20 score will not appropriately represent the construct." Haviland and Reise did not explain what quantitative result would be sufficient, but imply in their article that at least moderate correlations must be found between all factors. An examination of the factor correlation matrix from this study confirms the only moderate correlation exists between factors one and two ($r = .46$). Interestingly, these factors are have to do with confusion about emotion and a tangible or pragmatic style of communication, two elements of alexithymia that have been described as primary in a recent review of the research (Kooiman, 1998).

Bagby, Taylor and Parker (1993) listed TAS-20 item distributions that suggested a relatively even dispersion of items across the three factors with no overlap of items between factors. Factor one, Difficulty Identifying Feelings had 7 items, Factor two, Difficulty Describing Feelings had 6 items, and Factor three, Externally Oriented Thinking had 8 items. The pattern of item distribution changed significantly in the five-factor model

extracted to represent the data in this study. Factor one, Confusion was made up of 11 items. Factor two, Communication was made up of 8 items. Factor three, Description was made up of 1 item. Factor four, Externalization was made up of 2 items, and factor five, Internalization was also made up of 2 items (see Appendix B, Figure 1).

Conclusions From the Factor Analysis

Principal axis factor analysis, when applied to this data, was able to extract a five-factor model which explained 59% of the variance following an oblique rotation (an oblique rotation of the extracted factors was performed to increase the interpretability of the factors, but because the rotation is oblique, the rotated factors will now be correlated, Stevens, 1996). To review, the five extracted factors were: Confusion, Communication, Description, Externalization, and Internalization. These factors were relatively dissimilar from the three-factor structure (e.g. Difficulty Identifying Feelings, Difficulty Describing Feelings, and Externally Oriented Thinking) proposed by Bagby, Parker, and Taylor (1993). The extracted factors were not exact representations of the cognitive and affective domains of alexithymia as proposed by Taylor (1992), but rather were a rearrangement of items when compared to the original data set (Bagby, Taylor & Parker, 1993).

The derived set of factors were unequal in number of items. The Confusion Factor had many more items than the Communication, Description, Externalization, or Internalization factors. A low to moderate (but significant) correlation existed between the Confusion and Communication factors. The TAS-20 factors could be improved by decreasing the amount of item overlap, equating the number of items per factor, or

deleting items that are not theorized as central to the construct. Overall, caution should be used when attempting to assess alexithymia with the TAS-20, in light of the multidimensional data found in this investigation.

The Relationship Among Emotions, Cognitive Dimensions and TAS-20 Factors

This study also examined the linear relationship between the significant predictor variables and each of the TAS-20 factors (see Appendix A, Table 3). The following variables were entered into multiple regression analyses: anger (state, trait, anger expression inward and outward and controlled), anxiety (state and trait), depression, need for cognition, and psychological mindedness. The predictor variables for all five extracted factors are summarized in Appendix A (Table 4).

In this sample of college students, the linear relationship for the Confusion factor (which refers to confusion about feelings) was best described by: trait anxiety, psychological mindedness, depression, and anger expression turned inward. These four variables were significant at the alpha = .01 level of significance, and were able to account for 46% out of 48% total variance in this regression (see Appendix A, Table 3). Reducing the alpha level to .05 produced no additional significant increments in explainable variance.

In this sample, college student's level of confusion about their feelings was associated with long-term or trait anxiety, the tendency not value nor to turn inward for solutions to their problems, higher levels of depression, and the proclivity to turn their anger inward. The relationship between anxiety and alexithymia has been discussed before by Taylor (1992), where he indicated alexithymic persons are expected to have difficulty

modulating anxiety and other emotions. In this study, long-term anxiety was the strongest descriptor of confusion about emotions. These results also suggested that students who lacked the ability and/or devalued the process of turning inward for solutions to their problems would likely be confused about emotion. The student's level of depression was a component of emotional confusion, as was the tendency to focus anger inwardly.

Psychological mindedness and anger expression inward were the only significant variables in the linear relationship between the psychological variables and Communication factor. Notably, these variables accounted for 44% of the 46% of variance explained in this regression ($p < .01$ level, no further increments in variance were explained at $p < .05$). These findings indicated that the construct of psychological mindedness, which was defined as the motivation or ability to use their own mental resources to solve their problems, was the strongest descriptor of communication problems among this sample of college students. Students who were more motivated and able to solve problems were less likely to have communication problems compared to students who were less motivated and able to solve problems. Further, the results indicated that college students who expressed their anger by turning it inward towards themselves would also be apt to have problems communicating their feelings to other people. These findings were similar to those noted by Prince and Berenbaum (1993), who reported communication deficits among alexithymic persons while measuring social anhedonia. They proposed that alexithymia may be as much a social occurrence as an emotional deficit.

Anger expression turned inward and trait anger explained statistically significant amounts of variance in Description factor scores ($p < .05$), each accounting for

approximately 2% of the 8% total explained variance (see Appendix A, Table 3). These results were viewed cautiously as any substantive significance was assessed as low. With that caveat in mind, it was noted that college students scoring highly on Description factor were not only unable to describe their feelings in general, but were overcome with their anger. Their pervasive angry feelings were kept inside, and they lacked the words to discuss their angry feelings. These students would generally be described as angry individuals. Depictions of these types of person are found frequently among certain populations of alexithymic individuals, including violent offenders (Keltikangas-Jarvinen, 1982) and persons with PTSD (Henry et al., 1992). While Berenbaum and Prince (1994) found that alexithymic person's were able to identify negative emotions like anger and disgust in others, this study indicated that students with high scores on Description factor would be unable to describe those same angry or disgusted feelings they had just identified.

The linear relationship between the Externalization factor and the psychological measures was best described by the significant variables need for cognition and trait anxiety, which accounted for 12% of the 16% of the explainable variance ($p < .01$). Psychological mindedness contributed another 2% of variance ($p < .05$) which also was statistically significant, but has low substantive significance (see Appendix A, Table 3). College students in this sample who did not enjoy expending a lot of effort in thinking about problems reported higher levels of cognitive superficiality. This finding expanded on previous work that demonstrated inverse relationships between the NCS and the TAS (Taylor, Bagby, Ryan, and Parker, 1990) and the NCS and the TAS-20 (Taylor, 1992).

Ongoing or trait anxiety was a strong descriptor of cognitive superficiality. Taylor, Bagby, Ryan, and Parker, (1990) found negative relationships between NCS and global TAS scores, and Taylor, (1992) also reported negative relationships between NCS and global TAS-20 scores.

Cognitive theory would suggest that a greater understanding of one's world may lead to heightened feelings of control and lessened feelings of anxiety. This study suggested that long-term anxiety was associated with a propensity to turn one's thinking outward, and not inward to deeper issues, which could be expected to contribute to a continuance of the anxiety state. Again, psychological mindedness was associated with cognitive superficiality, which was expected due to the similarity of the concepts.

Psychological mindedness was the most significant descriptor in the linear relationship between the psychological measures and the Internalization factor. It contributed 10 of the 16% of the explained variance ($p < .01$) in Internalization factor. Need for cognition and anger expression inward contributed another 4% of explainable variance ($p < .05$), which had low substantive significance (see Appendix A, Table 3). In this sample of college students, those that did not value looking inward at their feelings, nor used introspection as a means of solving their problems, were unlikely to spend much time thinking deeply about their problems, and were unlikely to feel close to others. The students reported feeling emotionally isolated from other people, and they tended to turn their angry feelings in towards themselves.

Conclusions from the Multiple Regression Analysis

The results of the multiple regression indicated that confusion with emotion was best described by the linear relationship defined by the following psychological measures: long-term anxiety, psychological mindedness, depression, and one's tendency to turn anger inward towards oneself. Together, these measures describe a highly uncomfortable emotional state, with coping strategies that do not seem likely to help in the removal of the emotional discomfort.

Communication factor was the second extracted factor, and the linear relationship between the psychological measures and the Communication factor was best described by psychological mindedness and anger expression turned inward. These findings indicated that maladaptive coping strategies were the most important in understanding what makes up Communication factor. These students either lacked the motivation to or had an inability to use their own mental resources to solve their personal problems. Also, they had a self-punitive style of coping with anger. The results suggested maladaptive coping was being used during times of stress. Counseling approaches, including cognitive-behavioral interventions might be quite useful in teaching people with alexithymic characteristics new ways of coping with perceived stresses.

The Description factor, the third factor extracted in the study, was best described by anger expression turned inward and trait anger. These results suggested that students who had difficulty describing their feelings tended to have long-term internalized anger.

The Externalization factor was best described by need for cognition, trait anxiety, and psychological mindedness. This study suggested that long-term anxiety was related to

a propensity to turn one's thinking outward, and not inward to deeper issues, which could be expected to contribute to a continuance of the anxiety state. Being psychologically minded or introspective would nearly rule out the possibility of alexithymia, due to the opposite nature of the constructs. The strength of psychological mindedness on this regression supported the discriminant value of psychological mindedness in a construct validity study.

Internalization factor was the fifth factor extracted in the multiple regression analysis. Psychological mindedness, need for cognition and anger expression inward were the best descriptors of this factor. This suggested that college students that did not value introspection as a means of solving their problems would likely score poorly on the Internalization factor, and would likely be poor candidates for introspective styles of psychotherapy. Behavioral approaches may be more appropriate for helping these types of students make changes in their lives.

Relationships Among Factors and Psychological Measures

Correlational data was used to further discuss the relationships among the extracted factors and the psychological measures of the other factors (see Appendix A, Table 2). In regards to factor one, increased confusion about feelings was associated with higher levels of depression. This finding confirmed previous research findings of a positive relationship between depression and alexithymia (e.g. Prince & Berenbaum, 1993; Haviland, Hendryx, Cummings, Shaw & MacMurray, 1991). This finding also suggested that people with alexithymia might use confusion as a coping strategy to deal with their depression. This conclusion supported earlier findings where alexithymia was used as a

defense against depressed mood (Haviland, Shaw, Cummings & MacMurray, 1988; Hendryx, Haviland & Shaw, 1991; Haviland, Hendryx, Shaw & Henry, 1994). In this study, an alexithymic stance against depression reduced the student's vulnerability to further emotional hurts by allowing deeper emotional issues to remain untouched.

Increased confusion about feelings was also associated with lower levels of psychological mindedness (the motivation to introspect about one's thoughts, feelings and behaviors). This finding implied that students who did not care to look at their feelings or consider the implications of their behaviors or explore their thoughts and beliefs, were expected to be confused about their emotions or lack thereof. That implication was seen as reasonable, if one does not value an activity, they are less likely to be proficient at than persons that do value the same activity.

Higher levels of confusion about emotion was also associated with lower levels of need for cognition. Confusion was defined in terms of the inability to distinguish and label emotions as compared to other forms of bodily arousal. This inverse relationship suggested that alexithymic confusion might be accompanied by the tendency not to enjoy and/or engage in complex thought.

Increased confusion about feelings was associated with increased state and trait anger, and with increased anger expression in and out in this sample of college students. It could be predicted that as the alexithymic student's anger escalated, anything said by the student could become increasingly concrete in hopes of masking their emotions as their cognitive confusion mounts.

Correlational data suggested a strong positive relationship existed between immediate, short-term anxiety and confusion with feelings. This data suggested that emotional uncertainty would likely accompany a state of immediate anxiety. A strong positive relationship was noted between long-term anxiety and confusion about emotions. These results suggested high levels of ongoing anxiety could be expected to co-occur with emotional confusion.

With respect to factor two, increased difficulty with communicating emotions was associated with higher levels of depression in this sample of college students. The use of alexithymia as a defense may reduce communication of their feelings regardless of whether or not the students wanted to communicate their feelings. Alexithymia might therefore, be invoked as an unconscious defense mechanism.

Higher levels of college student's relative inability to communicate feelings was associated with lower levels of psychological mindedness (the motivation to examine one's thoughts, feelings, and behaviors). This finding suggested that when students don't value introspection (and from the discussion above were likely confused about what they found when they looked inward), they were even more unlikely to talk about their internal experiences. A similar finding was noted with respect to the association between higher levels of the relative inability to communicate feelings and lower levels of the need for cognition. Students who endorsed difficulties with communicating their feelings at a higher level also reported getting little enjoyment out of solving complex problems or engaging in complex thought.

Increased difficulty in communicating one's emotions was associated with higher levels of trait anger and "anger expression in." According to these findings, a person who increasingly turns their anger towards themselves, would also tend to shutdown their verbal communication about feelings towards others.

Correlational data suggested a positive relationship existed between immediate, short-term anxiety and the ability to communicate feelings. This data suggested that the reluctance to discuss feelings would likely accompany a state of immediate anxiety. Higher levels of difficulties with the communication of emotion were also associated with greater levels of trait anxiety. This finding was consistent with others conceptualizations of alexithymia acting as a coping strategy, which allows the student to "close down" emotionally. The strategy was thought to provide an escape from stressors, which would allow the student to continue functioning at a more concrete level.

Correlations with factor three suggested that increased difficulty with describing emotion was associated with lower levels of depression and less anger expression in among this sample of college students. These correlations were statistically significant, but were so small as to not have substantial significance.

In this sample of college students, an inverse relationship was noted between need for cognition and the externalization factor, meaning that as levels of need for cognition increased, levels of externalization decreased. This relationship was expected, as these concepts were nearly opposite in meaning. Recall that need for cognition was defined as the tendency to engage in and enjoy thinking, and externalization was conceptualized as a

cognitive superficiality, where among high externalization scorers, deep thought was actually avoided.

Correlational results suggested that a greater propensity to externalize one's thinking was associated with lower levels of psychological mindedness, and with lower levels of state anger. These results reached statistical significance, but the values were small enough as to not have substantial meaning.

Finally, with regards to factor five, a greater denial of the importance of looking inward to solve one's problems was associated with lower levels of psychological mindedness in this sample of college students. This association was predictable due to the nearly "opposite" nature of the Internalization factor and psychological mindedness.

Higher levels of denial of the importance of looking inward for solutions to problems was weakly associated with lower levels of anger control in this sample of college students. Higher levels of denial of internalization were also associated with lower levels of need for cognition, and with higher levels of both state and trait anxiety. While significant statistically, the practical significance of the anxiety data with regards to the Internalization factor was minimal.

Social Implications/Clinical Recommendations

The results advanced in this study represented a further refinement of the factor structure of the TAS-20 and the what the score may be telling a clinician about the person taking the TAS-20. This data set and its five extracted factors produced a multi-dimensional, mostly uncorrelated structure similar to the three factor structure of Haviland and Reise (1996) but relatively dissimilar to the three factor structure of Bagby, Taylor

and Parker (1993). The Haviland and Reise model viewed alexithymia as a defensive strategy against anxiety and depression. The results of this study provide additional support for the conceptualization of alexithymia as a defensive strategy against anxiety and depression. According to the results of this study, the TAS-20 measured five somewhat overlapping factors of alexithymia.

Alexithymia has been discussed as a construct that exists on a continuum (Kooiman, 1998), an idea that was apparent throughout the alexithymia literature but contrary to the conceptualization of Bagby, Taylor and Parker (1993). Although they suggested cutoffs for alexithymic vs. not alexithymic, they leave an ambiguous range between the scores of 51 an 61, which implies some kind of continuum exists. The factor structure derived in this study supported the continuum hypothesis of alexithymia. High scores on certain factors may not meet required cutoffs established by Bagby, Taylor and Parker (1993), however, alexithymic defenses against anxiety and depression could be operating in our clients. As was discussed above, such defenses might be a clue to further issues the person was unable to discuss right then or even in that session. Further exploration of those issues needs to occur, and the most plausible approaches should emphasize areas that are strengths to these persons. Concrete behavioral interventions like affect naming, emotions programs, modeling, or even physiological interventions like biofeedback would be most appropriate as therapeutic strategies to decrease anxiety or depression and how those feeling states are hampering the person from meeting their goals. A plan needs to be developed with the collaboration of the client, using concrete

terms so that they can continue to progress towards their goals even as alexithymic defenses are mobilized in the future.

Haviland and Riese (1996) recommended re-examining the factor structure of the TAS-20, tabulating scores for the subscales, and being very wary in using scores from the externally-oriented thinking subscale, as it does only a "fair job" in assessing the cognitive component of alexithymia. The author of this study calls for similar recommendations. Further research is necessary to clean up the existing factor structure. This may include writing more items to equalize the number of items across factors, as the distribution of items across factors is clearly unbalanced. Additionally, work needs to be done to describe what clinical features can be expected from elevations on the extracted factors. This recommendation could manifest as "code types" across individuals. A single numerical score for alexithymia may not be useful at all given the repeated finding that the TAS-20 has several factors. However, the TAS-20 should be advanced as a personality inventory, where more subtle nuances of alexithymic coping styles could be assessed with multiple scales.

Limitations

The interpretation of the results of this study were subject to the following limitations. First, although the design tried to minimize this effect, the sample was relatively homogeneous and non-random. Female participants outnumbered male participants by a nearly 2:1 margin. The mean age of those participating was 20.39 years. The majority of the participants were white (80%), single (88.2%), and lower classmen (e.g. freshman or sophomore; 88.2%). Homogeneous and non-random samples often

restrict the range of the results. For this study, the factor structure derived here might be different from what could be extracted from a more heterogeneous and random sample. Second, allowing the student participants to earn extra credit might have (along with possible response sets due to the homogeneity of the groups) distorted the validity of the instruments used. Third, the instruments used in this study were developed for use in Western cultures, and although work is being done on applying the TAS-20 in different cultures, cross-cultural analyses were not possible due to the homogeneity of the sample. Finally, the results of this study have not been cross-validated, which indicated that these results and any subsequent implications need to be viewed with caution.

REFERENCES

Abramson, L., McClelland, D. C., Brown, D. & Kelner, S., Jr. (1991). Alexithymic characteristics and metabolic control in diabetic and healthy adults. Journal of Nervous and Mental Disease, 179(8), 490-494.

Acklin, M.W. & Bernat, E. (1987). Depression, alexithymia, and pain prone disorder: A Rorschach study. Journal of Personality Assessment, 51(3), 462-479.

Altshul, V. A. (1977). The so-called boring patient. American Journal of Psychotherapy, 31, 533-545.

American Psychological Association. (1992). Ethical principles of psychologists and code of conduct. American Psychologist, 47, 1597-1611.

American Psychiatric Association: Diagnostic and Statistical Manual of Mental Disorders (3rd Ed.), Washington, D. C., 1980.

Apfel, R. J. & Sifneos, P. E. (1979). Alexithymia: Concept and measurement. Psychotherapy and Psychosomatics, 32, 180-190.

Applebaum, S. A. (1973). Psychological-mindedness: Word, concept and essence. International Journal of Psychoanalysis 54, 35-46.

Bagby, R. M., Parker, J. D. A & Taylor, G. J. (1994). The Twenty Item Toronto Alexithymia Scale: Item selection and cross-validation of the factor structure. Journal of Psychosomatic Research, 38(1), 23-32.

Bagby, R. M., Taylor, G. J. & Atkinson, L. (1988). Alexithymia: A comparative study of three self-report measures. Journal of Psychosomatic Research, 32, 107-116.

Bagby, R. M., Taylor, G. J. & Parker, J. D. A. (1988). Construct validity of the Toronto Alexithymia Scale. Psychotherapy and Psychosomatics, 50, 29-34.

Bagby, R. M., Taylor, G. J. & Parker, J. D. A. (1992). Reliability and validity of the 20-item Revised Toronto Alexithymia Scale. Presented at the 50th anniversary meeting of the American Psychosomatic Society, New York.

Bagby, R. M., Taylor, G. J., Parker, J. D. A. & Loiselle, C. (1990). Cross-validation of the factor structure of the Toronto Alexithymia Scale. Journal of Psychosomatic Research, 34(1), 47-51.

Bagby, R. M., Taylor, G. J. & Ryan, D. P. (1986). Toronto Alexithymia Scale: Relationship with personality and psychopathology measures. Psychotherapy and Psychosomatics, 45, 207-215.

Beck, A. T., Epstein, N., Brown, G. & Steer, R. (1988). An inventory for measuring clinical anxiety: Psychometric properties. Journal of Clinical and Consulting Psychology, 56, 893-897.

Beck, A. T. & Steer, R. A. (1993). Beck Depression Inventory Manual. San Antonio: The Psychological Corporation.

Berenbaum, H. & James, T. (1994). Correlates and retrospectively reported antecedents of alexithymia. Psychosomatic Medicine, 56, 353-359.

Berenbaum, H. & Irvin, S. (1996). Alexithymia, anger, and interpersonal behavior. Psychotherapy and Psychosomatics, 65(4), 203-208.

Berenbaum, H. & Prince, J. D. (1994). Alexithymia and the interpretation of emotion-relevant information. Cognition and Emotion, 8(3), 231-244.

Biskin, B. H. (1992). Review of the State-Trait Anger Expression Inventory. In J. J. Kramer & J. D. Conoley, (Eds.), The Eleventh Mental Measurements Yearbook (pp. 868-869). Lincoln, Nebraska: University of Nebraska Press.

Blishin, B. R. Carroll, W. K. & Moore, C. (1987). The 1981 socioeconomic index for occupations in Canada. Canadian Review of Sociological Anthropology, 24, 456-488.

Borens, R., Grosse-Schulte, E., Jaensch, W. & Kortemme, K.-H. (1977). Is 'alexithymia' but a social phenomenon? Psychotherapy and Psychosomatics, 28, 193-198.

Bourke, M. P., Taylor, G. J., Parker, J. D. A. & Bagby, R. M. (1992). Alexithymia in women with anorexia nervosa: A preliminary investigation. British Journal of Medical Psychology, 61, 255-266.

Buck, R. (1985). Prime theory: An integrated view of motivation and emotion. Psychological Review, 92(3), 389-413.

Cacioppo, J. T. & Petty, R. E. (1982). The need for cognition. Journal of Personality and Social Psychology, 42(1), 116-131.

Cacioppo, J. T., Petty, R. E. & Kao C. F. (1984). The efficient assessment of the need for cognition. Journal of Personality Assessment, 48(3), 306-307.

Chaplin, W. F. (1984). State-Trait Anxiety Inventory. In Keyser, D. J. & Sweetland, R. C. (Eds.), Test Critiques, (pp. 626-632). Kansas City, Missouri: Test Corporation of America, Westport Publishers Inc.

Cohen, A. R., Stotland, E. & Wolfe, D. M. (1955). An experimental investigation of need for cognition. Journal of Abnormal and Social Psychology, 51, 291-294.

Cohen, K., Auld, F. & Brooker, H. (1994). Is alexithymia related to psychosomatic disorder and somatizing? Journal of Psychosomatic Research, 38(2), 119-127.

Cohen, K, Auld, F. & Catchlove, R. (1985). Alexithymia: The development of a valid and reliable measure (the objectively scored archetypal 9 test). Journal of Nervous and Mental Disease, 173, 621-627.

Conte, H. R., Buckley, P., Picard, S., Karasu, T. B. & Lotterman, A. (1995). Relationships between psychological mindedness and personality traits and ego functioning: Validity studies. Comprehensive Psychiatry, 36(1), 11-17.

Conte, H. R., Plutchik, R., Jung, B. B., Picard, S., Karasu, T. B. & Lotterman, A. (1990). Psychological mindedness as a predictor of psychotherapy outcome: A preliminary report. Comprehensive Psychiatry, 31(5), 426-431.

Costa, P. T. & McCrae, R. R. (1985). The NEO Personality Inventory manual. Odessa, Florida: Psychological Assessment Resources, Inc.

Costa, P. T. & McCrae, R. R. (1987). Personality assessment in psychosomatic medicine: Value of a trait taxonomy. Advances in Psychosomatic Medicine, 17, 71-82.

Cox, B. J., Swinson, R. P., Shulman, I. D. & Bourdeau, D. (1995). Alexithymia in panic disorder and social phobia. Comprehensive Psychiatry, 36(3), 195-198.

Cremerius, J. (1976). Some reflections about the conception of psychosomatic patients in the French school. Psychotherapy and Psychosomatics, 28, 236-242.

Crowne, D. P. & Marlowe, D. (1960). A new scale of social desirability independent of psychopathology. Journal of Consulting and Clinical Psychology, 24, 349-354.

de Groot, J. M., Rodin, G. & Olmstead, M. P. (1995). Alexithymia, depression, and treatment outcome in bulimia nervosa. Comprehensive Psychiatry, 36(1), 53-60.

Demers-Derosiers, L. (1982). Influence of alexithymia on symbolic function. Psychotherapy and Psychosomatics, 38, 103-120.

Dodge, K. A. & Garber, J. (1991). Domains of emotion regulation. In Garber, J., Dodge, K. A. (Eds.), The Development of Emotion Regulation and Dysregulation, Cambridge University Press, 3-11.

Eiden, T. C. (1994). Alexithymic characteristics in hypertensive and healthy adults. Unpublished Master's thesis.

Farber, B. A. (1985). The genesis, development and implications of psychological-mindedness in psychotherapists. Psychotherapy Research and Practice, 22, 170-177.

Freud, S. (1895). On the grounds for detaching a particular syndrome from neuroasthenia under the description "anxiety neurosis," Standard Edition, 3, 90-115.

Freud, S. (1926). Inhibitions, symptoms, and anxiety. Standard Edition, 20, 87-156.

Fukunishi, I. (1994). Social desirability and alexithymia. Psychological Reports, 75, 835-838.

Fukunishi, I., Ichikawa, M., Ichikawa, T. & Matsuzawa, K. (1992). Alexithymia and depression in families with alcoholics. Psychopathology, 25(6), 326-330.

Fuqua, D. R., Leonard, E., Masters, M. A., Smith, R. J., Campbell, J. L. & Fischer, P. C. (1991). A structural analysis of the State-Trait Anger Expression Inventory. Educational and Psychological Measurement, 51, 439-446.

Gage, B. C. & Egan, K. J. (1984). The effect of alexithymia on morbidity in hypertensives. Psychotherapy and Psychosomatics, 41, 136-144.

Gardos, G., Schniebolk, S. & Mirin, S. M. (1984). Alexithymia: Towards validation and measurement. Comprehensive Psychiatry, 25, 278-282.

Haviland, M. G., Hendryx, M. S., Shaw, D. G. & Henry, J. P. (1994). Alexithymia in women and men hospitalized for psychoactive substance dependence. Comprehensive Psychiatry, 35(2), 124-128.

Haviland, M. G., Hendryx, M. S., Cummings, M. A., Shaw, D. G. & MacMurray, J.P. (1991). Multidimensionality and state dependency of alexithymia in recently sober alcoholics. Journal of Nervous and Mental Disease, 179(5), 284-290.

Haviland, M. G., MacMurray, J. P. & Cummings, M. A. (1988). The relationship between alexithymia and depressive symptoms in a sample of newly abstinent alcoholic inpatients. Psychotherapy and Psychosomatics, 49, 37-40.

Haviland, M. S. & Reise, S. P. (1996). Structure of the Twenty Item Toronto Alexithymia Scale. Journal of Personality Assessment, 66(1), 116-125.

Haviland, M. S., Shaw, D. G., Cummings, M. A. & MacMurray, J. P. (1988). Alexithymia: Subscales and relationship to depression. Psychotherapy and Psychosomatics, 50(3), 164-170.

Haviland, M. S., Shaw, D. G., MacMurray, J. P. & Cummings, M. A. (1988). Validation of the Toronto Alexithymia Scale with substance abusers. Psychotherapy and Psychosomatics, 50(2), 81-87.

Hendryx, M. S., Haviland, M. G. & Shaw, D. G. (1991). Dimensions of alexithymia and their relationships to anxiety and depression. Journal of Personality Assessment, 56(2), 227-237.

Hendryx, M. S., Haviland, M. G., Gibbons, R. D. & Clark, D. C. (1992). An application of item response theory to alexithymia assessment among abstinent alcoholics. Journal of Personality Assessment, 58(3), 506-515.

Hoppe, K. D., & Bogen, J. E. (1977). Alexithymia in twelve commisurotomized patients. Psychotherapy and Psychosomatics, 28, 148-155.

Horton, P. C., Gewirtz, H. & Kreutter, K. J. (1992). Alexithymia-state and trait. Psychotherapy and Psychosomatics, 58, 91-96.

Heiberg, A. N. & Heiberg, A. (1978). A possible genetic contribution to the alexithymic trait. Psychotherapy and Psychosomatics, 30, 205-210.

Kauhanen, J., Kaplan, G. A., Julkunen, T. W., Wilson & Salonen, J. T. (1993). Social factors in alexithymia. Comprehensive Psychiatry, 34(5), 330-335.

Keiser, R. E. & Prather, E. N. (1990). What is the TAT? A review of ten years of research. Journal of Personality Assessment, 55 (3&4), 800-803.

Kellner, R. (1993). The significance of somatization. Homeostasis in Health and Disease, 33, 2-6.

Keltikangas-Jarvinen, L. (1982). Alexithymia in violent offenders. Journal of Personality Assessment, 46(5), 462-467.

Kierkegaard, S. (1944). Either/or. Princeton, New Jersey: Princeton University Press.

Kirmayer, L. J. (1987). IV Languages of suffering and healing: Alexithymia as a social and cultural process. Transcultural Psychiatric Research Review, 24, 119-136.

Kirmayer, L. J., Robbins, J. M. & Paris, J. (1994). Somatoform disorders: Personality and the social matrix of somatic distress. Journal of Abnormal Psychology, 103(1), 125-136.

Kleiger, J. H., & Kinsman, R. A. (1980). The development of an MMPI alexithymia scale. Psychotherapy and Psychosomatics, 34, 17-24.

Kooiman, C. G. (1998). The status of alexithymia as a risk factor in medically unexplained physical symptoms. Comprehensive Psychiatry, 39(3), 152-159.

Kottler, J. A. (1993). On being a therapist. San Francisco, California: Jossey Bass.

Krystal, H. (1979). Alexithymia and psychotherapy. American Journal of Psychotherapy, 33(1), 17-31.

Krystal, H. (1988). Integration and self-healing: Affect, trauma, alexithymia. Hillsdale, NJ: Analytic Press.

Krystal, J.H., Giller, E. L. & Cicchetti, D. V. (1986). Assessment of alexithymia in posttraumatic stress disorder and somatic illness: Introduction of a reliable measure. Psychosomatic Medicine, 48, 84-94.

Kuczmierczyk, A. R., Labrum, A. H. & Johnson, C. C. (1995). The relationship between mood, somatization, and alexithymia in premenstrual syndrome. Psychosomatics, 36(1), 26-32.

Lane, R. D., Sechrest, L., Reidel, R., Weldon, V., Kaszniak, A. & Schwartz, G. E. (1996). Impaired verbal and nonverbal emotion recognition in alexithymia. Psychosomatic Medicine, 58, 203-210.

Lang, P. J. (1984). Cognition in emotion: Concept and action. In Izard, C. E., Kagan, J., Zajonc, R. B. (Eds.) Emotion, Cognition, and Behavior, Cambridge University Press, Cambridge.

Lesser, I. M. (1981). A review of the alexithymia concept. Psychosomatic Medicine, 43(6), 531-543.

Lesser, I. M. & Lesser, B. Z. (1983). Alexithymia: Examining the development of a psychological concept. American Journal of Psychiatry, 140(10), 1305-1308.

Loiselle, C. G. & Dawson, C. (1988). Toronto Alexithymia Scale: Relationships with measures of patient self-disclosure and private self-consciousness. Psychotherapy and Psychosomatics, 50, 109-116.

Lolas, F., de la Perra, G. & Arohnson, S. (1980). On the measurement of alexithymic behavior. Psychotherapy and Psychosomatics, 33, 139-146.

Lumley, M. A., Mader, C., Gramzow, J. & Papineau, K. (1996). Family factors related to alexithymia characteristics. Psychosomatic Medicine, 58(3), 211-216.

Lundy, A. (1988). Instructional set and thematic apperception test validity. Journal of Personality Assessment, 52(2), 309-320.

Mahler, M. S., Pine, F., & Bergman, A. (1975). The psychological birth of the human infant. New York: Basic Books.

Martin, J. B. & Pihl, R. O. (1985). The stress-alexithymia hypothesis: Theoretical and empirical considerations. Psychotherapy and Psychosomatics, 43, 169-173.

Marty, P. & de M' Uzan, M. (1963). La pensee operatoire. Revue Francaise de Psychanalyse, 27, 345-356.

Mayer, J. D., DiPaolo, M. & Salovey, P. (1990). Perceiving affective content in ambiguous visual stimuli: A component of emotional intelligence. Journal of Personality Assessment, 54 (3&4), 772-781.

McDonald, P. W. & Prkachin, K. M. (1990). The expression and perception of facial emotion in alexithymia: A pilot study. Psychosomatic Medicine, 52, 199-210.

McDougall, J. (1985). Theaters of the mind: Illusion and truth on the psychoanalytic stage. New York: Basic Books.

Morrison, S. L. & Pihl, R. O. (1989). Psychometrics of the Schalling-Sifneos and Toronto Alexithymia Scales. Psychotherapy and Psychosomatics, 51, 83-90.

Murphy, G. (1947). Personality: A biosocial approach to origins and structure. New York: Harper.

Murray, H. A. (1943). Thematic Apperception Test manual. Cambridge, MA: Harvard University Press.

Myers, L. B. (1995). Alexithymia and repression: The role of defensiveness and trait anxiety. Personality and Individual Differences, 19(4), 489-492.

Nemiah, J. C. (1977). Alexithymia: Theoretical considerations. Psychotherapy and Psychosomatics, 28(1-4), 199-206.

Nemiah, J. C. (1984). Anxiety and psychodynamic theory. In Grinspoon, L., (Ed.) Psychiatric Update: the American Psychiatric Annual Review, American Psychiatric Press, Washington, D. C., vol 3, 426-440.

Nemiah, J. C., & Sifneos, P. E. (1970). Psychosomatic illness: A problem in communication. Psychotherapy and Psychosomatics, 18, 154-160.

Newton, T. L. & Contrada, R. J. (1994). Alexithymia and repression: Contrasting emotion-focused coping styles. Psychosomatic Medicine, 56, 457-462.

Norton, N. C. (1989). Three scales of alexithymia: Do they measure the same thing. Journal of Personality Assessment, 53(3), 621-637.

Parker, J. D. A., Bagby, R. M., Taylor, G. J. (1991). Alexithymia and depression: Distinct or overlapping constructs? Comprehensive Psychiatry, 32(5), 387-394.

Parker, J. D. A., Bagby, R. M. & Taylor, G. J. (1991). Alexithymia and depression: Distinct or overlapping constructs? Comprehensive Psychiatry, 32(5), 387-394.

Parker, J. D. A., Taylor, G. J. & Bagby, R. M. (1989). The alexithymia construct: Relationship with sociodemographic variables and intelligence. Comprehensive Psychiatry, 30(5), 434-441.

Parker, J. D. A., Taylor, G. J. & Bagby, R. M. (1992). Relationship between conjugate lateral eye movements and alexithymia. Psychotherapy and Psychosomatics, 57, 94-101.

Parker, J. D. A., Taylor, G. J. & Bagby, R. M. (1993). Alexithymia and the processing of emotional stimuli: An experimental study. New Trends in Experimental and Clinical Psychiatry, 11(2), 9-14.

Parker, J. D. A., Taylor, G. J. & Bagby, R. M. (1993). Alexithymia and the facial expressions of emotion. Psychotherapy and Psychosomatics, 59, 197-202.

Parker, J. D. A., Taylor, G. J., Bagby, R. M. & Acklin, M. W. (1993). Alexithymia in panic disorder and simple phobia: A comparative study. American Journal of Psychiatry, 150(7), 1105-1107.

Pennebaker, J. W., Hughes, C. F. & O'Heeron, R. C. (1987). The psychophysiology of confession: Linking inhibitory and psychosomatic processes. Psychotherapy and Psychosomatics, 52(4), 781-793.

Piotrowski, C. & Keller, J. (1984). Psychodiagnostic testing in APA-approved clinical psychology programs. Professional Psychology: Research and Practice, 15, 450-456.

Prince, J. D. & Berenbaum, H. (1993). Alexithymia and hedonic capacity. Journal of Research in Personality, 27(1), 15-22.

Raven, J. C., Court, J. H. & Raven J. (1977). Manual for Raven's Progressive Matrices and Vocabulary Scales. London, Lewis.

Retzlaff, P. (1992). Review of the State-Trait Anger Expression Inventory in J. J. Kramer & J. D. Conoley, (Eds.), The Eleventh Mental Measurements Yearbook (pp. 869-870). Lincoln, Nebraska: University of Nebraska Press.

Rubino, I. A., Grasso, S., Sonnino, A. & Pezzarossa, B. (1991). Is alexithymia a non-neurotic personality dimension? British Journal of Medical Psychology, 64, 385-391.

Ruesch, J. (1948). The infantile personality. Psychosomatic Medicine, 10, 134-144.

Saarijarvi, S., Salminen, J. K., Tamminen, T. & Aairela, E. (1993). Alexithymia in psychiatric consultation-liaison patients. General Hospital Psychiatry, 15(5), 330-330.

Sadowski, C. J. (1993). An examination of the short Need for Cognition Scale. Journal of Psychology, 127(4), 451-454.

Sadowski, C. J. & Gulgoz, S. (1992). Internal consistency and test-retest reliability of the Need for Cognition Scale. Perceptual and Motor Skills, 74(2), 610.

Salminen, J. K., Saarijarvi, S. Aairela, E. & Tamminen, T. (1994). Alexithymia-state or trait? One year follow-up study of general hospital psychiatric consultation out-patients. Journal of Psychosomatic Research, 38(7), 681-685.

Sifneos, P. E. (1973). The prevalence of alexithymic characteristics in psychosomatic patients. Psychotherapy and Psychosomatics, 22, 255-262.

Sifneos, P. E. (1974). A reconsideration of psychodynamic mechanisms in psychosomatic symptom formation in view of recent clinical observations. Psychotherapy and Psychosomatics, 24, 151.

Sifneos, P. E. (1986). The Schalling-Sifneos Personality Scale-Revised. Psychotherapy and Psychosomatics, 45, 161-165.

Sifneos, P. E. (1988). Alexithymia and its relationship to hemispheric specialization, affect, and creativity. Psychiatric Clinics of North America, 11(3), 287-292.

Spielberger, C. D., Gorsuch, R. L., Lushene, R., Vagg, P. R. & Jacobs, G. A. (1983). Manual for the State-Trait Anxiety Inventory (STAI, Form Y). Palo Alto, California: Consulting Psychologists Press.

Spielberger, C. D., Krasner, S. S. & Solomon, E. P. (1988). The experience, expression, and control of anger. In Janisse (Ed.). Health Psychology: Individual Differences and Stress. New York: Sringer-Verlag.

Taylor, G. J. (1984). Psychotherapy with the boring patient. Canadian Journal of Psychiatry, 29, 217-222.

Taylor, G. J. (1992). Psychoanalysis and Psychosomatics: A new synthesis. Journal of the American Academy of Psychoanalysis, 20(2), 251-275.

Taylor, G. J. (1994). The alexithymia construct: Conceptualization, validation, and relationship with basic dimensions of personality. New Trends in Experimental and Clinical Psychiatry, 10(2), 61-74.

Taylor, G. J. & Bagby, R. M. (1988). Measurement of alexithymia: Recommendations for clinical practice and future research. Psychiatric Clinics of North America, 11, 351-366.

Taylor, G. J., Bagby, R. M. & Parker, J. D. A. (1990). A preliminary investigation of alexithymia in men with psychoactive substance dependence. American Journal of Psychiatry, 147, 1228-1230.

Taylor, G. J, Bagby, R. M. & Parker, J. D. A. (1992). The Revised Toronto Alexithymia Scale: Some reliability, validity, and normative data. Psychotherapy and Psychosomatics, 57, 34-41.

Taylor, G. J., Bagby, R. M., Ryan, D. P. & Parker, J. D. A. (1990). Validation of the alexithymia construct: A measurement-based approach. Canadian Journal of Psychiatry, 35, 290-297.

Taylor, G. J., Bagby R. M., Ryan, D. P., Parker, J. D. A., Doody, K. F. & Keefe, P. (1988). Criterion validity of the Toronto Alexithymia Scale. Psychosomatic Medicine, 50, 500-509.

Taylor, G. J., Doody, K. & Newman, A. (1981). Alexithymic characteristics in patients with inflammatory bowel disease. Canadian Journal of Psychiatry, 26(7), 470-474.

Taylor, G. J., Parker, J. D. A. & Bagby, R. M. (1990). A preliminary investigation of alexithymia in men with psychoactive substance dependence. American Journal of Psychiatry, 147, 1228-1230.

Taylor, G. J., Parker, J. D. A., Bagby, R. M. & Acklin, M. W. (1992). Alexithymia and somatic complaints in psychiatric out-patients. Journal of Psychosomatic Research, 36(5), 417-424.

Taylor, G. J., Ryan, D. & Bagby, R. M. (1985). Toward the development of a new self-report alexithymia scale. Psychotherapy and Psychosomatics, 44, 191-199.

Taylor, J. A. (1953). A personality scale of manifest anxiety. Journal of Abnormal Social Psychology, 48, 285-290.

Vane, J. R. & Guarnaccia, V. J.(1989). Personality theory and personality assessment measures: How helpful to the clinician? Journal of Clinical Psychology, 45(1), 5-19.

von Bertalanffy, L. (1968). General Systems Theory. Braziller: New York.

Watt, J. D. & Blanchard, M. J. (1994). Boredom proneness and the need for cognition. Journal of Research in Personality, 28(1), 44-51.

Wehmer, F., Brejnak, C. Lumley, M. & Stettner, L. (1995). Alexithymia and physiological reactivity to emotion-provoking visual scenes. Journal of Nervous and Mental Disease, 183(6), 351-357.

Weinryb, R. M. (1995). Alexithymia: Old wine in new bottles? Psychoanalysis and Contemporary Thought, 64, 159-195.

Weinryb, R. M., Gustavsson, J. P., Asberg, M. & Rossel, R. J. (1994). Relationship between components of alexithymia as measured with psychodynamic ratings and subjective lack of well-being. Psychotherapy and Psychosomatics, 61, 100-108.

Wise, T. N., Jani, N. N., Kass, E. B. & Sonnenschein, K. (1988). Alexithymia: Relationship to severity of medical illness and depression. Psychotherapy and Psychosomatics, 50(2), 68-71.

Wise, T. N. & Mann, L. S. (1994). The relationship between somatosensory amplification, alexithymia, and neuroticism. Journal of Psychosomatic Research, 38(6), 515-521.

Wise, T. N., Mann, L. S. & Epstein, S. (1991). Ego defensive styles and alexithymia: A discriminant validation study. Psychotherapy and Psychosomatics, 56, 141-145.

Wise, T. N., Mann, L. S. & Hill, B. (1990). Alexithymia and depressed mood in the psychiatric patient. Psychotherapy and Psychosomatics, 54(1), 26-31.

Wise, T. N., Mann, L. S. & Randell, P. (1995). The stability of alexithymia in depressed patients. Psychopathology, 28, 173-176.

Wise, T. N., Mann, L. S. & Shay, L. (1992). Alexithymia and the five-factor model of personality. Comprehensive Psychiatry, 33(3), 147-151.

Ushiroyama, T., Ueki, M., Orino, I. & Ikeda, A. (1994). Alexithymia and undefined complaints in climacteric women: Prevalence, correlates and personality traits. Research Communications in Psychology, Psychiatry and Behavior, 19(1-2), 49-58.

Zachary, R. A. (1986). Shipley Institute of Living Scale: Revised manual. Los Angeles, Western Psychological Services.

Zeitlin, S. B., Lane, R. D., O'Leary, D. S. & Schrift, M. J. (1989). Interhemispheric transfer deficit and alexithymia. American Journal of Psychiatry, 146(11), 1434-1438.

Zeitlin, S. B. & McNally, R. J. (1993). Alexithymia and anxiety sensitivity in panic disorder and obsessive-compulsive disorder. American Journal of Psychiatry, 150(4), 658-660.

Zeitlin, S. B. & McNally, R. J. (1994). Alexithymia and anxiety sensitivity in panic disorder and obsessive-compulsive disorder: Reply. American Journal of Psychiatry, 151(4), 628.

APPENDIX A

DATA TABLES

Table 1

Exploratory Factor Analysis Item Loadings for the TAS-20

Factor and Items		
Factor 1: Confusion		Item Loading
1.	I am often confused about what emotion I am feeling	.76
2.	It is difficult for me to find the right words for my feelings	.60
3.	I have physical sensations that even doctors don't understand	.50
6.	When I am upset, I don't know if I am sad, frightened, or angry	.68
7.	I am often puzzled by sensations in my body	.68
9.	I have feelings that I can't quite identify	.79
11.	I find it hard to describe how I feel about people	.63
13.	I don't know what's going on inside me	.83
14.	I often don't know why I am angry	.61
Factor 2: Communication Factor		Item Loading
12.	People tell me to describe my feelings more	.48
15.	I prefer talking to people about their daily activities rather than their feelings	.49
17.	It is difficult for me to reveal my to reveal my innermost feelings even to close friends	.77

Table 1 continued

Exploratory Factor Analysis Item Loadings for the TAS-20

Factor 3: Description Factor		Item Loading
4.	I am able to describe my feelings easily (reverse scored)	-.42
Factor 4: Externalization Factor		**Item Loading**
5.	I prefer to analyze problems rather than just describe them (reverse scored)	.58
8.	I prefer to just let things happen rather than to understand why they turned out that way	.65
Factor 5: Internalization Factor		**Item Loading**
18.	I can feel close to someone even in moments of silence (reverse scored)	.68
19.	I find examination of my feelings useful in solving personal problems (reverse scored)	.66

Table 2

Zero Order Correlations of Constructs Vs. TAS-20 Factors

Descriptor	Factors				
Variables	1	2	3	4	5
AngExpCon	-.266**	-.120*	-.037	-.027	-.221**
AngExpIn	.472**	.484**	-.140*	.017	.021
AngExpOut	.285**	.142*	.085	.005	.023
BDITotal	.529**	.286**	-.106*	-.086	.109*
NCSTotal	-.283**	-.165*	-.054	-.304**	-.201**
PMSTotal	-.488**	-.608**	-.038	-.142*	-.316**
StateAng	.216**	.115*	.040	-.117*	.054
StateAnx	.474**	.251**	-.069	-.081	.162**
TraitAng	.332**	.306**	.082	-.031	.100
TraitAnx	.563**	.319**	-.096	-.081	.143*

Note. AngExpCon = anger expression control, AngExpIn = anger expression inward, AngExpOut = anger expression outward, BDITotal = Beck depression inventory, NCSTotal = need for cognition scale, PMSTotal = psychological mindedness scale, StateAng = state anger, StateAnx = state anxiety, TraitAng = trait anger, TraitAnx = trait anxiety.

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

Factor 1: Confusion with emotions, Factor 2: Communication difficulties with emotion, Factor 3: Description of emotion difficulties, Factor 4: Externalization of thinking, Factor 5: lack of Internalization of thinking

Table 3

Multiple Regression of Convergent Scales on TAS Factors

Scales	R	Rsq	F(eqn)	RsqCh	F(Ch)	r
			Confusion Factor			
TrtAnx	.563	.317	112.616**	.317	112.616**	.563**
PMTot	.645	.415	85.999**	.099	40.894**	-.488**
BDITot	.664	.440	63.224**	.025	10.746**	.529**
AXIn	.677	.458	50.631**	.017	7.633**	.472**
NCSTot	.682	.465	41.512**	.007	3.187	-.283**
AXOut	.687	.472	35.458**	.007	3.243	.285**
TrtAng	.689	.475	30.616**	.003	1.296	.332**
StAng	.690	.476	26.786**	.001	.465	.216**
StAnx	.690	.477	23.769**	.001	.281	.474**
AXCon	.691	.477	21.329**	.000	.149	-.266**
			Communication Factor			
PMTot	.608	.370	142.553**	.370	142.553**	-.608**
AXIn	.664	.440	95.262**	.071	30.605**	.484**
AXCon	.668	.447	64.886**	.006	2.753	-.120*
TrtAng	.671	.450	49.080**	.003	1.366	.306**
StAng	.672	.452	39.355**	.002	.702	.115*
TrtAnx	.674	.454	32.931**	.001	.895	.319**
StAnx	.674	.455	28.233**	.000	.478	.251**
NCSTot	.674	.455	24.616**	.000	.074	-.165**
AXOut	.675	.455	21.804**	.000	.076	.142*
BDITot	.675	.455	19.547**	.000	.038	.286**

Table 3 continued

Multiple Regression of Convergent Scales on TAS Factors

Scales	R	Rsq	F(eqn)	RsqCh	F(Ch)	r
			Description Factor			
AXIn	.140	.019	4.825*	.019	4.825*	-.140*
TrtAng	.209	.044	5.517**	.024	6.108*	.082
BDITot	.225	.051	4.302**	.007	1.834	-.106*
NCSTot	.240	.058	3.676**	.007	1.757	-.054
StAng	.251	.063	3.220**	.005	1.375	.040
PMTot	.264	.070	2.963**	.006	1.636	-.038
TrtAnx	.273	.075	2.730*	.005	1.306	-.096
AXOut	.277	.077	2.455*	.002	.566	.085
StAnx	.279	.078	2.209*	.001	.301	-.069
AXCon	.280	.079	1.996*	.001	.146	-.037
			Externalization Factor			
NCSTot	.304	.092	24.661**	.092	24.661**	-.304**
TrtAnx	.351	.123	17.043**	.031	8.649**	-.081
PMTot	.378	.143	13.384**	.019	5.441*	-.142*
StAng	.388	.151	10.666**	.008	2.295	-.117*
StAnx	.393	.155	8.746**	.004	1.056	-.081
BDITot	.395	.156	7.348**	.002	.458	-.086
AXOut	.398	.158	6.355**	.002	.492	.005
TrtAng	.399	.159	5.590**	.001	.358	-.031
AXIn	.402	.161	5.023**	.002	.568	.017
AXCon	.402	.161	4.503**	.000	.010	-.027

Table 3 continued

Multiple Regression of Convergent Scales on TAS Factors

Scales	R	Rsq	F(eqn)	RsqCh	F(Ch)	r
			Internalization Factor			
PMTot	.316	.100	27.027**	.100	27.027**	-.316**
NCSTot	.345	.119	16.329**	.019	5.167*	-.201**
AXIn	.367	.135	12.502**	.016	4.391*	.021
AXCon	.385	.148	10.441**	.014	3.818	-.221**
AXOut	.399	.159	9.039**	.011	3.072	.023
StAnx	.404	.163	7.721**	.004	1.110	.162**
StAng	.405	.164	6.646**	.001	.325	.054
TrtAng	.405	.164	5.798**	.000	.051	.100
TrtAnx	.405	.164	5.135**	.000	.025	.143*
BDITot	.405	.164	4.603**	.000	.007	.109*

Note. TrtAnx = trait anxiety, PMTot = psychological mindedness scale, BDITot = Beck depression inventory, AXIn = anger expression inward, NCSTot = need for cognition scale, AXOut = anger expression outward, TrtAng = trait anger, StAng = state anger, StAnx = state anxiety, AXCon = anger expression control.
* $p < .05$, ** $p < .01$

Table 4

Linear Relationships Between Psychological Constructs and TAS-20 Factors

Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
TANX**	PMS**	AXIN*	NCS**	PMS**
PMS**	AXIN**	TANG*	TANX**	NCS*
BDI**	AXCON	BDI	PMS*	AXIN*
AXIN**	TANG	NCS	SANG	AXCON
NCS	SANG	SANG	SANX	AXOUT
AXOUT	TANX	PMS	BDI	SANX
TANG	SANX	TANX	AXOUT	SANG
SANG	NCS	AXOUT	TANG	TANG
SANX	AXOUT	SANX	AXIN	TANX
AXCON	BDI	AXCON	AXCON	BDI

Note. TANX = trait anxiety, PMS = psychological mindedness scale, BDI = Beck depression inventory, AXIN = anger expression inward, NCS = need for cognition scale, AXOUT = anger expression outward, TANG = trait anger, SANG = state anger, SANX = state anxiety, AXCON = anger expression control.

** = alpha = .01

* = alpha = .05

Table 5

Means and Standard Deviations of TAS-20 Items

Items		M	SD
1.	I am often confused about what emotion I am feeling.	2.20	1.17
2.	It is difficult for me to find the right words for my feelings.	2.73	1.30
3.	I have physical sensations that even doctors don't understand.	1.63	1.00
4.	I am able to describe my feelings easily.	2.56	1.14
5.	I prefer to analyze problems rather than just describe them.	2.39	1.03
6.	When I am upset, I don't know if I am sad, frightened, or angry.	2.14	1.11
7.	I am often puzzled by sensations in my body.	1.77	0.97
8.	I prefer to just let things happen rather than to understand why they turned out that way.	2.49	1.20
9.	I have feelings that I can't quite identify.	2.18	1.19
10.	Being in touch with emotions is essential.	1.92	0.94
11.	I find it hard to describe how I feel about people.	2.32	1.16
12.	People tell me to describe my feelings more.	2.37	1.22
13.	I don't know what's going on inside me.	1.93	1.12
14.	I often don't know why I am angry.	1.94	1.13

Table 5 continued

Means and Standard Deviations of TAS-20 Items

Items		M	SD
15.	I prefer talking to people about their daily activities rather than their feelings.	2.86	1.18
16.	I prefer to watch "light" entertainment shows rather than psychological dramas.	2.98	1.22
17.	It is difficult for me to reveal my innermost feelings, even to close friends.	2.44	1.38
18.	I can feel close to someone, even in moments of silence.	2.03	1.03
19.	I find examination of my feelings useful in solving personal problems.	2.23	0.98
20.	Looking for hidden meanings in movies or plays distracts from their enjoyment.	2.50	1.26

Note. The TAS-20 is scored in a Likert manner, 1 = Strongly Disagree, 2 = Moderately Disagree, 3 = Neither Disagree or Agree, 4 = Moderately Agree, 5 = Strongly Agree.

Table 6

Means and Standard Deviations of Psychological Measures

Scales	M	SD
BDI TOTAL	6.76	6.82
STATE ANGER	11.10	3.29
ANG EXP OUT	15.60	4.01
ANG EXP IN	16.21	4.34
TRAIT ANGER	17.97	5.03
ANG EXP CONT	23.58	5.43
STATE ANXIETY	34.51	11.52
TRAIT ANXIETY	36.22	10.80
TAS TOTAL	45.57	11.42
NCS TOTAL	59.53	12.21
PMS TOTAL	116.85	8.32

Note. BDI Total = total score on the Beck Depression Inventory, State Anger = subscale score from State Anger subscale of the State-Trait Anger Expression Inventory, Ang Exp Out = anger expression directed outward subscale score from the State-Trait Anger Expression Inventory, Ang Exp In = anger expression directed inward subscale score from the State-Trait Anger Expression Inventory, Trait Anger = subscale score from Trait Anger subscale of the State-Trait Anger Expression Inventory, Ang Exp Cont = anger expression controlled subscale score from the State-Trait Anger Expression Inventory, State Anxiety = subscale score from State Anxiety subscale of the State-Trait Anxiety Inventory, Trait Anxiety = subscale score from Trait Anxiety subscale of the State-Trait Anxiety Inventory, TAS Total = total score on the Twenty Item Toronto Alexithymia Scale, NCS Total = total score on the Need for Cognition Scale, PMS Total = total score on the Psychological Mindedness Scale.

Table 7

Variance Explained by Extracted Factors from the TAS-20

Factor	% of Variance	Sum of Variances
1	28.84	28.84*
2	11.61	40.45*
3	6.95	47.40*
4	6.33	53.72*
5	5.59	59.31*
6	4.37	63.68
7	4.23	67.91
8	4.03	71.94
9	3.84	75.78
10	3.33	79.11
11	2.92	82.03
12	2.75	84.77
13	2.52	87.30
14	2.42	89.71
15	2.16	91.87
16	2.03	93.90
17	1.83	95.73
18	1.55	97.28
19	1.45	98.73
20	1.27	100.00

Note. * = signifies the five extracted factors

Table 8

Pattern Matrix for the Factor Analysis

TAS-20	Factors				
Items	1	2	3	4	5
1	.701	.100	-.121	.057	.061
2	.414	.363	-.344	.039	.045
3	.519	.039	.279	-.053	.088
4	.368	.330	-.456	.193	.068
5	-.058	-.182	-.060	.598	.170
6	.641	.072	-.154	.076	-.119
7	.744	-.112	.266	-.074	.005
8	.037	.056	.074	.658	-.130
9	.799	-.032	-.096	.088	-.138
10	-.085	.327	.290	.212	.180
11	.499	.259	-.160	.046	.070
12	.238	.396	-.066	-.057	-.057
13	.815	.038	.018	.035	-.046
14	.571	.084	-.028	-.148	.154
15	.023	.459	.116	.053	.029
16	.034	.208	.317	.124	.124
17	-.043	.809	-.022	-.105	.028
18	.015	-.076	-.075	-.053	.724
19	-.035	.169	.102	.144	.562
20	.128	.093	.277	.133	.032

Note. principal axis factoring, oblimin rotation, Kaiser normalization,

Table 9

Structure Matrix from the Factor Analysis

TAS-20 Items	Factors 1	2	3	4	5
1	.756	.448	-.118	.112	.108
2	.594	.570	-.338	.107	.084
3	.496	.208	.276	.024	.155
4	.546	.558	-.421	.240	.110
5	-.101	-.027	.064	.584	.254
6	.676	.355	-.187	.074	-.084
7	.678	.204	.235	-.027	.057
8	.086	.200	.139	.653	.059
9	.784	.323	-.136	.073	-.103
10	.077	.382	.365	.371	.366
11	.628	.541	-.150	.126	.133
12	.416	.478	-.091	.026	.020
13	.831	.410	-.009	.076	.019
14	.611	.346	-.030	-.067	.163
15	.235	.490	.132	.187	.176
16	.133	.284	.362	.250	.274
17	.325	.771	-.025	.089	.184
18	.018	.086	.076	.091	.677
19	.077	.319	.249	.332	.656
20	.171	.192	.300	.209	.153

Note. principal axis factoring, oblimin rotation, Kaiser normalization

Table 10

Factor Correlation Matrix

	Factors				
Factor	1	2	3	4	5
1	1.000	.458	-.028	.049	.053
2	.458	1.000	.0059	.238	.233
3	-.028	.0059	1.000	.144	.221
4	.049	.238	.144	1.000	.239
5	.053	.233	.221	.239	1.000

APPENDIX B

FIGURES

Figure 1

Visual Representation of Changes to TAS-20 Factors

Factors	
Bagby, Taylor and Parker, 1993	Eiden, 1998
(F1) Difficulty Identifying Feelings items: 1, 3, 6, 7, 9, 13, 14	(F1) Confusion items: 1, 2, 3, 6, 7, 9, 11, 13, 14
(F2) Difficulty Describing Feelings items: 2, 4, 11, 12, 17	(F2) Communication items: 12, 15, 17
(F3) Externally Oriented Thinking items: 5, 8, 10, 15, 16, 18, 19, 20	(F3) Description items: 4
	(F4) Externalization Items: 5, 8
	(F5) Internalization items: 18, 19

APPENDIX C

CONSENT FORM

CONSENT FORM

I_____, hereby authorize Todd Eiden to administer the Twenty Item Toronto Alexithymia Scale (a 20 item measure), the Beck Depression Inventory (a 21 item measure), the State/Trait Anxiety Inventory (a 40 item measure), the State/Trait Anger Inventory (a 44 item measure), the Need for Cognition Scale (an 18 item measure), the Psychological Mindedness Scale (a 45 item measure), and a short demographics sheet. I understand that 30-40 minutes of my time will be required, and that my responses will be provided anonymously and that the study materials will in no way be linked to me. I understand that it is not foreseen that I will experience any discomfort or risk to my mental or physical health. I also understand that benefits to society will include increased knowledge of personality development. This is done as part of an investigation entitled, "Twenty Item Toronto Alexithymia Scale: Construct and Convergent Validity in an Undergraduate Population."

I understand that participation is voluntary, that there is no penalty for refusal to participate, and that I am free to withdraw my consent and participation in this project at any time prior to turning in the study materials. I also understand that due to the confidential nature of the study, I will not be able to withdraw after this time because my materials will not be able to be identified.

I may contact either Todd Eiden at (405) 744-6036 or 377-9770 or Carrie Winterowd at (405) 744-6036 should I wish further information about this project. I may also contact Gay Clarkson, 305 Whitehurst, Oklahoma State University, Stillwater, OK, 74078: Telephone: (405) 744-5700.

I have read and fully understand the consent form. I sign it freely and voluntarily. A copy has been given to me.

Date:_____ Time_____(am/pm)

Signed:_____

APPENDIX D

PARTICIPANT STANDARDIZED INSTRUCTIONS

PARTICIPANT STANDARDIZED INSTRUCTIONS

My name is Todd Eiden. I am currently a graduate student in counseling psychology at Oklahoma State University. I would appreciate your voluntary participation in the present study. The purpose of this investigation is to examine the inter-relationships between emotion and cognition. If you are between the ages of 18 and 75 years old, your voluntary and anonymous participation would be greatly appreciated.

You will be asked to complete six paper and pencil instruments, a demographic questionnaire, and two consent forms. Please fill out the consent forms first. Keep one for yourself and turn in the other one separate from your other materials. Do not write your name on any of the instruments.

It is not anticipated that you will experience any immediate or long-range unfavorable mental health difficulties as a result of your participation. If, however, you do experience any unfavorable reaction as a result of your participation in the study and express a desire for assistance, mental health services will be made available to you. If you choose not to participate, mark "withdraw" on the forms and return them. The anonymous nature of this does not allow you to withdraw from participation after you have returned your materials. The information gathered in the study will be stored on a computer and it will be impossible to identify individual participants.

Once the study is completed, I will be glad to provide the results to you. If you have any questions, please call or write:

Todd C. Eiden
Department of Applied Behavioral Studies in Education
Oklahoma State University
Stillwater, OK 74078
(405) 744-6036

APPENDIX E

DEMOGRAPHIC INFORMATION

DEMOGRAPHIC INFORMATION

Please write your age in the blank provided and circle the appropriate response to the remaining items. Participation in this investigation is designed to be anonymous, so **DO NOT** write your name anywhere in this packet of information.

Age_____ Gender: Female_____
Male _____

Marital Status:____ Single
____ Married
____ Divorced
____ Separated
____ Widowed
____ Partnered

Education Level that you are currently pursuing:

____ 1st year of college
____ 2nd year of college
____ 3rd year of college
____ 4th year of college
____ 5th year of college
____ post-baccalaureate/not graduate
____ graduate studies
____ audit

Ethnicity:
____ African American
____ Asian American
____ Caucasian/White
____ Hispanic
____ Native American
____ Other_____

College Major:_____

APPENDIX F

SOLICITATION SPEECH

SOLICITATION SPEECH

Hi. My name is Todd Eiden. I am currently a graduate student in counseling psychology at Oklahoma State University. I am seeking and would greatly appreciate your voluntary participation in a new study examining the inter-relationships between emotion and cognition. The purpose of this investigation is increase understanding of the emotion/cognition balance inter-relationships and to attest to the usefulness of a new, relatively untested questionnaire (one that you will anonymously fill out). I will have six other questionnaires that I also would like consenting participants to complete.

Although it may sound strenuous and time consuming to fill out seven surveys, I don't believe that I will take any more than 35 - 40 minutes of your time. I am seeking adult participants, so if you are between the ages of 18 and 75 years old, your voluntary and anonymous participation would be greatly appreciated.

I will pass around a sign-up sheet which will give you a chance to choose a session to attend in order to participate in the study. Thank you for your time and your cooperation.

APPENDIX G

UNIVERSITY RESOURCES

UNIVERSITY RESOURCES

University Counseling Services
310 Student Union
Oklahoma State University
405-744-5472

Psychological Services Center
118 North Murray Hall
Oklahoma State University
405-744-5975

Personal Counseling-West
Student Health Center
1202 West Farm Road
Oklahoma State University
405-744-7665

APPENDIX H

IRB APPROVAL

OKLAHOMA STATE UNIVERSITY
INSTITUTIONAL REVIEW BOARD
HUMAN SUBJECTS REVIEW

Date: 04-02-97 **IRB#: ED-97-090**

Proposal Title: TWENTY ITEM TORONTO ALEXITHYMIA SCALE: CONSTRUCT AND CONVERGENT VALIDITY IN AN UNDERGRADUATE POPULATION

Principal Investigator(s): Carrie Winterowd, Todd Eiden

Reviewed and Processed as: Expedited

Approval Status Recommended by Reviewer(s): Approved

ALL APPROVALS MAY BE SUBJECT TO REVIEW BY FULL INSTITUTIONAL REVIEW BOARD AT NEXT MEETING, AS WELL AS ARE SUBJECT TO MONITORING AT ANY TIME DURING THE APPROVAL PERIOD.
APPROVAL STATUS PERIOD VALID FOR DATA COLLECTION FOR A ONE CALENDAR YEAR PERIOD AFTER WHICH A CONTINUATION OR RENEWAL REQUEST IS REQUIRED TO BE SUBMITTED FOR BOARD APPROVAL.
ANY MODIFICATIONS TO APPROVED PROJECT MUST ALSO BE SUBMITTED FOR APPROVAL.

Comments, Modifications/Conditions for Approval or Disapproval are as follows:

Signature: _____ Date: April 7, 1997

Chair of Institutional Review Board

cc: Todd Eiden

VITA

Todd C. Eiden

Candidate for the Degree of

Doctor of Philosophy

Dissertation: TWENTY ITEM TORONTO ALEXITHYMIA SCALE: CONSTRUCT VALIDITY IN A COLLEGE STUDENT POPULATION

Major Field: Applied Behavioral Studies

Biographical:

Personal Data: Born in Oshkosh, Wisconsin On March 28, 1966 son of Chester M. and Diane L. Eiden.

Education: Graduated from Oshkosh West High School, Oshkosh, Wisconsin in 1984. Graduated from the University of Wisconsin-Oshkosh in 1989 with a Bachelor of Science in Biology. Completed coursework for a second major in Psychology in 1990 at the University of Wisconsin-Oshkosh. Graduated from the University of Wisconsin-Oshkosh in 1994 with an Master of Science in Psychology, with a Clinical Psychology emphasis. Completed the requirements for the degree of Doctor of Philosophy at Oklahoma State University in December, 1998.

Experience: Completed a 2000 hour Pre-doctoral Internship at the Little Rock and North Little Rock Veterans Administration Hospital, Arkansas. Completed additional pre-doctoral training with children (while on internship) at Arkansas Children's Hospital, also in Little Rock, Arkansas.

Professional Membership: American Psychological Association
Student Affiliate