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<u>RETURNING MATERIALS:</u> Place in book drop to remove this checkout from your record. <u>FINES will</u> be charged if book is returned after the date stamped below. AN INVESTIGATION INTO THE RELATIONSHIP BETWEEN ALEXITHYMIA, IMAGING CAPACITY AND AFFECTIVE DIFFERENTIATION

Ву

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A DISSERTATION

Submitted to

Michigan State University

in partial fulfillment of the requirements

for the degree of

DOCTOR OF PHILOSOPHY

Department of Counseling Psychology

ACKNOWLEDGMENTS

I would like first to thank my parents, Scott and Beatrice Bradley, for instilling in me the drive for knowledge and truth that kindled the motivation for this project. I would like also to express appreciation to my committee members, Drs. Gershen Kaufman, Steven Raudenbush, Frederick Lopez and, particularly, Dr. William Hinds as advisor, committee chair and friend. Finally, I extend heartfelt thanks to Geoff, Michelle, Carolin and Diane, without who's patient assistance this project could not have come to fruition.

ABSTRACT

AN INVESTIGATION INTO THE RELATIONSHIP BETWEEN ALEXITHYMIA, IMAGING CAPACITY AND AFFECTIVE DIFFERENTIATION

by

Terence L. Bradley

The purpose of the study was to empirically examine the relationship between alexithymia, as the dependent variable, and affective differentiation and mental imagery as the independent variables in a sample of health services consumers. A secondary purpose was to examine how anxiety and depression relate to alexithymia. The previous literature reports clinically anecdotal validation of the alexithymic concept with few attempts to empirically establish it's psychological sequelae.

A total of 150 subjects drawn from two outpatient medical clinics in southern California volunteered for full participation in the study. The Schalling-Sifneos Personality Scale was used as the measure of alexithymia. The Beck Depression Inventory, State-Trait Anxiety Inventory-Form Y, Differential Emotions Scale-IV, and the Survey of Mental Imagery-Form A were administered as measures of the independent variables. It was hypothesized that affective differentiation and mental imagery would demonstrate an inverse relationship with alexithymia while anxiety and depression would not systematically covary with alexithymia.

The study was of an observational nature using a hierarchical multiple regression analysis to test the research hypotheses. Independent variables were ordered hierarchically prior to the regression analysis. F-tests were performed in order to test the significance of incremental variations. Bivariate analyses were performed on the demographic variables by treating them as grouping variables. A Bivariate analysis was also performed using a new variable, alexithymia, which was created using a cutoff score of 45 on the SSPS. The .05 level of significance was used for all hypothesis tests.

The major findings of the study suggested that: 1) A significant and negative relationship exists between alexithymia and scores on the SMI-A measure of mental imagery.

2) A non-significant relationship exists between alexithymia and scores on the DES-IV measure of affective differentiation.

3) Non-significant relationships exist between alexithymia and scores on the Trait and State measures of anxiety. 4) A significant and positive relationship may exist between alexithymia and scores on the BDI measure of depression.
5) Non-significant relationships exist between alexithymia and the demographic variables of age, sex, and race. A significant and negative relationship may exist for education.

6) The SMI-A was the single best predictor of SSPS scores in the model tested.

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CHAPTER I

INTRODUCTION

The Problem

It has long been recognized that a substantial number of people constitute a significant drain on health care resources by presenting physical conditions in which there is either no underlying organic basis found or for which standard medical treatments have little or no remedial effect. Indeed, many of Freud's earliest psychoanalytic cases revolved around baffling physical complications that rendered the traditional medical treatments of the day useless wastes of time and health care expenditure (Freud, Despite an anecdotally rich and extensive 1895). literature that has purported a vast array of psychological treatments since that time (adequately summarized by Alexander, 1943; Wittkower, 1974; Wolff, 1968; and Kellner, 1975), the problem of health care management of the so-called "psychosomatic" disorders continues largely unabated to the present. Schreter (1978) has gone as far as suggesting that up to 60% of the patients presenting in health care settings today may present some form of somatization disorder as described in the American Psychiatric Association's Diagnostic and Statistical Manual - III. Our capacity to provide meaningful and cost effective assistance has been far outstripped by an increasingly overwhelming demand for health care services.

One approach to the problem has been developed by Sifneos (1967), who collected observations of psychosomatic patients under his care and launched a burgeoning literature in the theoretical understanding and potential treatment of these conditions. He coined the term "alexithymia" to describe an unusually consistent cognitive and affective patterning in his patients characterized by: 1) a relatively mechanistic thought pattern, dominated by environmental detail and substantially devoid of fantasy associated with feeling states; and 2) a relative inability to experience, evoke and verbalize differentiated affective states. Additionally, he noted that the patients tended to be quite well adjusted to their roles in society but tended to have rather superficial and shallow interpersonal relationships. Since that earlier work, the disorder of alexithymia has been found to overlap a number of traditional diagnostic categories which include certain of the psychosomatic disorders as well as substance abuse disorders (Krystal, 1962 and 1970), severe post-traumatic states (Krystal, 1971) as well as certain of the eating disorders (Weiner, 1976).

Need

While the alexithymic concept has broadened our understanding of the nature and function of many of the psychosomatic disorders, clear explication of the clinically observed cognitive and affective sequelae has

been difficult to isolate and identify (Krystal, 1979; Leventhal and Tomarken, 1986; Nemiah, 1974 and 1977; Sifneos, 1967 and 1977; Apfel, 1979; Blanchard, et. al., 1981; Lolas, et. al., 1980; Martin, et. al., 1984; Shipko and Noviello, 1984). This lack of clarity in the affective and imaginal domains, as they relate to the clinical manifestations of alexithymia and psychosomatic disorders in general, has contributed to a clouded conceptual articulation and a paucity of effective treatment approaches (Sifneos, 1974, 1975, 1977, 1983; Stephanos, 1975, 1976, 1979; Shands, 1977, Schreter, 1978; Krystal, 1979; and Von Rad, 1979). Sifneos (1974 and 1975) has summarized the difficulty with the use of traditional psychodynamic therapies in the treatment of alexithymia as these treatments uniformly rely heavily on the client's ability to gain access to and experience a full range of relatively well differentiated emotions, tolerate anxiety that is inevitably generated in "uncovering" therapies, and the ability to use fantasy in the forms of waking imagery and/or dreams. The alexithymic person appears to come to therapy deficient in each respect and is unable to articulate these cognitive and affective deficits.

Krystal (1979) is more hopeful about positive therapeutic intervention and recommends alterations in the techniques used:

"The task is to help the patient to interpret, organize and recognize his own feelings. One

often has to help patients....to understand what they are feeling and to give it a name." (pg.27).

and further:

"It is in this process of working with verbalization of affects that one observes progress toward affect differentiation and desomatization." (pg. 29)

Clearly, advances in our theoretical and empirical understanding of the role and mechanisms of these interacting affective and cognitive realms will lead to enhanced therapeutic interventions and outcomes.

The relationship between, and relative psychophysiological primacy of, emotion vs cognition has been long debated in various theories of psychological and physical well-being (Lazarus, 1984; Zajonc, 1984; Leventhal and Tomarken, 1986; Izard and Schwartz, 1986; Tomkins, 1984; Plutchik, 1980 and 1984; Krystal, 1975a, 1975b and 1977). Additionally, there is a growing literature in the psychophysiological mechanisms of mental imagery as it relates to the mediation of a variety of acute and chronic psychophysical conditions and psychoneuroimmunological processes (Achterberg and Lawlis, 1984; Locke and Hornig-Rohan, 1983; Schneider, et. al., 1983).

While there exists an abundance of theoretical positions offered to explain isolated research findings, there is a spate of unified theoretical understanding of the function, development and interaction of these affective and cognitive psychological domains. There appears to exist a need to theoretically articulate and

empirically investigate the relationships between these realms and their potential effect on the somatic and psychic health and equilibrium of the individual. It is the position set forth in the present study that such an articulation can be fruitfully pursued through the integration of Differential Affect Theory and Developmental Object Relations Theory via the empirical investigation of alexithymia and its psychological sequelae.

Theory

Although it is true that Freud never used the term "psychosomatic" in his writing to describe the interface between the psyche and the soma, his concept of "conversion" dominated the early psychoanalytic literature concerning the treatment of physical disturbances that did not demonstrate medically verifiable causes. The conversion model could be summarized as an entirely intrapsychic process involving the repression of unacceptable wishes or ideas out of the conscious awareness of an individual. Once unconscious, the ideas are "dissociated" from the emotional excitations originally attached to them and rendered innocuous through the process of "converting" the discomforting emotional excitations into a bodily, and thus disguised, form of expression. It was presumed that the physical "conversion" of the symptom might certainly be disturbing in its own right but less so than the distress it replaced. The conversion model was

clearly based on the conflict resolution theory of neurotic symptom formation as outlined by Fenichel (1945).

There flourished, in the neo-Freudian era, a substantial body of literature forwarding the conversion model as the primary etiological factor involved in any number of specific physical disturbances falling under voluntary innervation that might share a sexualized symbolic underpinning. The conversion and specificity literature has been extensively summarized by Wolff (1968), Wittkower (1974) and Alexander (1950) and held considerable sway over psychosomatic research in Europe and the United States until the early 1940's.

Following the lead of Cannon (1920) and similar to Selye (1946), Alexander (1943) extended the conceptual broadening of the psychosomatic model by postulating a second major group of psychophysiological disorders which did not play a primarily symbolic psychological nor tension reduction role. These disorders Alexander referred to as "psychogenic vegitative" conditions which were not seen as substitute expressions of repressed ideas and emotions but rather as expected physiological concomitants of chronic emotional states such as extended stimulation of the adrenal system and subsequent elevations in blood pressure as physical correlates of the emotional experience of rage. He viewed these conditions similarly to the Flight/Fight response of Cannon (1920) and the General Adaptation Syndrome of Selye (1946).

The overall importance of this conceptual shift was felt in at least two major ways; first, it offered a theoretical base for the psychological research and treatment of a greater number of physiological disturbances and, secondly, it allowed for a shifting of etiological focus to earlier developmental periods. As Shur (1955) and Nemiah (1974) have pointed out, the conversion model has been shrouded in conceptual mist and is open to further criticism on the grounds of the presumption of a relatively developmentally advanced personality structuring of the self, achieving at least psychosexual development at the oedipal level. Thus, the conversion model offered no clarity in those clinical cases suggesting preverbal levels of disturbance such as the severe personality disorders or schizophrenia. As discussed by Engel and Schmale (1967):

"we are proposing that a (type of) conversion mechanism at pregenital as well as phallic levels (of psychosexual development) may.... play a role in the background of a variety of somatic disorders not heretofore conceptualized as involving a conversion process." (pg. 347)

In an attempt to further outline this theoretical shift, Engel and Schmale go on to write:

"Conversion is a psychological concept, the definition of which cannot be bounded by neuroanatomy, even though the function and structure of the nervous system may be involved secondarily as a result of the biological meaning of the conversion (in the broader sense) to the organism. The parts or systems of the body capable of being involved in conversions (of this sort) are determined not by the voluntary of involuntary nature of their innervation but by their capability to achieve mental representation, a process involving innervations,

perceptions through distance receptors, and fantasy. Important here are object relating activities for when object relating involves a body part in discharge, expression, or communication, concomitant physiological as well as pathophysiological processes may also acquire mental representation, thereby not only becoming capable of reactivation by symbolic stimuli but also of participating in primary symbolic expression." (pg. 346)

Stephanos, et. al. (1975, 1976, 1978 & 1979) have been most active in extending the object relations theory of psychosomatics. This group basically views the category of psychosomatic disturbances (as differentiated from neurotic forms of conversion reactions) as a clinically definable condition growing out of developmental disturbances in primary psychological identifications whereby the internalization of the maternal object by the infant is disrupted by tension filled interactions with her. This disturbed primary identification process is viewed as the precursor to the lack of capacity to develop a fantasy life which normally acts as a transitional buffer between the child and overwhelming somatopsychic frustration. Substantial disturbances in this developmental flow render the individual vulnerable to direct somatic expression of these overwhelming frustrations with limited capacity for adaptive use of higher level imaginal and cognitive functions. The adult phenomenlogical manifestations have been described as the psychosomatic person's "characteristic lack", in the sense of his/her:

"absence of psychic fantasy life, his (/her) inability to develop interpersonal relations, and general psychic emptiness." (Stephanos,

1975, pg. 179)

A separate but related line of inquiry has been conducted by Nemiah and Sifneos (Nemiah, 1977; Sifneos, 1967, 1977) whereby they have encountered and documented a very similar clinical picture in their psychosomatic patients. They have coined the term "alexithymia" to describe an inability to experience and verbally express affect together with an unusual lack of fantasy life appropriate to the expression of feelings. Thinking tends to be flat, mechanistic, dichotomous and dominated by details of the environment.

The phenomenological similarities of these separately described conditions are striking and akin to the types of cognitive functioning outlined by Liebovich (1973) and Schreter (1978) in their respective discussions of borderline personality functioning in medical settings. Interestingly, Ammon (1979) has described the developmental and ego functioning similarities of borderlines and psychosomatics, offering the major line of distinction as being the mode of discharge of aggressive feelings. He asserts that borderlines tend to externally discharge aggression while psychosomatic individuals tend to internalize and somatize these powerful affects.

Other clinical investigators have carved out more specific theoretically pathogenic relationships such as Levitan (1976), who postulates a correlation between early interpersonal loss, rage, and ulcerative colitis; Musaph

(1974), who also points to the role of aggression and object relating in the formation of psychosomatic disturbances; and Mitscherlich (1977), who discusses the importance of the "transitional object" as an important psychic organizer around which early imaginal processes are crystalized, a repeatedly noted deficit in the cognitive functioning of psychosomatic individuals.

Thus, contemporary psychodynamic thinking has focused less on a conflict or psychological trauma model while closer attention has been paid to the normal and deviant lines of psychological development.

The innate differentiability of emotional states is another important aspect of the present study. In a recent review of the dominant theories of emotion, Leventhal and Tomarken (1986) have pointed out a major distinction between competing theories as revolving around the question of differentiability of feeling states, physiologically as well as cognitively.

A central proponent of the Cognition-Arousal Theory, Schacter (1962) asserts that emotional states are grounded in nondifferentiated physiological arousal and the labeling of different affects relies solely on the cognitive appraisals of social cues as guides. Following an extensive review of the misattribution of arousal to emotional and neutral cues, excitation transfer and bogus feedback literatures, Leventhal and Tomarken (1986) conclude, unenthusiastically,

"Overall, research testing predictions derived from Cognition-Arousal theory has yielded disappointing results." (pg. 574)

An alternative view of emotion, and one which is consistent with the thrust of the present study, suggests that emotion is biologically innate, complete with differentiable and specific states of physiological arousal and forms of expression. However, forms of behavior appropriate to the expression of affect is not innate and must be learned. Darwin (1904) noted the evolutionary significance of affect in man and Ekman (1982) has demonstrated the cultural universality of facial expression attached to specific affects. Several authors have suggested integrated developmental models of affective differentiation (Schmale, 1964; Tomkins, 1962 and 1982; Izard, 1971; Krystal, 1975) and Plutchik (1980) has forwarded a complete psychoevolutionary synthesis.

Silvan Tomkins (1962, 1963, 1982, and 1984) has theorized that the affects are not only biologically innate, but, indeed, form the primary motivating system for humans. He notes that drives such as hunger and sex must be "fused" with, or "amplified" by affect before they become motivators.

"The affect system is, therefore, the primary motivational system because without its amplification, nothing else matters, and with its amplification, anything else <u>can</u> matter." (Tomkins, 1984, pg. 164)

Tomkins further believes that affects are tied to

facial and vocal expressions, being triggered at subcortical centers. He earlier specified facial musculature as the feedback bridge but has recently shifted to facial skin (1984). He first proposed eight primary affects, each with its own specific facial concomitant. A ninth has recently been added, further differentiating dissmell from disgust (1984). The nine primary affects and their associated facial expressions are as follows: (1984, pg. 167)

Affect

Facial Expression

- 1) Interest Excitement
- 2) Enjoyment Joy
- 3) Surprise Startle
- 4) Distress Anguish
- 5) Fear Terror
- 6) Shame Humiliation
- 7) Dissmell
- 8) Disgust
- 9) Anger or Rage

- 1) Eyebrows down, stare fixed or tracking an object.
- 2) Smiling response.
- 3) Eyebrows raised, eyes blinking.
- 4) Crying response.
- 5) Eyes frozen open in fixed stare or moving away from object to the side, skin pale, cold, sweating, trembling, and with hair erect.
- 6) Eyes and head lowered.
- 7) Upper lip raised in a sneer.
- 8) Lower lip lowered and protruded.
- 9) Frown, clenched jaw and red face.

The first three affects comprise the positive affects and the last six are considered negative affects. Presumably the list of negative affects is longer due to the evolutionary function of emotion as a signaling system in order to avoid danger. Apparently there were more dangers to avoid than pleasures to approach.

Summarizing their review of current state of theory of emotion, Leventhal and Tomarken (1986) reinforce the conceptual bridge, through empirical study, between Tomkins work and the object relations view of alexithymia outlined above. They state:

"Our reading of the evidence on the universality of expressive behavior and the lateralization of emotional processing suggests an innate, centralmotor system for constructing expressions and feelings with the critical function of cementing interpersonal relationships. Further support comes from the ability to detect these processes during the first year and even the first days of life. It is a system that thrives on social contexts, able to react to social stimuli as well as provoke them. Common sense and the data showing links between emotion and memory suggest that the emotion system undergoes elaborate development over the individual life span. In turn, the power of social cues in eliciting and responding to emotional expression suggests that such emotional development occurs primarily in social interactions. It is in these same social contexts that the infant becomes aware of the distinction between self and other, and that the child elaborates distinctive self-attributes and develops a sense of self-esteem and effectance. Emotion and self-concept are intimately bound in memory." (pgs. 599 & 600)

Krystal (1977) has written extensively about early affective development and differentiation and views the evolving capacity for language, verbalization and symbolization as key factors.

"....the process of putting emotions into gestures, sounds and finally words is a basic one. Language can be viewed as an outgrowth or a manifestation of emotions... (pg. 10)

As an individual grows up, his (/her) affect becomes progressively verbalized and desomatized...(pg. 11)

....the main advantage of verbalization is that it manifests the child's ability to experience specific emotions rather than a generalized response. (pg. 11)

The development of language and symbolization is the fundamental event in the development of affects...failure to do so would lead to the child being flooded with somatic and undifferentiated affects..." (pg. 16)

Shifting the point of emphasis from the

affective/physiological domain to the cognitive/ physiological domain, Ahsen (1982) suggests that the prevalent models of imagery have been focused too narrowly. He asserts that previous debate over the nature and function of imagery has been constricted to a discussion of the cognitive aspects of the image and/or its semantic, lexical meaning structures. He points out the importance, from a theoretical and clinical perspective, of the emotional and somatic linkage of the image to the cognitive realm. He writes:

"Whether one believes that conscious experience ensues upon an upward discharge from the hypothalamus to the cerebral cortex as in the Cannon-Bard theory...or upon return impulse from the muscles as in the James-Lange theory..., the simple fact remains that upon seeing an image (I), (the sight of a bear in the woods), a specific somatic or neurophysiological change (S) ensues as either (a) a strong overt response observable by another person or (b) an inner response which is observable only by the subject himself. The S is always of a specific type - skeletal, proprioceptive, motor neural impulse, sensory experience and so forth." (pg. 172) Ahsen is certainly not alone in viewing the

imagery/emotion link as a powerful somatic mediator.

Achterberg (1984) points out that:

"the image serves both a reactive and a causative role with regard to physiology. And, as part of this reciprocal position, it can be consciously accessed both to understand the physiologic pattern and evoke change." (pg. 1)

The emerging field of psychoneuroimmunology provides some key conceptual interfaces whereby the same neuroanatomic structures involved in immunity are also implicated in the transmission of the image as well as emotional responses. Brain and central nervous system structures, particularly the hypothalamus and the pituary gland, as well as the limbic system and the reticular formation, appear to be involved in the activation or suppression of the immune system (Harrell, et. al., 1981; Rogers, et. al., 1979; Spector and Korneva, 1981; Stein, et. al., 1976). In fact, several authors have demonstrated fairly specific interaction between imagery and various aspects of immune function, even at the cellular level (Achterberg and Lawlis, 1984; Schneider, et. al., 1983).

Sheikh and Kunzendorf (1984) have offered three potential explanations of the psychosomatic effects of imagery. The <u>self-regulatory mechanism</u> hypothesis assumes that both the perceptually induced innervation and the imaginally induced innervation of brain structures with conscious qualities serve innately to regulate autonomic responses. This self-regulatory mechanism would include the immunological functions described above. A second hypothesis, referred to as the associative-mechanism,

assumes that the imaginally induced innervation of brain structures with sensory qualities elicits whatever autonomic responses have been associatively connected with those same brain structures during perceptual innervation. A Third hypothesis, the <u>structural-mechanism</u>, assumes that the innervation of brain structures possessing imaginal qualities is neuroanatomically similar to the innervation of brain structures controlling autonomic phenomena. Again, a similar position as offered by Achterberg (1984) and Ahsen (1982). Sheikh and Kunzendorf (1984) suggest that these three functional interfaces need not be seen as mutually exclusive or in competition as all are supported by significant research literature.

The debate regarding the relative primacy of affect vs imagery in brain/mind development can be assumed to continue and is beyond the scope of the present discussion. However, the emotion/imagery/physiology connections appear manifest. The alexithymic concept would further appear to be a useful organizing conceptual bridge for the observation of relationships between and among these domains from an empirical standpoint.

Thus, the present study can be viewed as an empirical validation of the theoretical linkages between alexithymia, affective differentiation and imaging capacity. Additionally, the treatment of affect as independent from cognition in this study provides the opportunity to empirically investigate whether affect and affective

differentiation are embedded in cognition or not. Finding a relationship between affective differentiation and alexithymia, independent of mental imagery, would support the theory of the innate psychobiological properties of emotion as forwarded be Tomkins, Izard, Plutchik, and Ekman. Conversely, failing to discover an independent relationship would be consistent with the Cognition-Arousal model of affective experience of Schacter and Singer.

Purpose

The purpose of the present study was to empirically examine the relationship between alexithymia and its primary psychological concomitants, affective differentiation and imaging capacity in a sample of health care consumers. A secondary purpose was to investigate the role of anxiety and depression in the manifestation of alexithymia.

Research Hypotheses

There were five fundamental research questions that guided the present study. Stated as broad hypotheses, they were:

- Persons who manifest higher levels of alexithymia will inversely manifest a reduced capacity to engage in mental imagery contrasted with persons who manifest lower levels of alexithymia.
- 2. Individuals who demonstrate higher levels of

alexithymia will inversely demonstrate a reduced ability for affective differentiation compared to individuals who demonstrate lower levels of alexithymia.

- 3. Individuals who manifest higher levels of alexithymia will show little or no differences in levels of anxiety contrasted with individuals who manifest lower levels of alexithymia.
- 4. Persons who demonstrate higher levels of alexithymia will show little or no differences in levels of depression compared with persons who demonstrate lower levels of alexithymia.
- 5. Individuals who manifest higher levels of alexithymia will demonstrate no differences in the demographic variables of age, sex, race or educational level.

<u>Overview</u>

The pertinent literature is reviewed in Chapter Two under the following headings: Alexithymia, Affect Theory, and Mental Imagery. In Chapter Three, the study sample, instruments, procedures, hypotheses, research design and data analysis are described. A summary of the results of the data analysis is presented in Chapter Four. A discussion of the results and limitations of the present study, along with a discussion of the implications for future research are presented in Chapter Five.

CHAPTER II

LITERATURE REVIEW

The three major variables under investigation in the present study were alexithymia, emotional differentiation and mental imagery. The pertinent literature will be summarized in this chapter in regard to each major variable under the headings of; Alexithymia, Affect Theory and Mental Imagery.

Alexithymia

The summary of the literature in the following review must be prefaced with one clear caveat; the overwhelming bulk of the literature concerning alexithymia has been, to date, theoretical, observational and exploratory. Theories have proliferated regarding the manifestations and possible etiology of alexithymia but the validation of the clinical observations have lagged significantly behind. As Sifneos (1977) pointed out in an address opening the 11th European Conference on Psychosomatic Research devoted to alexithymia, there are more questions than answers provided by the current research literature. In the following section, a number of the theoretical and empirical perspectives on the condition will be summarized. Thev span the biopsychosocial range of interactive domains but with little connective conceptual or empirical underpinning.

The present study can be viewed as an attempt to empirically establish the linkages between the observations, from various perspectives, of alexithymia, affective differentiation and imaging capacity and does not presuppose one <u>single</u> etiological factor. However, affective and imaginal/cognitive development, as outlined in the Object Relations and Affect Theory perspectives summarized in Chapter One, is used as the overarching conceptual framework.

The term alexithymia, as coined by Sifneos, derives from the Greek `a' for lack, `lexis' for word, and `thymos' for emotion (Sifneos, 1977). Considering his pivotal position in the articulation of the alexithymic condition, a summary of his earliest observations seems in order. Those observations pertained to patients presenting at the Beth Israel Hospital Psychiatric Clinic and were summarized into 13 categories contrasting alexithymics and neurotics. Those observations were as follows (Sifneos, 1977):

Alexithymic

Neurotic

1. Presenting Complaints a) Endless descriptions of physical symptoms, at times not related to an underlying medical illness

Example: an ulcerative colitis patient complaining more about aches and pains all over his body than about his bloody diarrhea.

2. Other Complaints Tension, irritability, frustration, pain, boredom, void, restlessness, agitation,

a) Less emphasis on physical complaints

b) Elaborate description
of psychological difficulties (symptoms and/
or interpersonal problems)

a) Anxiety described in terms of fantasies and thoughts rather than in

physical sensations nervousness. b) Depression described in terms of feelings of worthlessness, guilt, during sleepless nights, etc. 3. Thought Content Striking absence of fantasies a) Rich fantasy life and elaborate description of trivial environmental details b) Marked ability to describe feelings in elo-(pensee operatoire) quent terms 4. Language Marked difficulty in finding Appropriate in descriwords to describe feelings bing feelings 5. Crying a) Rare a) Appropriate to specib) At times they cry copiously fic feeling but crying seems not related to an appropriate feeling such as sadness or anger 6. Dreaming Rare Often 7. Affect Inappropriate Appropriate 8. Activity Tendency to take action Appropriate to situation impulsively, action seems to be a predominant way of life 9. Interpersonal Relations Usually poor with a tendency Specific conflicts with at marked dependency or prepeople but generally good ference for being alone, interpersonal relations avoiding people 10. Personality Make-Up Narcissistic, withdrawn, pas-Flexible sive-aggressive, or passivedependent, psychopathic

11. PostureRigidFlexible

12. Countertransference The interviewer or therapist is usually bored by the patient whom they find "dull"

Easy communication with patient whom the interviewer or therapist finds "interesting"

13. Relation to social, educational, economic, or cultural background

None

Considerable

It is clear from this original work that the cognitive/affective difficulties demonstrated by the alexithymic are often consistent with the manifestation of psychosomatic disorders as well. However, this earliest work points to no clear etiology of the alexithymic condition or to any possible linkage with the psychosomatic process.

While Sifneos collected the first routine <u>observations</u> of the alexithymic condition, Nemiah (1977) was instrumental in beginning to articulate the different theoretical perspectives that were starting to appear in the literature regarding the <u>etiology</u> of alexithymia. He initially dichotomized the theories (as if mutually exclusive) into Psychological and Neuroanatomical groups of theories with the former focusing primarily on the psychic conflicts of the individual and the latter focusing primarily on brain structure and function. An outline of his organization of the theories is presented below: I. Psychological Theories

A. Psychodynamic Models

1. Conversion Model (outlined in Chapter One)

- 2. Specificity Model (outlined in Chapter One)
- 3. Denial Model

This position broadly spans the Conversion and Specificity Models. Nemiah suggests that massive denial can be differentiated from repression on the grounds that denial, as a defense mechanism, may tend to be globally applied to the totality of affective phenomenon. Repression is here viewed as more specifically applied to certain areas of psychic conflict. He offers this view of the denial process as augmenting the existing psychodynamic models.

B. Deficit Model

This model is based on the tenets of Object Relations Theory as outlined in Chapter One.

C. Developmental Models

As presented by Nemiah, the Developmental Models are actually the developmental <u>mechanisms</u> underlying the Conversion, Specificity and Deficit Models outlined previously.

II. Neuroanatomical Theories

A. Structural Models

Nemiah here proposed that there is either an absence of, or a deficit in, pathways between neuronal centers underlying affect OR an absence of, or a deficit in, the neuronal centers themselves.

B. Developmental Models

Two developmental models are offered to account for the structural anomolies presented above. 1. Defective post-natal development of neuronal structures resulting from a lack of adequate environmental stimulation and support. 2. Genetic abnormalities based on a inhereted defect in anatomical structures.

After initially dichotomizing these various perspectives, Nemiah concludes that only the Denial, Deficit and Structural Models could account for the breadth and scope of the alexithymic's lack of affect and fantasy and calls for an open-minded integration of theories.

In an updated review of the alexithymic concept, Lesser (1981) expands on the work of Nemiah, outlining in greater detail the current neuroanatomical etiological positions. He cites Nemiah's early work (Nemiah, 1975) and points to a dysfunction of the striatum which inhibits access to consciousness of neocortical sensory inputs as well as affective input from the limbic system.

Lesser reports two studies which bear on the split-brain phenomenon and possible alexithymic characteristics. Hoppe (1977), studying patients who had surgical commissurotomies for intractable epilepsy, noted that these patients exhibited a paucity of dreams and

fantasies and had poor ability to symbolize. The similarity to the "pensee operatoire" and alexithymic behavior led him to introduce the concept of a "functional commissurotomy" in patients with severe psychosomatic disturbances. He theorized that a lack of interhemispheric communication resulted in concern of the left hemisphere with the translation of thing-presentations into word-presentations, while the right hemisphere, unable to verbalize, hypercathected bodily sensations.

Relatedly, Buchanan, et. al. (1980) present the case of a man with a severed corpus callosum who manifested severe alexithymic characteristics together with the inability to report dream states. they conclude that one facet of alexithymia may be this subtle cross-hemispheric disturbance.

In a more recent study suggesting some cross-hemispheric role in alexithymia, Rodenhauser, et. al. (1986) looked at the relationship between handedness and alexithymia in a sample of 100 college students. Their results indicated a higher prevalence of alexithymia in non-right hand dominant individuals raising questions, again, about the role of right-hemispheric or anomalous hemispheric dominance in fantasy life and awareness of emotions. The most likely assumption would involve a relative deficit in the development of left-hemispheric dominance implying a residual deficit in language accessing of the right-hemispheric productions.

Kaplan and Wogan (1976/77) developed an experimental approach to cerebral laterality and alexithymia by using subjective response to a painful stimuli and EEG monitoring to assess subjects' ability to manage pain. They found that left-hemisphere activation was associated with a reported increase in pain, while right-hemisphere activation was associated with a reported decrease in pain, and with the apparent mobilization of fantasies following experimental instructions. The investigators concluded that the instruction to fantasize allowed subjects to endure their pain better than under conditions where fantasy was not prescribed. By analogy, alexithymic individuals, unable to utilize fantasy, could experience more prolonged and painful bodily symptoms. The speculative nature of these conclusions needs to be emphasized.

A possible genetic contribution to alexithymia was reported by Heiberg & Heiberg (1978). With the use of the Beth Israel Psychosomatic Questionnaire, monozygotic (MZ) and dyzygotic (DZ) twin pairs were compared. Intrapair differences on the questionnaire were significantly different, with the MZ pairs having more similar scores than the DZ pairs. The conclusion was that there is a strong hereditary component in alexithymia. However, this needs to be interpreted with great care for several reasons. First, only 33 pairs were studied. There were no data on sociocultural variables, and, since the twins were
presumably reared together, they shared similar environments where social learning and styles of communication would influence their later behavior. Similar kinds of studies have been forwarded to explain the genetic basis for such disorders as schizophrenia with similar, and well documented, methodological pitfalls.

Martin reports several studies on alexithymia conducted with undergraduates from McGill University (1984, 1986). Martin theoretically extrapolated from Nemiah's earlier work (1975) which suggested a certain dissociation between alexithymic's physiological response mechanisms and their subjective cognitive/affective response mechanisms under stress situations. Martin (1984) selected 53 subjects divided into high and low alexithymia groups based on the results of the Schalling-Sifneos Personality Scale (SSPS). The subjects underwent a psychophysiological stress-monitoring procedure and a dietary tryptophan manipulation. The results showed that high alexithymics manifested significantly lower levels of blood volume pulse as well as a significantly greater percentage increase in free tryptophan as compared to low alexithymics. The author suggests that the results provide preliminary supportive evidence for a dissociation between physiological and subjective responses to stress under high alexithymic conditions. However, the 1984 study included only physiological measures and thus response characteristics of a more psychological nature, such as

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anxiety or depression, could not be directly determined.

In a follow-up study, Martin(1986) studied 30 subjects, again divided into high and low categories of alexithymia based on SSPS scores. Frontal EMG, digital blood volume pulse amplitude and heart rate constituted the physiological measures. Measures of repression-sensitization, social desireability and state/trait anxiety comprised the psychological measures. Interestingly, the results provided clear support for earlier work that suggested that alexithymia is independent of other psychological variables as there were no significant correlations between SSPS scores and the psychological measures. Secondly, high alexithymics manifested higher levels of sympathetic activity during a stress condition (in this case placing a hand in ice-water until pain was reported) and during recovery periods. This high level of sympathetic activity is conducive to the development of a stress-related disorder either through general systemic deterioration (Selye, 1946) or through chronic demands on a genetically based specific organ weakness (Sifneos, 1977). Thirdly, there was limited support for the contention that alexithymics dissociate their physiological responses from their ratings of subjective levels of stress. These and the previous lines of physiologically based research suggest that clearly there are physiological concomitants to the alexithymic condition as one would expect. However, to demonstrate

such a physiological connection is not to rule out influence in the psychological realm as well. In fact, literature will be cited in subsequent sections of this review that will suggest that early learning experience can alter brain structure and function, rendering this type of nature/nurture question into a complex interactional network of mutually reciprocal processes.

One final series of studies points to the subtle psychological influences upon even the most tightly controlled psychophysiological research. Embarking from the linguistic/symbolic facet of the alexithymic dysfunction, Von Rad & Lolas (1982) have extensively studied the speech patterns and verbal productions of alexithymics and psychoneurotics. Examining 80 subjects, verbal production to TAT card 3BM, Rorschach fantasy production, and Gottschalk & Gleser (1969) analyses of speech content, were gathered. In the first research run, all of the procedures took place in a lively interactive context between interviewer and subject similar to the context of patient and doctor interview in which alexithymic characteristics were first, and primarily continue to be, elicited and observed. The main results were as follows: the alexithymic subjects (compared to neurotics) produced less words on the TAT and open-ended story, used the word 'I' less and more frequently used the word 'one', and employed a smaller number of 'affect-laden' words. The Gottschalk-Gleser scores for the first 1,000

words of the interview indicated that alexithymic patients expressed less quilt, shame, separation anxiety as well as less ambivalent and inner-directed hostility. These results are as might be expected. However, controls were minimal and there was a lack of a normal control group. However, on a second run with a similar research design using 353 subjects, some interesting findings emerged. Although the tasks were similar in design to the first study, the subjects were either instructed to respond into a tape recorder or interacted with an interviewer instructed to provide no active feedback or interactional stimuli. Under this situation no differences were apparent either for pure groups (alexithymic vs neurotic) or for mixed groups with "predominantly psychosomatic components" or "predominanly neurotic components". While there were no physiological measures included in order to determine the possible interactive effect of the interpersonal field with the physiological response patterns, the authors still tentatively conclude:

"The phenomenon of alexithymic behavior was first, and continues to be, observed in the interactive situation of the doctor-patient relationship. What has been described as pensee operatoire, was an interactional behavior in which the patient perceives the other in a technical, stereotyped way without clear recognition of his lively uniqueness, often handling him like a thing. Only in the explicitly dyadic situation of the conversation with a partner who is alive and who intervenes and asks about affects and is himself emotionally involved and manifests his presence through reinforcement or objection making the patient unsure about his stereotypes and moving him, will alexithymic behavior become clear, making it possible to see the described differences between psychosomatic and

psychoneurotic subjects."

and further:

"We seem justified in concluding, on the basis of the so-far gathered experience, that alexithymia should be defined and studied within the context of <u>dyadic</u> <u>verbal</u> <u>interaction</u>; it is also probably true that perhaps we are on the wrong track if we expect it to be exclusively an 'organismic' attribute of patients." (Von Rad & Lolas, 1982, pgs. 99 & 100)

With this statement, the pendulum swings fully back to the starting point first described by Sifneos (1977) in his clinically oriented observations. Since the clinical criteria and measurement of alexithymia have not been clearly standardized, it seems somewhat premature to be focusing exclusive attention on possible etiological models. Rather there is need to establish empirical validity for the concept itself. The present study is viewed as just such an attempt at validating the alexithymic concept without over-reliance on any single etiological formulation. The literature summarized in the remainder of this chapter sheds further light on the possible interconnections between affect and imagery and lay further groundwork for the present study.

Affect Theory

In this section the theoretical and research underpinnings of the role of affect as viewed in the present study will be outlined. Competing theories abound regarding the nature and function of emotion in humans.

As Leventhal & Tomarken (1986) have suggested, there

have been, historically, four main theoretical approaches to emotion articulated in the literature: 1) Darwinian-Evolutionary Theory which assumes the existence of multiple emotions and focuses on their form (expressive response patterns), functions and evolutionary history (Darwin, 1904; Izard, 1971; Plutchik, 1980); 2) Body Reaction Theory which assumes that different emotions are a product of different patterns of autonomic responses (James, 1950; Schacter, 1957); 3) Central Neural Theories which seek to find the neural structures involved in emotional expression, feeling and behavior (Davidson, 1984; Pribram, 1984); and 4) Cognition-Arousal Theory which attempts to define emotion as the integration of thought and/or perception with arousal (Schacter & Singer, 1962; Lazarus, 1984).

Leventhal & Tomarken (1986) go on to suggest that much of the current confusion surrounding the integration of theoretical perspectives on emotion relies on a reluctance to grant independent conceptual status to emotion as such. They write:

"This "begrudging" attitude has three components: (a) the behavioristic legacy and its suspicion of subjective concepts; (b) the traditional cognitive hold on our thinking in which emotion is a combination of arousal and cognition...; and (c) the reluctance of cognitively oriented scientists to view an emotion as anything more complex than a "stop" or interrupt rule in a simulation of mental operations....Admitting a richer concept of emotion to the lexicon could generate major upheavals in cognitive theory as emotions theory addresses the growing theoretical and empirical knowledge in neuroscience and molecular biology." (Leventhal & Tomarken, 1986, pg. 566).

The innate psychobiological differentiability of affect is a key conceptual assumption underlying the present study. As such, it relies jointly on an integration of aspects of the Evolutionary, Body Reaction and Central Neural theories briefly outlined above and it stands in stark contrast to the cognitively based Cognition-Arousal theory as forwarded by Schacter (1957, 1962) and expanded by Richard Lazarus (1984).

The Cognition-Arousal theory of emotion has dominated the social-psychological research literature for the past 20 years. As it's major proponent, Schacter (1957, 1962) asserts that emotion is basically reduceable to an interaction between non-differentiated physiological arousal (as characterized by a hightened sympathetic activation) and a cognition or thought about the nature or cause of the arousal. Since this arousal is perceived to be emotionally non-specific, it determines only the intensity of emotional states, while thoughts (cognitions) determine their quality. One of the core assumptions requires that both arousal <u>and</u> cognitions are <u>necessarily</u> components for emotional experience. As Lazarus (1984) states it:

"the quality and intensity of an emotional reaction are determined by <u>cognitive appraisal</u> processes, that is, the person's continually reevaluated judgments about the significance of demands and constraints in ongoing transactions with the environment and about the options for meeting them. Second, cognitive appraisal processes underlie <u>coping</u> activities which, in turn, continually shape the emotional reaction by altering in various ways the meanings

of ongoing relationships between the person and the environment, that is, by affecting appraisal itself via <u>reappraisal</u>." (Scherer & Ekman, 1984, pg. 222)

In their extensive review of the empirical literatures testing the Cognition-Arousal theory, Leventhal & Tomarken (1986) point out that investigations appear to fall into one of two categories: those that clearly fail to support the theory and those that provide only limited support, with some, but not all, findings consistent with predictions. Summarizing the literature on the misattribution of arousal to emotional cues, they conclude that the evidence in favor of the theory is quite weak and that the findings which have leant partial support to the theory have been based on such highly restrictive experimental conditions as to render them nearly meaningless in respect to generalizability beyond the laboratory.

In summarizing their review of over 40 studies in the misattribution of emotional as well as neutral cues, excitation transfer, and bogus feedback literatures, Leventhal & Tomarken unenthusiastically conclude:

"Overall, research testing predictions derived from Cognition-Arousal theory has yielded disappointing results." (pg, 574).

The alternative view of emotion, which is consistent with the orientation of the present study, suggests that emotion is psychobiologically innate, complete with differentiable and specific states of physiological arousal, experiential phenomenology and forms of

neuromuscular expression. However, forms of behavioral expression appropriate to differentiated affect is not innate and must be learned in developmentally sequential interactions with the social and non-social environment.

Zajonc (1984) provides a powerful response to the Cognition-Arousal school ala Schacter and Lazarus. He asserts that the necessity of cognition in the experience of emotion has been established by <u>definition</u> rather than by empirical investigation. His argument is substantial and will be quoted at some length.

"Assuming that cognitive appraisal is always a necessary precondition of emotion, preempts research on the matter. It is my preference to leave the question of cognitive appraisal open for empirical research, postponing the task of precise and extensive definitions of both processes until we know more about them. Solving problems by definition is not an incentive for further study. It is a useful temporizing maneuver that allows us to proceed with our work for a while, pretending that one aspect of our problem had already been solved. But we can pretend just so long. At some point of theoretical development, we must look to the empirical side of the problem and confront each element of our definition with empirical reality and theoretical consistency. This point of theoretical development has now been reached, I believe. Of course, the question that is contested here cannot be fully resolved unless we have a full understanding of consciousness. Such an understanding is at the moment beyond our reach. But we have learned just about enough about cognition and emotion to move beyond definitional disputes. There are sufficient number of conflicting results which I pointed out in my paper (Zajonc, 1980), and a sufficient number of suggestive experimental results that need to be integrated. Questions about the independence and primacy of affect can now be seriously asked at the empirical level. I offered the notion of affective independence and primacy as an hypothesis to be empirically verified--not as a definition to be disputed. Above

all, however, defining affect as heavily dependent on cognition, should make it rather clumsy to study the interaction of cognition and emotion, and especially those forms of emotion where the latter influences cognition (in such phenomena, for example, as phobia and prejudice)." (Scherer & Ekman, 1984, pg. 260).

In support of this contention, Zajonc (1984) goes on to summarize the empirical literature on the independence of affect and cognition crystalized around five major clusters of findings. A detailed review of this literature would be beyond the scope of the present study and the reader is referred to Zajonc for an in-depth analysis. The five clusters of findings can be simply put forward as: 1) Affective reactions show phylogenetic and ontogenetic primacy; 2) Separate neuroanatomical structures can be identified for affect and cognition; 3) Appraisal and affect are often uncorrelated and disjoint; 4) New affective reactions can be established without an apparent participation of appraisal; and 5) Affective states can be induced by drugs, hormones or electrical stimulation of the brain.

Darwin (1904) first outlined the evolutionary and adaptive significance of emotion in animals and humans, noting species-wide modes of expression and cross-cultural adaptations. Lorenz (1965) and Izard (1971) have independently demonstrated the cross-cultural similarities in emotional expressiveness with Izard's work, particularly, paralleling a significant series of cross-cultural studies carried out by Ekman and Friesen (1969, 1975, 1980). Ekman and Friesen displayed pictures of facial expressions across five culturally diverse populations and then presented a list of potential emotions. Observers gave the same interpretations to each face.

Other investigators have contrarily suggested that facial expression is culturally specific and functions more like a culture-bound language system than a biologically innate expressive mechanism (Leach, 1972; Mead, 1975, LaBarre, 1947). If this position were correct it would undermine the theory of innate differentiability of affect. In an elegant study, Ekman and Friesen (1969) tested the notion of display rules as a means of reconciling their findings with those of Mead, Leach and LaBarre. They essentially posited that affective expression is innate and cross-cultural but that each culture develops social rules that govern who can express what emotion under what social contexts. For example, in Western cultures males should not cry, females should not show anger, losers should not cry in public and winners should not be too happy about winning, etc. Ekman and Friesen (1969) successfully demonstrated how affective expression is both universal (in private with no display rules operating) and culture specific (in public with display rules in operation).

Ekman (1983) has provided further evidence in support of the innate psychobiological differentiation of emotion by demonstrating emotion-specific activity in the autonomic

nervous system. In assessing the autonomic correlates (primarily heart rate and temperature change) of six distinct emotions (anger, fear, sadness, happiness, surprise and disgust), the null hypothesis of no main effect for emotion was heartily rejected F(25,317) =2.51, P .001).

Numerous authors have suggested integrated psychobiological developmental models of affective experience and differentiation (Schmale, 1964; Tomkins, **1962 & 1982; Izard, 1971; Krystal, 1975).** Plutchik (1980) has offered a complete psychoevolutionary synthesis which organizes affect and cognition around a series of adaptational tasks that the organism faces in interaction with the physical and social environments. He asserts that, in an evolutionary sense, emotion serves to organize experience and mobilize behavior that fosters survival and adaptation in eight broad functional classes. Thus, he suggests that there are three languages that may be used to describe emotional states; a subjective language, a behavioral language and a functional language. Correspondences between these three language systems results in the following table (Plutchik, 1984, pg. 200).

Subjective	<u>Behavioral</u>	Functional
Fear, Terror	Withdrawing, Escaping	Protection
Anger, Rage	Attacking, Biting	Destruction
Joy, Ecstasy	Mating, Possessing	Reproduction
Sadness, Grief	Crying for Help	Reintegration

Acceptance, Trust	Pair Bonding, Grooming	Incorporation or Affiliation
Disgust, Loathing	Vomiting, Defecating	Rejection
Expectancy, Anticipation	Examining, Mapping	Exploration
Surprise, Astonishment	Stopping, Freezing	Orientation

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Silvan Tomkins (1962, 1963, 1982, 1984) has theorized that the affects are not only biologically innate, but, indeed, form the primary motivating system for humans. He notes that drives such as hunger and sex must be "fused" with, or "amplified" by affect before they become motivators to behavioral action.

"The affect system is, therefore, the primary motivational system because without its amplification, nothing else matters, and with its amplification, anything else <u>can</u> matter." (Tomkins, 1984, pg. 164)

Tomkins further believes that affects are tied to facial and vocal expressions, being triggered at subcortical centers, identical in his position to that offered by Ekman. Tomkins earlier suspected that facial musculature was the primary feedback bridge but has recently shifted his focus on to the facial skin (1984). He first proposed that there were eight primary affects, each with its own specific facial concomitant. The similarities to Plutchik are manifest. A ninth affect has recently been added by Tomkins, further differentiating dissmell from disgust (1984).

In the summary of their review of the current state of

theory of emotion, Leventhal & Tomarken (1986) have reinforced the conceptual bridge, through empirical study, between Tomkins work and the object relations view of alexithymia. Their words bear repeating here:

"Our reading of the evidence on the universality of expressive behavior and the lateralization of emotional processing suggests an innate, central motor system for constructing expressions and feelings with the critical function of cementing interpersonal relationships. Further support comes from the ability to detect these processes during the first year and even the first days of life. It is a system that thrives on social contexts, able to react to social stimuli as well as provoke them. Common sense and the data showing links between emotion and memory suggest that the emotion system undergoes elaborate development over the individual life span. In turn, the power of social cues in eliciting and responding to emotional expression suggests that such emotional development occurs primarily in social interactions. It is in these same social contexts that the infant becomes aware of the distinction between self and other, and that the child elaborates distinctive self-attributes and develops a sense of self-esteem and effectance. Emotion and self-concept are intimately bound in memory." (pqs. 599 & 600)

Krystal (1977) has written extensively about early affective development and differentiation and views the evolving capacity for language, verbalization and symbolization as key factors.

"....the process of putting emotions into gestures, sounds and finally words is a basic one. Language can be viewed as an outgrowth or a manifestation of emotions..." (pg, 10)

"As an individual grows up, his (/her) affect becomes progressively verbalized and desomatized..." (pg.11)

"....the main advantage of verbalization is that it manifests the child's ability to experience specific emotions father than a generalized response." (pg. 11)

"The development of language and symbolization is the fundamental event in the development of affects...failure to do so would lead to the child being flooded with somatic and undifferentiated affects..." (pg. 16)

In order to follow this progression in the direction of cognition, language, and symbolization, the pertinent literature regarding the role of imagery and affective experience will be summarized.

Mental Imagery

As noted above, controversy rages over the issue of the psychophysiological primacy of affect vs cognition (the image). Within the narrower discussion of the nature of imagery, debate is longstanding and intense regarding what it is that actually constitutes an image and how it functions in the psychic constitution of the individual. While it is beyond the scope of the present discussion to detail the theoretical and philosophical underpinnings of the debate, a brief history will be presented for the purpose of laying a foundation for the conceptualization of imagery and its psychosomatic implications in the present study. Following that historical brief, pertinent research literature will be summarized.

As Kolers (1983) points out, in a recent review of Perception and Representation, imagery has an old but confused status in the study of the mind. For many it was both the carrier of information from the environment to the

mind as well as the mind's expression of that information. Richardson (1983) has noted that this duality in the nature of imagery is in need of clarity by distinguishing the <u>nature</u> of imagery (by contrasting it to perception) from the <u>function</u> of imagery (by inquiring into the conditions of its arousal and the information that it can make available).

Holt (1964), in a broad historical discussion, suggests that shifting philosophical paradigms from the introspective idealism of James, with its emphasis on inner subjectivity, to the behaviorally oriented epiphenomenology, with its dualistic assertion that mental events are caused by physical events but have no effect themselves, has resulted in a scientific hiatus in the study of imagery. Not until the mid 1960's did imagery as a legitimate field of study re-emerge, cresting on the wave of cultural preoccupation with the nature of consciousness and subjective experience. This lingering debate over the question of whether the image is a <u>real</u> phenomenological experience or whether the image exists separate from the phenomenal field remains.

In further respect to the <u>nature</u> of imagery, Paivio (1971) has summarized many previous works in the context of a "Dual Code Theory" - suggesting we use two different but redundant coding systems to represent the world, a pictoral system and a linguistic system.

Pylyshyn's (1973) position contrasts pictorialists

from propositionalists - those who argue for the fundamentally pictorial or spatial or "analog" representation of objects in the mind versus those who argue that all mental events were best captured as a list of statements something like those of a computer program. The contrast is sometimes put, in fact, as between <u>pictorial</u> mental representation and <u>symbolic</u> representations, the latter identified with mathematical or similarly language-like symbolization.

Holt (1964) suggests one form of conceptual bridge by basing our thinking on a "double-aspect-coded-meaning" position. This position tentatively accepts that consciousness may make a considerable difference and therefore suggests the term <u>image</u> when we are speaking about a phenomenal content of a sensory or quasisensory nature (pictorialist) and the term <u>representation</u> when we are speaking about the lexical meaning structure (propositionalist) as mediated by a brain process without awareness. This sense of the nature of mental imagery as a sensory or quasisensory phenomenally based experience in the mind is the meaning basis for the present study.

Given the clear somatic linkages proposed in the present study, it is necessary to extend the previous discussion into the realm of the physiologic. Ahsen (1984) states that:

Paivio's Dual Code Model...implicitly involves a statement against the status of physiological correlates in imagery by virtue of omission. The somatic (S) side is not given any representation

in the model, which posits a parallel relationship between the image (I) and the meaning (M) as word or language. The image represents the concrete side and the verbal represents the abstract side of the same experience. Obviously, if the somatic side is given a due representation, it would change the Dual Code Model into a Triple Code Model" (pg. 16).

As indicated in chapter one, and reiterated here, Ahsen

(1982) also states:

"Whether one believes that conscious experience ensues upon an upward discharge from the hypothalamus to the cerebral cortex ...or upon return impulse from the muscles..., the simple fact remains that upon seeing an image (I), (the sight of a bear in the woods), a specific somatic or neurophysiological change (S) ensues as either (a) a strong overt response observable by another person or (b) an inner response which is observable only by the subject himself. The S is always of a specific type - skeletal, proprioceptive, motor neural impulse, sensory experience and so forth." (pg. 174).

This is a direct attack on the epiphenomenalist position by suggesting that there is an interactive effect between the physiology and the conscious experience of the image. Kolers (1983) joins this attack by pointing to the work of Greenough (1975 & 1978) and Freeman (1979) which provides:

" reason to think that cognitive learning and (by extension) imagery actually modifies biological structure, making a distinction such as Pylyshyn (1973) proposes very difficult to maintain, if not vacuous." (pg. 148).

Plutchik (1984) takes a moderate position on the epiphenomenalist position but links imagery directly to the evolutionary properties of emotion in the coping and survival of the organism. He suggests:

" that images are related to emotions in the following ways: (1) Images are part of the mental maps we make of the environment to help us adapt more successfully; (2) Images reflect emotional states; (3) Images can intensify emotional states; (4) Images can habituate or reduce the intensity of emotional states; (5) Images can sometimes help an individual gain mastery over a situation; and (6) Images have both a phylogenetic and ontogenetic sequence of development." (pgs. 110 & 111).

Sheikh & Kunzendorf (1984) take a similar stance, stating that the epiphenomenalist's division of mind and body has warded off any attempt to define the image in its physiological context and continues to influence the modern medical community's attitude toward potential psychosomatic effects. They go on to cite literally hundreds of research studies in the areas of; imagery and heart rate, imagery and electrodermal activity, imagery and voluntary muscles, imagery and blood flow, imagery and body chemistry, imagery and ocular effects and, finally, imagery and the treatment of disease as a counterpoint to the epiphenomenalist position.

The domain of imagery and disease is of particular import to the thrust of the present study. Sheikh & Kunzendorf (1984) cite eleven studies in the treatment of experimentally induced but disease related pain whereby subjects instructed to imagine that a painful sensation feels more numb or more pleasant increases both their subjectively reported tolerance of pain and their behaviorally measured tolerance. Further, subjects with specific food allergies have been able to consume those foods without becoming sick by imagining that other foods were being eaten instead (Ikemi, 1965). Achterberg (1984) extends the imagery/physiology linkages by stating:

" the image serves both a reactive and causative role with regard to physiology. And, as part of this reciprocal position, it can be consciously accessed both to understand the physiologic pattern and evoke change" (pg. 1).

As mentioned in chapter one, the emerging field of psychoneuroimmunology provides some of the key conceptual interfaces whereby the same neuroanatomic structures involved in immunity are also implicated in the transmission of the image as well as the affective response system. Brain and central nervous system structures, particularly the hypothalamus and the pituary gland, as well as the limbic system and the reticular formation, appear to be involved in the activation or suppression of the immune system (Harrell, et. al., 1981; Rogers, et. al., 1979; Spector & Korneva, 1981; Stein, et. al., 1976).

In a series of studies conducted with patients diagnosed with widely metastic, Stage IV cancer (Achterberg & Lawlis, 1978), three blood chemistry/hemotological factors and two psychological factors were found to be related to concurrent disease states. One of the psychological factors measured denial and the other psychological factor measured imagery dynamics of the disease, with the imagery dynamics of disease having the highest correlation. For the two-month follow-up, none of blood chemistry/hemotological factors were found to be predictive. On the other hand, four psychological factors

were found to be predictive, including; denial, locus of control, investment in the self and the imagery dynamics factor. Again, the imagery factor was the most powerful predictor of disease change.

The imagery analysis developed above has also been extended to cover diabetes and low back pain (Achterberg & Lawlis, 1984). The diabetes assessment was found to predict levels of blood glucose and the back pain imagery has proven to be a useful diagnostic and prognostic tool in determining several factors related to potential for surgery and rehabilitation.

Schneider, et. al., (1983) trained subjects to image specific behaviors of neutrophils (a type of white blood cell which is not targeted for any special disease). In several reiterations of their design, they demonstrated that such imagery would reliably result in changes in both the number of the cells and in the type of cell behavior imaged.

Achterberg (1984) states:

" These and other findings describe a neuroanatomical bridge between the image and physiology that is not only intact but guite ancient. Further, the association is considerably more primitive in terms of phylogeny and ontogeny than is the link-up of either image or physiology to the language system....this tie-in between the location of the image and the area associated with emotions (right brain) is extremely important, since many of the autonomic functions associated with health and disease are emotionally triggered....these two sets of information - the involvement of the central nervous system in immune function and the image in physiology - should be of critical concern to the practice of medicine." (Pgs. 5 & 6).

The convergence of Achterberg's position with that of Plutchik's is evident. So too is it consistent with the Triple Code Model of imagery offered by Ahsen. Achterberg writes:

The studies cited above support the Triple Code Model (Ahsen, 1982) which considers the image to be the primary phenomenon, followed by the somatic responses and lastly by meaning or the lexical and verbal aspects." (Achterberg, 1984, pg, 10).

As briefly outlined in chapter one, Sheikh & Kunzendorf (1984) have forwarded three general hypotheses explaining the mechanics through which imaging affects the body; the Structural Mechanism hypothesis, the Associative Mechanism hypothesis, and the Self-Regulatory Mechanism hypothesis.

The Structural Mechanism hypothesis assumes that the the innervation of brain structures possessing imaginal qualities is neuroanatomically similar to the innervation of brain structures controlling autonomic phenomena ala Achterberg's discussion above.

There are three current positions held relative to the Structural Mechanism hypothesis. One version of the Structural Mechanism is based on the "image-hemisphere identity" hypothesis: the hypothesis that neural states with imaginal qualities are located in the right hemisphere of a right-handed subject's brain. According to this version of the hypothesis, imaginal control facilitates autonomic control because both processes require right-hemisphere activation, and better imagers should exhibit better autonomic control because they utilize their right hemispheres to a greater extent. To date the latter claim has not been supported by the literature but the general assertion that both imaging and autonomic responding involve right-hemisphere activation has been supported by all six studies cited to date (Sheikh & Kunzendorf, 1984).

A second version of the Structural Mechanism hypothesis is based on the "image-ERG identity" hypothesis: the hypothesis that visual images are the sensory qualities of centrifugally innervated retinal states. If the image-ERG identity hypothesis is correct, then imaginal responses and autonomic responses are the results of structurally similar processes which may or may not overlap in terms of <u>location</u>. Two studies are reported in support of this hypothesis (Sheikh & Kunzendorf, pg. 116).

Friedman (1978) has put forth a third version of the Structural Mechanism hypothesis, based on evidence that the ability to image rises and fall in 90-minute cycles throughout the nocturnal portion of that day. Friedman has suggested that, inasmuch as autonomic processes are regulated by structurally similar biological rhythms, any desynchronization of the imaging cycle may either cause or reflect a disruption in the self-regulatory cycles of the autonomic nervous system. It would appear that Price's (1975) finding that better visualizers exhibit more regular heart-beat intervals and more stable respiratory cycles is

consistent with Friedman's suggestion.

The second broad explanation is referred to as the Associative Mechanism. An extensive, and contradictory literature has accumulated suggesting that, within the classical conditioning paradigm, mental images may play the role of an unconditioned stimulus (UCS), a conditioned response (CR) or a conditioned stimulus (CS). Following a detailed summary of the associative literature (beyond the scope of the present review) Sheikh & Kunzendorf conclude that:

" The hypothesis that Pavlovian conditioning mediates autonomic control through imagery can be valid only if there is no validity to King's (1973, 1974) counterhypothesis, that imagery mediates Pavlovian conditioning. ... In fact, autonomic conditioning in humans did not appear to be imaginally mediated, until Bell & Schwartz (1975) asked their human subjects to describe how they controlled heart rate: their human subjects reportedly imaged UCSs. Unfortunately, it is not possible to ask Pavlov's dogs whether (a) the bell CS automatically elicited a salivary CR, as Pavlov hypothesized, or whether (b) the bell CS initiated retrieval of a food image, which evoked a salivary UCR, as King hypothesizes." (pg. 120.)

Finally, the Self-Regulatory Mechanism is offered as the third possible explanation. The Self-Regulatory Mechanism assumes that the neural processes behind self-regulation of the body include not only unconscious brain states, but also brain states with conscious qualities. Accordingly, conscious images of heat are likely to be concomitants of a self-regulatory process which warms up the body. Moreover, any trauma-induced blocking of those brain states that are identical with conscious images of heat disrupts the self-regulation of body heat and distorts conscious images of heat. However, such disruption or imbalance in a self-regulated neural process can supposedly be treated by generating the traumatic image in question, and thereby inducing a cathartic unblocking and rebalancing of the self-regulated process. A total of 13 studies are reviewed that support the Self-Regulatory Mechanism hypothesis ranging across cases of chronic migraine, heart rate studies, skin temperature and immune function (Sheikh & Kunzendorf, 1984).

Whether a self-regulatory mechanism, an associative mechanism, or a structural mechanism best accounts for the autonomic effects of imagery remains a matter for future research to determine. Yet each of the three mechanisms assumes that conscious images are qualities of specific brain states which interact mechanically with autonomic brain states, thus providing the necessary linkages to physiology.

The theoretical significance of the interaction of imagery and emotional access, differentiation and regulation is the conceptual linchpin in the present study. Ahsen's (1982, 1984) discussion of the Triple Code Model of imagery offers one interactive model of the processes involved. In order to examine how the experience of affect was influenced by individual differences in imagery

ability, Suler (1985) selected 30 "high imagers" and 32 "low imagers" out of 400 male undergraduates who responded to the Questionnaire Upon Mental Imagery (Sheehan, 1967) and to the Vividness of Visual Imagery Questionnaire (Marks, 1973). Affective reactance was measured by self-report, primary process thinking and psychophysiological changes. High visualizers manifested greater levels of electrodermal activity associated with affectively loaded cue words (punish, bloody, naked, seduce and kill). The hypothesis that free association imagery can enhance the experience of affect was further supported by the result that all subjects using visual associations, regardless of imaging ability, reported a higher personal relevance of their associations as compared to subjects using verbal associations.

Thus, the current literature on the nature and function of mental imagery points decidedly in the direction of significant interaction between imagery, affect and physiology.

Summary

By way of summary, it appears clear that the attempt of the present study, to empirically establish the conceptual linkages between alexithymia, affective differentiation and mental imagery, is well grounded in the respective literatures reviewed. Regardless of the theoretical stance on the etiology of alexithymia

(psychodynamic or neuroanatomical), there do appear to be manifest psychobiological interfaces which are consistent with the contemporary literatures regarding the nature and function of emotion and imagery. In a sense, the present study can be viewed as an empirical attempt to support the construct validity of a clinically defined syndrome which, heretofor, has been phenomenologically described and presumptively accepted by definition.

CHAPTER III

METHODOLOGY

The purpose of the present study was to examine the relationship between alexithymia and its primary psychological concomitants, affective differentiation and imaging capacity. A secondary purpose of the study is to examine the relationship between alexithymia and anxiety, depression and demographic information including age, sex, race and educational level.

Subjects drawn from health care populations were assessed using the Schalling-Sifneos Personality Scale (SSPS), the Differential Emotions Scale-IV (DES-IV), the Survey of Mental Imagery-Form A (SMI-A), the Beck Depression Inventory (BDI) and the State-Trait Anxiety Inventory-Form Y (STAI-Y). A multiple regression analysis was conducted in order to establish the pattern of relationships between the dependent variable, alexithymia, and the sets of independent variables of affective differentiation, imaging capacity, anxiety, and depression.

In the remainder of this chapter, the study sample, instruments and procedures will be described. The research hypotheses guiding the study as well as the design and data analysis used in order to test the hypotheses will also be outlined.

Sample

The population from which the sample for the present study was drawn, consisted of health clinic users presenting for medical services at the Isla Vista Medical Clinic as well as the Montecito Medical Offices, located in Isla Vista and Montecito, California, respectively.

Both clinics provide a full range of outpatient medical services including diagnosis, treatment and referral. The two clinics draw from all socio-economic segments of the greater Santa Barbara area but their proximity to the University of California, Santa Barbara campus results in a relatively heavy student representation in their clientele. As a result, the average age of the clinic's patients is likely biased in the direction of the 18-24 year old range while the average level of education is likely to be higher than that of the typical outpatient medical clinic.

A total of 195 individuals initially volunteered for participation in the study in the months of June and July of 1987. Of those 195, 150 individuals volunteered to participate completely by scheduling dates for the administration of the total battery of questionnaires, including the Beck Depression Inventory (BDI), State-Trait Anxiety Inventory-Form Y (STAI-Y), Differential Emotions Scale-IV (DES-IV), and the Survey of Mental Imagery-Form A (SMI-A). The remaining 45 participants initially completed only the Schalling-Sifneos Personality Scale (SSPS) but

were excluded from complete participation for one of three possible reasons: 1) the person left no phone number by which they could be contacted in order to schedule test administrations; 2) the person wished to participate further but was unable to schedule the necessary time; or 3) the person changed his/her mind between filling out the SSPS and scheduling the remaining questionnaires.

Given that the primary demographic data was collected at the time of the follow-up administration, the only information gathered from the 45 people who did not fully participate was gender and SSPS score. A Total of 11 males with an average score of 56.0 on the SSPS did not participate further in the study while a total of 34 females with an average score of 54.9 on the SSPS chose not to participate fully. This information is summarized in Table 3-1.

Table 3-1

Gender and SSPS Scores of Partially-Participating Subjects

SEX	N	8	Mean(SSPS)	S.D. (SSPS)
Male	11	24.4	56.0	4.0
Female	34	75.6	54.9	3.4

The gender proportions in the partial-participation group of 24.4% male and 75.6% female was very close to the proportions in the full-participation group which consisted of 25.3% male and 74.7% female, suggesting essential equivalence of the two groups on this attribute.

A t-test was conducted on the mean scores on the SSPS for the two groups in order to assure group equivalency on the dependent variable. The results of the t-test affirmed the null hypothesis of no significant difference between the two groups on the dependent measure of alexithymia, t=1.34, df=1, p< .05.

The demographic information for the 150 subjects who participated fully in the study is summarized in Tables 3-2 through 3-5.

Table 3-2

AGE CATEGORY	N	8	
15 - 19	9	6.00	
20 - 24	59	39.34	
25 - 29	26	17.33	
30 - 34	13	8.67	
35 - 39	17	11.33	
40 - 44	8	5.33	
45 - 49	5	3.33	
50 - 54	4	2.67	
55 - 59	9	6.00	
60 - 64	0	0.00	

Age of Subjects

As can be seen from Table 3-2, the age distribution of the sample was unimodal and heavily biased in the direction of younger subjects. 94 (62.67%) of the total sample fell within the ages of 15 to 29 years with the 20-24 year olds reflecting the modal category showing a total of 59 (39.34%) of the 150 total subjects. The racial breakdown of the sample, reflected in Table 3-3, again demonstrates a unimodal distribution with a predominantly white representation with 130 (86.66%) falling in this category. Hispanics and Asians were nearly equally represented with 7 (4.66%) and 6 (4.00%) in each group. Blacks and Native Americans were least represented with 3 (2.00%) and 3 (2.00%) in each category. This overall ranking accurately reflects that of the greater Santa Barbara area although, by percentage, the sample was more predominantly white than is the greater metropolitan area.

Table 3-3

3	2.00	
ic 7	4.66	
130	86.66	
6	4.00	
Amer. 3	2.00	
1	0.68	
	3 130 6 Amer. 3 1	3 2.00 ic 7 4.66 130 86.66 6 4.00 Amer. 3 2.00 1 0.68

Race of Subjects

The gender composition of the sample, summarized below in Table 3-4, was primarily female, 112 (74.40%). 38 (25.60%) males participated in the study. As noted, this breakdown was nearly identical to that of the 45 partially participating subjects. Table 3-4

Gender of Subjects

GENDER	N	8	
Male	38	25.30	
Female	112	74.70	

Table 3-5

Educational Level of Subjects

LEVEL OF EDUCATION	N	¥
Less Than High School	8	5.33
High School Graduate	12	8.00
Part. Completed College	85	56.67
Comp. Col. Degree (4yr)	18	12.00
Grad. or Prof. School	27	18.00

The educational level of the sample is summarized in Table 3-5 above. While each educational level is represented, the sample is heavily biased in the direction of partially or fully completed undergraduate or graduate/professional degrees. 130 (86.67%) of the participants have begun or completed their college or professional degrees. 12 (8.00%) subjects graduated from high school only and 8 (5.33%) individuals did not complete a high school degree.

While the Isla Vista Medical Clinic and the Montecito Medical Offices are not formally affiliated with the University of California, Santa Barbara, the sample demographics(particularly age and education) would suggest that the clinics draw heavily from the student population. It would seem that, resultantly, students from UCSB were heavily represented in the study sample.

Instruments

The following section will consist of a description of the instruments used in the present study.

Schalling-Sifneos Personality Scale

The instrument used to screen study participants for the presence of alexithymia was the Schalling-Sifneos Personality Scale (SSPS) (Apfel & Sifneos, 1979) (see appendix A). The SSPS is a 20-item, self-report questionnaire designed to elicit responses to statements about the respondent on a four point scale ranging from 1 (does not apply at all) to 4 (applies completely). It was originally developed by Apfel and Sifneos at the Beth Israel Hospital Psychiatric Service, Boston, Mass. in order to screen patients for the presence of alexithymia in a more time effective manner. Previous assessment procedures have involved time consuming structured clinical interviews which have demonstrated inconsistent inter-rater reliability and are subject to unintended observer/investigator effects (Shipko & Noviello, 1984; Lolas, et. al., 1980).

At this time, the SSPS appears to be the most widely used of the available instruments and appears to have good face validity. Additionally, evidence has been presented indicating that the SSPS scores measure something distinct from other psychological constructs such as anxiety or depression (Blanchard, et. al., 1981; Martin, et. al., 1984; Taylor, et. al., 1981). These findings provide evidence for the discriminative validity of the SSPS. Scores on the SSPS are derived by a simple tally across items with a range of 20 to 80 for a total score. Items, 3,4,12,15, & 20 are scored in the opposite direction of the remaining items (Martin, 1987). A score of 50 or below is considered demonstrative of the relative presence of alexithymia (Blanchard, et. al., 1981).

Blanchard, Arena and Pallmeyer (1981) conducted a series of four psychometric studies on the SSPS, providing initial data on the prevalence of alexithymia in a normal college population. In their sample of 230 undergraduates, alexithymia was found to be distributed approximately normally with a prevalence of 1.8% in the female group and 8.2% in the male group (pg. 64). Two factor analytic studies were conducted revealing the following three factors: I. Difficulty in expression of feelings; II. The importance of feelings, especially about people; and III. Daydreaming or introspection (pg. 67). Finally, intercorrelations between scores on the SSPS and scores on the Beck Depression Inventory, State-Trait Anxiety Inventory, Rathus Assertiveness Scale and the Psychosomatic Checklist were quite low, ranging from -.290 to -.067 (pg. 69). These low correlations suggest that the SSPS is

relatively orthogonal to measures of other dimensions of psychological disturbance.

In an attempt to provide further descriptive data for the SSPS and also to replicate the Blanchard, et. al. (1981) factor analytic studies, Martin, et. al., (1984) administered the SSPS to 430 undergraduates at McGill University. The overall prevalence rate for this sample was 1.9% which was not further broken down by gender (pg. 147). The results of the factor analytic studies yielded three similar factors to those found by Blanchard, et. al. (1981) suggesting the factor structure of the SSPS is stable and replicable across samples and is, therefore, psychometrically robust.

Finally, in a further replication conducted on a sample of 46 undergraduates at the University of California, Irvine, Shipko & Noviello (1984) found a test-retest reliability estimate of .76 and replicated Blanchard's three primary factors (Shipko & Noviello, 1984, pg. 87.).

According to the factor loadings on individual items in all three factor analytic studies, item 10 (I like people to be precise and to describe details) and 19 (I prefer to use my left hand) bore no significant relationship to the primary factor structure. It is reasonable to delete items 10 and 19 in order to increase the instrument's overall sensitivity to the presence of alexithymia. In fact, one author has gone as far as to
recommend that only nine of the original 20 items be retained, only those most heavily loaded on the three primary factors (Shipko & Noviello, 1984). Other authors have not supported such an extreme alteration of the instrument however. The revised scale resultantly consisted of 18 items and was scored from 18 to 72, with a score of 45 or below suggesting the presence of alexithymia. Items 3,4,11,14 & 18 were scored in the opposite direction in the revised scale. The cut point of 45 retained the proportional properties of the original scale.

Differential Emotions Scale-IV

Affective differentiation was assessed using the Differential Emotions Scale-IV (DES-IV) (Blumberg & Izard, 1985, in press) (see appendix B). The DES-IV is a 49 item, paper-and-pencil self-report questionnaire which measures the following emotions: Interest, Enjoyment, Surprise, Sadness, Anger, Disgust, Contempt, Fear, Shame, Shyness, Guilt and Inner-Directed Hostility. Respondents rate how often over the past 30 day period they have experienced the feelings expressed in phrases which comprise the items over a five point scale from 0 (rarely or never) to 5 (very often). Scoring simply consists of summing the items that make up the 12 affect scales yielding a frequency score for each emotion as well as a sum total for all emotional experience by adding the individual emotion scale totals.

The parent version of this scale, the Differential

Emotions Scale, was originally developed to test Differential Emotions Theory (Izard, 1971), which was based on the initial work of Silvan Tomkins (1962 & 1963). The original DES was designed as a state measure of subjective emotional experience but was soon adapted to a trait measure by shifting to a frequency-over-time response scale similar to the one employed in the present study (Izard, 1977). Izard, (1977) reports a factor analytic study of the DES yielding 10 factors: 1. Interest; 2. Enjoyment; 3. Surprise; 4. Distress; 5. Anger; 6. Disgust; 7. Contempt; 8. Fear; 9. Shame/Shyness; and 10. Guilt. Test-retest reliabilities for the trait instructions (DES-II) ranged from .68 to .87 (Izard, 1977, pg. 126).

The DES-IV is identical to an earlier version of the DES (DES III) with the exception of the addition of two subscales hypothesized to target patterns of emotions specific to depression, shame and guilt (Izard, 1972). The DES-III was developed specifically for use with a college and adolescent population by replacing emotional adjectives with short phrases for the items. The DES-III has been shown to possess reliability and validity in adolescents and college students, and equivalency with the parent DES and DES-II (Izard, et. al., 1974; Kotch, et. al., 1982). The DES-IV, which was used in the present study, has been shown to correlate significantly with the Children's Depression Inventory in a sample of older children (Blumberg & Izard, 1985, in press) and with the Depression

subscale of the Mental Health Inventory (Nelson, 1985).

Complex emotions such as anxiety and depression are considered to be patterns of more finely differentiable primary affects. The DES has been used to delineate these patterns specific to complex emotions (Izard, 1972). In a sample of college students, the following pattern of primary affects were used by subjects to describe the experience of depression (listed by order of frequency): Distress; Hostility Directed Inwardly (a combination of anger, disgust and contempt); Fear; Fatigue; Guilt; Surprise; Shyness; and Joy (Izard, 1972). The instrument offers clear distinction of the affective patterning. Survey of Mental Imagery

Imaging capacity was determined using form A of the Survey of Mental Imagery (SMI-A) (Switras, 1979) (see appendix C). This instrument consists of two untimed, paper-and-pencil, parallel-form surveys of 86 items each of self reported mental imagery. For the purpose of the present study, only form A was used as there was only one administration required for each study participant. The survey assesses two aspects of imaging capacity, Controllability and Vividness. In addition, the survey assesses imagery in seven sensory modalities; Visual, Auditory, Olfactory, Gustatory, Tactile, Somesthetic and Kinesthetic.

Scoring of the SMI-A requires simple addition. Subtest scores exist for both controllability and vividness

in each of the seven sensory modalities. For example, there is both a visual controllability and a visual vividness score, an auditory controllability and an auditory vividness score, etc. Each subtest score is obtained by adding the blackened numbers of the items comprising that particular subtest. In addition to the 14 subtest scores, there is a total controllability score, a total vividness score, and a sum total score. The total controllability scores are obtained by adding together the seven controllability subtest scores, while the total vividness score is obtained by adding together the seven vividness scores. The total score is the sum of all the items making up the test.

The SMI-A is a relatively recent instrument that was standardized using 350 (129 male and 221 female) undergraduate students from Iowa State University. The author reports scale homogeneity data, using Chronbach's alpha, ranging from .68 to .97 (Switras, 1978, pg. 381). Reliability estimates using correlations between alternative forms ranged from between .74 and .91 (pg. 381). Analysis of scale convergence and discrimination supported sensory modality and controllability-vividness discrimination between the various subtests. The same analysis supported same-sensory-modality and same-dimension (controllability or vividness) convergence among the various subtests. A factor analysis performed on the 28 subtests rendered the following seven factors: I. Visual

Imagery; II. Olfactory Imagery; III. Somesthetic Imagery; IV. Kinesthetic-tactile Controllability; V. Gustatory Imagery; VI. Kinesthetic-tactile Vividness; and VII. Auditory Imagery.

Validity checks using correlations with several existing measures of mental imagery were low, with correlations ranging from .00 to .31 (Switras, 1979, pg. 34). However, the author points out that for several of the sensory modalities there exist no other published measure for comparison purposes and the measures that were used for comparison comprise widely discrepant imaging tasks. Further validity study is clearly called for.

In addition to the reliability and validity estimates reported above, Hull and Render (1984), using the SMI, forms A and B, to assess imaging controllability and vividness in 96 college students, conducted split-half comparisons using the Spearman-Brown formula. Adjusted reliability estimates ranged from .97 to .99 (pg. 73). Parallel-form reliabilities were also estimated for each subtest, the overall controllability and vividness totals and the sum total. All correlations were found to be significant at or above the .05 level, ranging from .50 to .95 (pg. 73).

Considering the above reliability and validity estimates and the unique nature of the instrument, the SMI-A was deemed appropriate for use in the present study.

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State-Trait Anxiety Inventory-Form Y

The State-Trait Anxiety Inventory-Form Y (STAI-Y) was used as the measure of anxiety in the present study (Spielberger, et. al., 1983) (see appendix D). The STAI-Y has been used extensively in research and clinical practice for over 20 years and yields independent measures of Trait Anxiety as it manifests over time and State Anxiety as it manifests phenomenologically in the moment. Thus, the instrument is made up of two, 20-item, self-report scales; the State inventory consisting of statements pertaining to the respondent's experience in the moment, with the Trait inventory consisting of statements pertaining to how the respondent generally feels over time. The State items are scored on a four point scale, ranging from 1 (not at all) to 4 (very much so). The Trait items are similarly scored on a four point scale, ranging from 1 (almost never) to 4 (almost always). Nearly half of the items are scored in reverse and, resultantly, scored from 4-1. The scores are tallied across items, resulting in separate State and Trait totals ranging from 20 to 80.

Over 2,000 studies have been conducted with the STAI since 1970 and extensive normative data exists for working adults, college students, high school students and military recruits. Alpha coefficients of reliability are reported by the test author between .86 and .96 with test-retest reliability figures being somewhat lower, ranging from .73 to .86 (Spielberger, et. al., 1983). Given the transitory nature of expressed anxiety, the measure of internal consistency, alpha, is considered the more valid measure of reliability, falling well within acceptable limits.

The main populations with which the STAI has been used as a measure of anxiety includes high school students, college students, working adults, military personnel, and psychiatric, psychosomatic, medical, surgical and dental patients. Application to the present study is clearly within these sample parameters.

Construct validity of the STAI has been demonstrated through the contrasted groups procedure whereby scores achieved by normals were compared to scores achieved by psychiatric groups in which anxiety was a major component of the presenting complaint. All of the psychiatric groups scored substantially higher on the T-scale than the normal groups save the Character Disorder group, in which the expectation of low reported levels of anxiety would be predicted (Spielberger, et. al., 1983). Concurrent validity of the STAI has been demonstrated through correlation with other well known measures of anxiety, including the IPAT Anxiety Scale (Cattell & Schier, 1963) and the Taylor Manifest Anxiety Scale (TMAS, 1953). On groups of college females, college males and psychiatric patients, the correlations ranged from .73 to .85 (Spielberger, op. cit.).

Finally, two factor analytic studies conducted on Form-Y of the STAI strongly supported the State-Trait

distinction as well as replicating the general factor results of five previous factor analytic studies conducted on the earlier, and psychometrically less robust, Form-X of the STAI (Barker, et. al., 1977; Gaudry & Poole, 1975; Gaudry, et. al., 1975; Kendall, et. al., 1976; & Spielberger, et. al., 1980). The first factor analytic study on Form-Y was reported by Spielberger in 1980 using the principle axis method of factor extraction with varimax rotation using a population of high school students. Four factors emerged: Factor I (State Anxiety Present), with factor loadings ranging from .37 to .71; Factor II (State Anxiety Absent), with factor loadings ranging from .53 to .68; Factor III (Trait Anxiety Absent), with factor loading from .39 to .66; and Factor IV (Trait Anxiety Present), with loadings from .37 to .69. The second factor analytic study was conducted by Vagg, et. al. (1980) with a sample of 1,728 Air Force recruits. The principle axis and varimax rotation methods were again applied. Vagg's data yielded both a two-factor and a four-factor solution. The two-factor solution resulted in a State Anxiety Factor with item loadings ranging from .42 to .68 and a Trait Anxiety Factor with item loadings ranging from .32 to .72. The four-factor solution yielded the same four factors as reported by Spielberger, et. al., 1980.

Considering the wealth of clinical and research applications of the STAI with samples similar in background characteristics to the present study, it was deemed

appropriate for use.

Beck Depression Inventory

The Beck Depression Inventory (BDI) was used in order to assess the presence of depression in the present study (see appendix E). The BDI is a 21 item self-report inventory consisting of a series of statements pertaining to the respondent's feelings. Responses to each item can range from 0 - 3, resulting in a four point Likert-like scale for each item. The range of responses varies in severity for each individual item. For example, item one ranges from "0 = I do not feel sad" to "3 = I am so sad or unhappy that I can't stand it" (Beck, et. al., 1961; Beck et. al., 1979).

The BDI yields a single global score rating of the severity of experienced depression ranging from 0 - 63. Burns & Beck (1978) have provided the following classification rating of resulting scores: 0-9 = no or minimal depression; 10-14 = borderline depression; 15-20 = mild depression; 21-30 = moderate depression; 31-40 = severe depression; 41-63 = very severe depression. For the purposes of the present study, these clinically derived classifications will not be used. Rather, the global score for each participant will be reported and used in the data analysis.

According to Beck, et. al. (in press) the BDI has been employed in over 1,000 research studies since its development in 1961 and a summary of the psychometric

properties is currently in press. Citing from that review, Beck, et. al., (in press) summarize 19 studies that have addressed the internal consistency of the BDI as a measure of reliability in both psychiatric and non-psychiatric populations. For psychiatric populations, the nine coefficient alphas ranged from .76 through .95, and the mean coefficient alpha was .87. Similar values were found for the 10 coefficient alphas that were reported for the non-psychiatric samples. The range was from .73 to .92, and the mean coefficient alpha was also .87.

Stability of the BDI is demonstrated by a summary of nine studies reported by Beck, et. al., (in press) providing test-retest correlations. Pre- and posttest intervals ranged from hours to weeks. The range of the Pearson product-moment correlation coefficients for psychiatric patients ranged from .48 to .86, whereas the coefficients for non-psychiatric subjects ranged from .62 to .83. It would appear from the lower boundary of the non-psychiatric patient's range that these subjects displayed more stable BDI scores than the psychiatric patients as would have been predicted. Furthermore, the high correlations for the non-psychiatric groups suggest that the BDI does demonstrate substantial stability over time.

The test authors review five types of validity studies conducted on the BDI, including; content, concurrent, discriminant, construct and factorial.

The content validity of the BDI was originally based on a clinical consensus of the symptomatology of depression (Beck, et. al., 1961). Since that time the BDI has been compared to the DSM-III criteria and found to accurately reflect six out of nine DSM-III criteria well, two criteria partially, and one criteria not at all (Moran & Lambert, 1983). The test author responds that these three criteria (appetite gain, increased sleep and psychomotor aggitation) reflect atypical depression and their inclusion in the instrument would result in many false positives (Beck, et. al., in press).

Concurrent validity of the BDI has been established with clinical assessments and a variety of alternative assessment instruments, including the MMPI, the Hamilton Rating Scale for Depression, the Zung Self-Reported Depression Scale and the Multiple Affect Adjective Checklist (Beck, et. al., in press). While correlations varied from study to study, the mean correlations within studies conducted with the above instruments ranged between .56 and .73 (pg. 17).

In regard to discriminant validity, the original intention of the BDI was to reflect the depth or severity of depression and not its subtype classification. Resultantly, Beck. et. al. (in press) report several studies that support the ability of the BDI to differentiate between psychiatric and non-psychiatric patients and two studies that demonstrate that the BDI

cannot differentiate between endogenous, involutional, psychogenetic or mixed depressive diagnoses (Delay, et. al., 1963; Schnurr, et. al., 1976).

In the same review, Beck, et. al. (in press) demonstrates that the construct validity for the BDI is strong with a number of hypothesized relationships between physiological, behavioral and attitudinal variables detected (pg. 20).

Factorially, 18 studies were reviewed with the BDI appearing to be measuring a general second-order syndrome of depression which may be decomposed into three highly intercorrelated factors reflecting negative attitudes, performance impairment and somatic disturbances. Importantly, although the factor loadings of specific BDI symptoms vary across diagnostic groups, the three predominant factors still emerged. Specific factor loadings were not reported by study (Beck, et. al., in press).

Procedures

Subjects for the study were recruited from the population of individuals presenting for medical services at either the Isla Vista Medical Clinic or the Montecito Medical Offices during June and July of 1987. The clinics are located in Isla Vista and Montecito, California, respectively. A box containing the Study Introduction (see appendix F) with the SSPS attached was placed next to the registration desk at each clinic. A 3x5 card was attached to the box inviting clinic users to take and review the Introduction, fill out the SSPS, and provide their name and phone number. Completed Introductions and SSPS forms were then returned to the respective receptionists who placed the completed forms in manilla envelopes until collected by the investigator at two to three day intervals.

After the questionnaires were collected, the investigator telephoned the prospective subjects and explained the purpose of the study in terms of investigating the relationship between imagination and how people experience their emotions. The subjects were also informed about the nature of their further participation, consisting of responding to several other paper-and-pencil questionnaires. It was explained that these questionnaires would ask about how they think and feel about themselves and others and would take approximately 45 minutes to complete. A total of 150 persons agreed to participate completely in the study out of a total of 195 who originally filled out the SSPS as discussed in the Sample section above.

Next, depending on where the subject lived, small group administrations of the remaining questionnaires, including the BDI, STAI-Y, DES-IV, and the SMI-A, were scheduled in quiet rooms of either the UCSB campus library, the Goleta public library or the Santa Barbara public library. Although not identical in size and decor, these

quiet rooms were similar in respect to providing a comfortable, quiet and neutral environment for responding to the questionnaires.

Subjects were grouped together based on time availability considerations only with administrations scheduled in the early evening hours, generally 5:00 to 8:00 p.m.. The number of subjects per administration ranged from five to fifteen. The amount of time required to respond to the questionnaires ranged from approximately 20 to 90 minutes, averaging approximately 45 minutes per subject. All subjects who attended administrations completed all questionnaires.

At the time of administration, another verbal statement of the purpose of the study was provided along with a review and signing of the Consent Form (see appendix G) in accordance with the <u>Ethical Principles in the Conduct</u> of <u>Research with Human Participants</u> (APA,1973) and the standards of the University Committee on Research Involving Human Subjects, Michigan State University. General instructions for the questionnaires were provided at this time and demographic information was gathered. Subjects desiring a summary of the study results were invited to provide mailing addresses (see appendix H).

Following the administration of the instruments, they were coded and scored by the investigator. Introduction and Consent forms containing the names of subjects were gathered and secured for purposes of confidentiality.

Research Questions and Hypotheses

Several research questions guided the present study. These questions and their attendant hypotheses are stated below.

1. Will a relationship exist between the presence of alexithymia and the capacity to engage in mental

imagery?

- <u>HYPOTHESIS</u> <u>I</u>: Holding other variables constant, individuals demonstrating lower scores on the SSPS measure of alexithymia will also demonstrate lower scores on the SMI-A measure of imaging capacity compared to individuals who score higher on the SSPS.
- 2. Will a relationship exist between the presence of alexithymia and the capacity for affective differentiation?
- <u>HYPOTHESIS</u> <u>II</u>: Holding other variables constant, individuals demonstrating lower scores on the SSPS measure of alexithymia will also demonstrate lower scores on the DES-IV measure of affective differentiation contrasted to individuals who score higher on the SSPS.
- 3. Will a relationship exist between the presence of

alexithymia and levels of self-reported anxiety?

- <u>HYPOTHESIS</u> <u>IIIa</u>: Holding other variables constant, scores on the SSPS measure of alexithymia will not covary systematically with scores on the STAI-Y measure of Trait Anxiety.
- <u>HYPOTHESIS</u> <u>IIIb</u>: Holding other variables constant, scores on the SSPS measure of alexithymia will not systematically covary with scores on the STAI-Y measure of State Anxiety.
- 4. Will a relationship exist between the presence of alexithymia and levels of self-reported depression?

<u>HYPOTHESIS</u> <u>IV</u>: Holding other variables constant, scores on the SSPS measure of alexithymia will not co-vary systematically with scores on the BDI measure of depression.

- 5. Will a relationship exist between the presence of alexithymia and demographic variables including age, sex, race, and education?
- <u>HYPOTHESIS</u> <u>Va</u>: Mean scores of the SSPS measure of alexithymia will not differ between subjects falling in different age categories.
- <u>HYPOTHESIS</u> <u>Vb</u>: Mean scores on the SSPS measure of alexithymia will not differ between males and females.
- <u>HYPOTHESIS</u> <u>Vc</u>: Mean scores on the SSPS measure of alexithymia will not differ between subjects falling in different racial groups.
- <u>HYPOTHESIS</u> <u>Vd</u>: Mean scores on the SSPS measure of alexithymia will not differ between subjects differing in educational level.

Research Design

The study was designed as an observational investigation into the relationships among measures of naturally occuring variables. As such, the study represents a non-experimental design of a correlational nature with single measures (Cohen & Cohen, 1983).

Random assignment to groups is not available as a form of experimental control in this type of design. However, potentially intervening variables including demographic information, a measure of depression and a measure of anxiety were built into the study for the purpose of controlling the possibility of their confounding influence. (Cohen & Cohen, 1983) Further controls to safeguard the internal validity of the study were built into the procedures of the study as outlined in the Procedures section above.

Data Analysis

The data analysis was broken into two primary sections. The initial purpose of the study was of a confirmatory nature regarding the relationships between alexithymia, affective differentiation and mental imagery as previously suggested by the available literature. The research hypotheses were laid out in respect to the available theory. This confirmatory aspect of the study was addressed by predicting a particular linear model and then testing the hypotheses that derived from that model using the hierarchical regression analysis described below. An alternative test of hypotheses I through IV is provided by the bivariate analyses conducted on the alexithymia variable. Hypothesis V was tested by conducting bivariate analyses on the grouped demographic variables of age, sex, race and educational level.

A second aspect of the study was exploratory in nature, given that the previous theory regarding the relationship between the dependent and independent variables has been criticized for it's lack of empirical validation. This exploratory aspect of the study was addressed by conducting an all-subsets regression analysis and a stepwise regression analysis in order to point out some helpful directions for future research.

A full description of the data analysis used in the study will be summarized below.

Hierarchical Regression Analysis

The data was initially analyzed using a hierarchical multiple regression analysis. A hierarchical analysis requires the researcher to sequentially order the independent variables (IV's) as they appear in the regression equation before the equation is run based on predictions made by the theory. This 'a priori' arrangement of IV's results in a more powerful statistical test of the overall regression model and the research hypotheses because it reduces the likelihood of capitalizing on chance correlations as is possible if conducting only a stepwise regression analysis with many variables. In the present case, the variables of Mental Imagery and Affective Differentiation were of primary interest and were entered early in the equation. The Sex variable was entered first, however, due to it's temporal priority. One's gender is determined before one develops the capcity for mental imagery, affective differentiation, anxiety or depression. The demographic variables of age, race, and education were coded in a categorical manner which prevented their inclusion in the regression analysis. Treatment of these demographic variables is discussed separately under the heading, Bivariate Analyses. The

variables of Anxiety and Depression were of secondary interest and were consequently entered last (Cohen & Cohen, 1983). Thus, the variables were entered in the following sequence for the initial regression analysis: 1) SEX; 2) Mental Imagery (MI); 3) Affective Differentiation (AD); 4) Anxiety (ANX); and 5) Depression (DEP), yielding the following overall regression model for testing:

SSPS = C + SEX + MI + AD + ANX + DEP The hierarchical analysis proceeds in a sequential manner, entering the first variable first and calculating a correlation coefficient. Subsequent variables are entered one at a time with coefficients partialled from the preceding variables such that the maginitude of the incremental contribution of each successive variable to the prediction of variation in the dependent variable can be determined.

An analysis of variance was conducted to examine the null hypothesis that the multiple correlation coefficients for the population was zero. F-tests were conducted in order to test the individual hypotheses by examining the significance of the incremental contribution to variation on the dependent variable for each individual independent variable as it was entered into the regression equation. The .05 level of significance was used for all F-tests.

Bivariate Analyses

As a test of hypothesis V, concerning the relationship of demographic variables to alexithymia, bivariate analyses

were conducted by treating the demographic variables as grouping variables and examining the relationships between levels of the demographic variables and scores on the BDI, STAI-Y, DES-IV, SMI-A, and SSPS. Where only two categories exist on the demographic variables (for example sex), t-tests were conducted for differences between means. Where more than two categories exist (for example education), analyses of variance (ANOVA's) were conducted. Scatter plots were constructed and visually examined in order to check for the possiblity of curvilinear relationships between the variables. The variables of age and race, originally consisting of nine and six categories respectively, were collapsed into five and two categories respectively due to limited cell frequencies in the original sample.

Bivariate analyses were also conducted using the cutoff score of 45 on the SSPS to designate scores as falling into either alexithymic (45 or below) or non-alexithymic (46 or above) groups. This results in the creation of a new variable, alexithymia (ALEX). The bivariate analyses conducted with ALEX provide an additional test of hypotheses I through IV.

The .05 level of significance was used for all t- and F-tests conducted to reject the null hypotheses of no differences between mean scores on measured variables.

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Assumptions Underlying the Analysis of Variance

In an unbalanced, non-experimental design of this nature, there are few methodological procedures available with which to safeguard the assumptions underlying the fixed-model analysis of variance. In a balanced, experimental design, assumptions regarding the normality of the distributions of variables can be addressed through randomization procedures. The potential inequality of group variances can be addressed by obtaining equal numbers of subjects in contrasted groups.

In the present study, assumptions regarding the normality of distributions cannot safely be made. Therefor, descriptive statistics including the range, skewness and kurtosis of the variable distributions are reported. In cases where skewness or kurtosis reached significance (BMDP, 1983), it was so indicated for tabled values. The resulting t or F statistic should be interpreted conservatively.

Due to the inequality of cell frequencies, Bartlett's Test for the homogeneity of variances was conducted prior to each t-test or ANOVA. The Bartlett Chi-Square Test is a powerful test for the homogeneity of variances and p< .01 was the alpha level used to reject the null of no differences in group variances. Bartlett Chi-Squares are reported and, where significant, are indicated with an *, suggesting the t or F statistic should be viewed with caution.

Pairwise Comparisons

All of the bivariate analyses consisted of post-hoc contrasts between group means on various measures. Such contrasts need not be orthogonal as in the case of planned comparisons. Where significant overall results were found, the Scheffe correction formula was applied in order to examine the individual pairwise contrasts and control for Type I Error.

All-Subsets Regression Analysis

Following the initial hierarchical regression analysis, an all-subsets regression analysis was performed post-hoc in order to determine the linear model that best predicted outcomes on the dependent measure of alexithymia, scores on the SSPS. The all-subsets analysis provides a more clear view of the sample data set as it looks at all possible combinations of variables entered into the equation rather than being 'forced' into a sequential ordering by the experiementer. The all-subsets analysis does not provide as powerful a test of the overall model or the research hypotheses based on that model. It does, however, provide a useful organization of the data set in question in terms of generating future hypotheses. It forms the basis of the exploratory aspect of the present study.

Stepwise Regression Analysis

One rigorous stepwise regression analysis was conducted post-hoc in order to determine the overall best

predictor in the model. The analysis was conducted using the .01 level of significance to enter or remove variables. Therefor, only those variables that contributed to variation in the dependent measure beyond the .01 level were generated for inclusion in this model. Again, this analysis was conducted in order to provide exploratory guidance and was not included in hypothesis testing.

Summary

The purpose of the study was to examine the relationship between alexithymia, as the dependent variable, and mental imagery and affective differentiation as the independent variables. A total of 150 subjects drawn from the Isla Vista Medical Clinic and the Montecito Medical Offices volunteered for full participation in the study.

The Schalling-Sifneos Personality Scale was used as the measure of alexithymia and was administered at the time that subjects volunteered for the study. Administration of the Beck Depression Inventory, the State-Trait Anxiety Inventory-Form Y, the Differential Emotions Scale-IV, and the Survey of Mental Imagery-Form A were scheduled and conducted in the months of June and July, 1987. All 150 subjects completed all measures.

The study was of an observational, non-experimental nature using a hierarchical multiple regression analysis to test the first four research hypotheses. All independent variables were ordered hierarchically prior to the regression analysis. An analysis of variance was performed in order to test the prediction of alexithymia by the overall model. F-tests were performed on the incremental contribution of each variable to the overall R squared in order to test the individual hypotheses. An all-subsets regression analysis was conducted in order to refine the model and to provide guidance for future research. A stepwise regression analysis was conducted in order to isolate the best predictor in the model at the .01 level of significance.

In order to test Hypotheses Va through Vd, bivariate analyses were performed on the demographic variables of age, sex, race, and education by treating them as grouping variables and contrasting the mean scores on measured variables by level of demographic information. A bivariate analysis was also performed using a new variable, alexithymia (ALEX), which was created using the cutoff score of 45 on the SSPS. The bivariate analyses using the ALEX variable provide an additional test of the major research hypotheses. Bartlett's Chi-Square Test for the homogeneity of variances was performed prior to all bivariate analyses and Scheffe's post-hoc correction was calculated on the pairwise contrasts where appropriate.

The results of the data analyses are reported in Chapter Four and a discussion and interpretation of the results are presented in Chapter Five.

CHAPTER IV RESULTS

The results of the data analysis are summarized in Chapter Four. First, the descriptive statistics are presented for the total sample with respect to scores on the dependent and independent measures. Next, a summary of the results of the hierarchical regression analysis is presented. The descriptive statistics are then presented for the grouped variables by demographic information and alexithymia. Next is a reporting of the summary statistics resulting from the bivariate analyses. Following is a statement of the major research hypotheses and their statistical tests. The results of the all-subsets and the stepwise regression analyses are then presented. The chapter is concluded with a summary of the major results.

Sample Descriptive Statistics

Table 4-1 contains a summary of the means and standard deviations achieved by the overall sample on the SSPS, the BDI, and the STAI-Y.

The means and standard deviations of the subscale scores along with the total scores on the SMI-A are presented in Table 4-2.

A summary of the means and standard deviations of the subscale and total scale scores on the DES-IV is presented in Table 4-3.

Table 4-1

Sample Means and Standard Deviations for SSPS, BDI, and STAI-Y(State & Trait)

	SSPS	BDI	STAI-Y(Sta)	STAI-Y(Tra)
Mean	53.733	6.500	34.927	36.607
S.D.	6.588	6.509	12.110	10.856

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Sample Means and Standard Deviations for SMI-A

Scale	Mean	S.D.
Visual Controllability	44.047	6.307
Visual Vividness	60.087	14.604
Auditory Control.	34.920	4.947
Auditory Vivid.	46.680	11.695
Tactile Control.	27.207	4.309
Tactile Vivid.	36.500	10.107
Olfactory Control.	27.180	6.166
Olfactory Vivid.	34.020	11.469
Gustatory Control.	34.540	6.194
Gustatory Vivid.	44.773	13.283
Kinesthetic Control.	35.933	5.225
Kinesthetic Vivid.	49.120	11.929
Somesthetic Control.	25.447	4.408
Somesthetic Vivid.	33.187	8.890
	·	
Total Controllability	229.793	30.739
Total Vividness	304.433	68.328
Grand Total	534.227	95.692

Table 4-3

Scale	Mean	S.D.
Guilt	6.347	2.238
Shame	22.260	6.653
Inner-Directed Hostility	12.407	4.465
Anger	8.000	2.439
Fear	5.787	2.801
Sadness/Distress	9.720	3.577
Interest	11.367	2.420
Enjoyment	11.460	2.770
Surprise	7.893	2.583
Disqust	4.980	2.252
Contempt	6.220	2.252
Shyness	5.740	2.203
Total	112.300	22.189

Sample Means and Standard Deviations for DES-IV

Hierarchical Analysis

The initial series of hierarchical regressions tested the linear model:

SSPS = C + SEX + SMI + DES + TRA + STA + BDIThe multiple correlations and the R squared values for the hierarchical analysis are presented in Table 4-4.

Table 4-4

Multiple Correlation Coefficients and Variance Proportions for the Hierarchical Regression Analysis

Variable	R	R Squared
SEX	.113	.013
SMI	.495	.245
DES	.497	.247
TRA	.497	.247
STA	.501	.251
BDI	.556	.309

As can be seen in Table 4-4, the overall multiple correlation coefficient of .556 accounted for approximately 30% of the total variance in scores on the dependent measure of alexithymia. An analysis of variance was performed in order to reject the null hypothesis which states that the true value of the multiple correlation coefficient in the population for the model tested is zero. The results of the analysis of variance is reported in Table 4-5.

Table 4-5 Analysis of Variance for Multiple Correlation Coefficient

Source	SS	DF	MS	F	p
Regression Residuals	1880.998 4204.065	6 139	313.500 30.245	10.365	.001

The multiple correlation coefficient of .556 was found to be significant beyond the .001 level, F = 10.365(6,139), p<.001. Thus, the null hypothesis is rejected.

It should be noted that the ANOVA was conducted on a total N of 146 rather than 150 as it was found that four cases produced undue leverage on the size of the mean square error term. Those four cases were thus deleted from the analysis. This reduces the degrees of freedom in the residuals term from 143 to 139.

Table 4-6

	SEX	SMI-A	DES-IV	TRA
SEX	1.000			
SMI-A	0.007	1.000		
DES-IV	-0.093	0.181	1.000	
TRA	0.018	-0.003	0.707	1.000
STA	-0.013	0.079	0.592	0.714
BDI	-0.126	-0.010	0.633	0.734
SSPS	-0.126	0.466	0.137	-0.012
	STA	BDI	SSPS	
STA	1.000			
BDI	0.690	1.000		
SSPS	-0.013	-0.141	1.000	

Correlation Matrix of Predictor Variables

Table 4-6 contains the correlation matrix of predictor variables for the full model. An examination of Table 4-6 reveals that the correlations were low to moderately high, ranging from .007 to .734. As can be seen, there were fairly high and consistent correlations among all of the affectively oriented measures including the BDI, the TRA scale of the STAI-Y, the STA scale of the STAI-Y and the DES-IV. Table 4-7 contains the raw correlation coefficients, standard error, standardized coefficients, t statistics performed on the standardized coefficients and the two-tailed alpha level associated with the t-tests. This t statistic tests the null hypothesis of zero correlation between the dependent variable and each variable in the population.

Table 4-7

Regression Table for the Hierarchical Regression Analysis

Variable	Raw Coef.	Std-Error	Std-Coef.	t	p
CONSTANT	28.847	3.761	0.000	7.671	0.000
SEX	-2.242	1.071	-0.151	-2.094	0.038
SMI-A	0.034	0.005	0.467	6.399	0.000
DES-IV	0.049	0.034	0.166	1.442	0.151
TRA	0.113	0.079	0.187	1.431	0.155
STA	0.003	0.058	0.006	0.057	0.954
BDI	-0.413	0.121	-0.389	-3.408	0.001

Three of the variables reached statistical significance at or beyond the .05 level. In decreasing order of magnitude they were: SMI-A, t = 6.399, p< .001; BDI, t = 3.408, p = .001; SEX, t = 2.094, p = .038. These tests demonstrate that the respective correlations differ from zero and that they should be retained in the equation. However, they are not sufficient tests of the research hypothses as they to not take the overall model into account. In the Systat statistical program, autocorrelations are routinely conducted on the residuals. However, they are not routinely reported unless found significant beyond the .03 level. No autocorrelation was reported indicating that it did not reach a significant level.

Descriptive Statistics for Grouped Variables

The means, standard deviations, ranges, skewness and kurtosis for the distributions of scores on the BDI, STAI-Y, DES-IV, SMI-A and SSPS by grouped demographic variable and the alexithymia variable are presented in Tables 4-8 through 4-12. Significance of skewness and kurtosis is reported for tabled values. Due to the limited cell frequencies on the age variable, the original nine categories were collapsed into five categories. The new age categories consisted of:

1) ages 10-19; 2) ages 20-29; 3) ages 30-39; 4) ages 40-49; and 5) ages 50-59. The race variable was similarly collapsed from the original six categories to two new categories consisting of White and Other due to limited numbers of non-white participants in the overall sample.

Visual examination of scatter plots failed to reveal curvilinearity in the relationships between variables.

Table	4-8
Tante	

Descriptive	Statistics	for	Age	Variable

	Age Category				
Measure	1(n=9)	2(n=85)	3(n=30)	4(n=13)	5(n=13)
BDI					
Mean	10.11	5.81	5.77	7.46	9.23
S.D.	7.93	4.84	8.15	7.33	9.07
Range	27.00	22.00	33.00	21.00	30.00
Skewness	1.58*	1.28*	2.44*	.69	1.25*
Kurtosis	1.75	1.57*	5.42*	78	.54
STAI(St)					
Mean	41.57	33.86	34.07	36.77	37.46
S.D.	14.76	10.61	12.83	13.85	15.62
Range	39.00	41.00	50.00	47.00	54.00
Skewness	.08	.57*	1.06*	.99*	1.18*
Kurtosis	-1.43	44	.43	.10	.72
<u>STAI (Tr)</u>					
Mean	39.67	36.36	35.87	36.23	38.15
S.D.	14.46	10.09	12.02	9.64	12.52
Range	36.00	44.00	48.00	28.00	41.00
Skewness	.08	.49*	1.01*	.78	.65
Kurtosis	-1.62	21	.57	77	63
DES-IV					
Mean	115.78	113.91	107.40	110.54	112.46
S.D.	15.90	20.19	26.37	27.17	24.14
Range	43.00	93.00	130.00	85.00	69.00
Skewness	25	.50*	1.76*	1.39*	.42
Kurtosis	-1.28	0.05	4.35*	.69	-1.19
<u>SMI-A</u>					
Mean	531.33	521.16	556.17	535.46	569.77
S.D.	96.41	96.87	94.12	95.50	86.58
Range	310.00	490.00	374.00	265.00	324.00
Skewness	.02	-1.27*	89*	.17	93*
Kurtosis	67	2.15*	.54	-1.37	.66
<u>SSPS</u>					
Mean	53.28	53 .89	54.85	51.77	52.38
S.D.	7.95	6.54	6.66	6.37	6.34
Range	23.00	35.50	26.00	20.00	19.00
Skewness	86	85*	61*	38	59
Kurtosis	54	.70*	42	-1.09	76

Descriptive Statistics for Sex Variable

	Sex Category		
Measure	Female(n=112)	Male(n=38)	
BDI			
Mean	6.84	5.50	
S.D.	7.09	4.28	
Range	33.00	20.00	
Skewness	1.79*	1.11*	
Kurtosis	-1.15*	1.83*	
<u>STAI(St)</u>			
Mean	35.02	34.66	
S.D.	12.61	10.64	
Range	56.00	47.00	
Skewness	.85*	1.01*	
Kurtosis	.12	1.11	
<u>STAI(Tr)</u>			
Mean	36.49	36.95	
S.D.	11.26	9.70	
Range	49.00	34.00	
Skewness	.74	.28	
Kurtosis	06	86	
DES-IV			
Mean	113.50	108.76	
S.D.	22.14	22.23	
Range	130.00	94.00	
Skewness	.96*	.83*	
Kurtosis	1.67*	.35*	
<u>SMI-A</u>			
Mean	533.84	535.37	
S.D.	93.55	103.04	
Range	499.00	502.00	
Skewness	86*	-1.22*	
Kurtosis	1.00*	2.29*	
<u>SSPS</u>			
Mean	54.21	52.32	
S.D.	6.58	6.50	
Range	35.50	22.50	
Skewness	89*	27	
Kurtosis	• 67*	-1.10	

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Table 4-10

Descriptive Statistics for Race Variable

	Race Category		
Measure	White(n=130)	Other(n=20)	
BDI			
Mean	6.32	7.06	
S.D.	6.43	7.07	
Range	33.00	29.00	
Skewness	1.92*	1.60*	
Kurtosis	4.83*	2.41*	
<u>STAI(St)</u>			
Mean	34.46	37.95	
S.D.	11.46	13.73	
Range	56.00	47.00	
Skewness	.89*	.66*	
Kurtosis	.91*	-1.17	
STAI(Tr)			
Mean	36.40	37.95	
S.D.	10.71	11.98	
Range	49.00	37.00	
Skewness	.71*	.22	
Kurtosis	.04	97	
DES-IV			
Mean	111.54	117.25	
S.D.	22.14	22.45	
Range	130.00	86.00	
Skewness	1.04*	.20	
Kurtosis	1.91*	45	
<u>SMI-A</u>			
Mean	536.32	520.60	
S.D.	97.82	81.37	
Range	499.00	263.00	
Skewness	87*	23	
Kurtosis	1.25*	95	
SSPS			
Mean	54.04	51.75	
S.D.	6.57	6.53	
Range	35.00	23.00	
Skewness	81*	78*	
Kurtosis	.31	24	

Descriptive Statistics for Education Variable

		Education Category			
Measure	l(n=8)	2(n=12)	3 (n=85)	4 (n=18)	5(n=27)
BDI					
Mean	9.75	10.25	6.83	4.28	4.30
S.D.	6.32	10.44	6.38	5.65	3.85
Range	18.00	32.00	33.00	25.00	13.00
Skewness	.90	1.27*	1.70*	2.90*	.85*
Kurtosis	33	.34	3.54*	8.32*	01
STAI (St)					
Mean	39.87	34.50	36.23	33.06	30.78
S.D.	10.06	12.41	12.64	13.90	8.46
Range	30.00	37.00	50.00	56.00	28.00
Skewness	54	.75	.71*	1.65*	.78*
Kurtosis	84	78	29	2.98*	60
STAI (Tr)					
Mean	41.87	39.42	37.28	32.11	34.67
S.D.	8.32	15.19	11.19	7.77	9.14
Range	21.00	41.00	49.00	29.00	34.00
Skewness	06	.49	.60*	.69*	.35
Kurtosis	-1.46	-1.21	20	09	94
DES-IV					
Mean	123.00	112.17	116.13	104.56	102.30
S.D.	14.94	19.22	23.96	16.30	18.64
Range	39.00	67.00	130.00	64.00	64.00
Skewness	-1.07	.68	.97*	1.17*	.34
Kurtosis	49	09	1.25*	1.28	-1.11
<u>SMI-A</u>					
Mean	505.75	500.08	543.86	551.94	515.70
S.D.	108.82	114.12	91.24	94.71	96.67
Range	364.00	346.00	516.00	321.00	362.00
Skewness	-1.10	26	-1.51*	48	13
Kurtosis	. 59	-1.15	4.04*	80	.63
<u>SSPS</u>					
Mean	45.62	50.83	54.80	54.36	53.65
S.D.	7.96	8.14	5.27	7.37	7.09
Range	24.00	24.50	25.00	22.00	23.00
Skewness	63	.40	-1.06*	19	42
Kurtosis	65	89	1.01*	-1.15	-1.11

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Descriptive Statistics for Alexithymia Variable

	Alexithymia	Category
Measure	Non-Alexithymic(n=120)	Alexithymic(n=30)
BDI		
Mean	6.21	7.67
S.D.	6.00	8.26
Range	33.00	32.00
Skewness	1.91*	1.58*
Kurtosis	4.48*	2.12*
<u>STAI(St)</u>		
Mean	34.99	34.67
S.D.	12.34	11.32
Range	56.00	39.00
Skewness	.99*	.34
Kurtosis	• 53*	-1.05
<u>STAI(Tr)</u>		
Mean	36.77	35.97
S.D.	10.40	12.68
Range	49.00	43.00
Skewness	.75*	.45*
Kurtosis	.01	71
<u>DES-IV</u>		
Mean	114.88	101.97
S.D.	22.42	18.13
Range	130.00	75.00
Skewness	.91	.79*
Kurtosis	1.38*	.02
<u>SMI-A</u>		
Mean	557.22	442.23
S.D.	77.74	106.33
Range	376.00	399.00
Skewness	59*	90*
Kurtosis	.14	.38
<u>SSPS</u>		
Mean	56.45	42.87
S.D.	3.87	2.97
Range	19.50	14.00
Skewness	.16*	-2.37*
Kurtosis	34	6.63*
Bivariate Analyses

As tests of Hypotheses Va through Vd, and in order to gain further insight into the data, bivariate analyses were conducted on the grouped demographic variables, examining the relationships between levels of the demographic variables and scores on the BDI, STAI-Y, DES-IV, SMI, and SSPS. Bartlett's Tests for the homogeneity of variances were conducted in each case and are reported for tabled values as Chi-Squares. The .05 level of significance was used for all hypothesis tests. In cases where the F statistic was found to be significant, Scheffe's post-hoc correction was applied to pairwise contrasts.

A summary of the bivariate analyses are presented in Tables 4-13 through 4-16. Table 4-13 demonstrates that no significant differences were found between age categories on any of the measures reported. Table 4-14 contains a summary of bivariate analyses conducted using sex as a grouping variable. No significant differences between males and females were found on any of the variables measured. T-tests conducted with race as a grouping variable are presented in Table 4-15. The original six categories of race (Black, Hispanic, White, Asian, Native American, Other) were collapsed into two categories (White and Other) due to limited cell frequencies. No significant differences were found. A summary of the bivariate analyses for Education is presented in Table-16. Differences were found on the BDI, the DES-IV and the SSPS.

Table 4-13

Bivariate Analyses for Age (five levels)

ANOVA		VA	Chi-Square	F	p
Age	x	BDI	19.479*	1.866	.153
Age	x	STAI(State)	5.775	1.098	.360
Aqe	х	STAI (Trait)	3.831	.288	.885
Aqe	х	DES-IV	5.931	.546	.702
Aqe	х	SMI-A	.257	1.249	.293
Age	x	SSPS	.695	.658	.622

Note: * = significant at .01 level

Table 4-14

Bivariate Analyses for Sex (two levels)

t-test	Chi-Square	t	p	
Sex x BDI	11.655*	1.097	.275	
Sex x STAI(State)	1.504	.158	.875	
Sex x STAI (Trait)	1.159	.223	.824	
Sex x DES-IV	.001	1.138	.257	
Sex x SMI-A	.529	.085	.933	
Sex x SSPS	.008	1.542	.125	

Note: * = significant at .01 level

Table 4-15

t-1	test	Chi-Square	t	p
Race	X BDI	.302	.848	.398
Race	x STAI(State)	3.816	1.201	.232
Race	x STAI (Trait)	.430	.593	.554
Race	x DES-IV	.006	1.072	.285
Race	X SMI-A	1.006	.683	.496
Race	X SSPS	.001	1.452	.149

Bivariate Analyses for Race (two levels)

Table 4-16

Bivariate Analyses for Education (five levels)

ANOVA		Chi-Square	F	q
Education	Y POT	17 20644	2 002	020+
Education		17.290~~	3.002	.020*
Education	X STAL(State)	6.603	1.506	.204
Education	x STAI(Trait)	8.330	1.778	.136
Education	X DES-IV	6.821	3.196	.015*
Education	X SMI-A	1.369	1.187	.319
Education	X SSPS	8.841	4.619	.002**
Note: * =	significant at	.05 level		
** =	significant at	.01 level		

T-tests were also conducted using the cutoff score of 45 on the SSPS to designate scores as either alexithymic or non-alexithymic. The research hypotheses would predict that significant differences should be present in scores on the DES-IV and SMI-A only. The results are summarized in Table 4-17.

Table 4-17

t-test		Chi-Square	t	р
Alex. x BDI	:	5.343	1.098	.274
Alex. x STA	I(State)	.333	.131	.896
Alex. x STA	I(Trait)	1.943	.360	.719
Alex. x DES	S-IV	1.907	2.923	.004*
Alex. x SMI	- A	5.089	6.698	.000**
Notos da -	ignificant	at 05 laval		

Bivariate Analyses for Alexithymia (two levels)

Note: * = significant at .05 level ** = significant at .001 level

Hypothesis Tests

The following section will contain a statement of the research hypotheses together with their respective statistical tests. F-tests were conducted on the hierarchical analysis as tests of hypotheses I through IV. Results of the t-tests conducted using the Alexithymia variable will be reported as a secondary, and less powerful, test of the major hypotheses. Where results from the two analyses are in conflict, the F-test will be considered the over-riding test. Hypotheses Va through Vd will be tested using the bivariate analyses conducted on the grouped demographic variables. I. The first hypothesis was concerned with the relationship between mental imagery and alexithymia. In testable form it reads:

I Ha: Holding other variables constant, individuals demonstrating lower socres on the SSPS measure of alexithymia will also demonstrate lower scores on the SMI-A measure of imaging capacity compared to individuals who score higher on the SSPS.

Partialling other variables, scores on the SMI-A made a significant unique contribution to variation in SSPS scores, F(1, 139) = 42.71, p< .001. The alexithymia by SMI-A t-test was also found to be significant, t = 6.698, df = 148, p< .001. Thus, the null hypothesis of no unique contribution was rejected in favor of the alternative hypothesis.

II. The second hypothesis was concerned with the relationship between affective differentiation and alexithymia. In testable form it reads:

II Ha: Holding other variables constant, individuals demonstrating lower scores on the SSPS measure of alexithymia will also demonstrate lower scores on the DES-IV measure of affective differentiation compared to individuals who score higher on the SSPS.

Partialling other variables, scores on the DES-IV did not make a unique contribution to variation in SSPS scores, F(1, 139) = .37, p > .05. The alexithymia by DES-IV t-test did demonstrate a significant difference between groups, t = 2.923, df = 148, p = .004. This result is in conflict with the F-test. However, the deviation of the distribution of scores from normal and the wide dispersion of scores around the mean render this a less powerful test of the hypothesis. Therefor, the null hypothesis of no unique contribution was not rejected in favor of the alternative hypothesis.

III. The third hypothesis was concerned with the relationship between anxiety and alexithymia. The STAI-Y yields two measures of anxiety, trait and state, and, thus, hypothesis three was tested in two parts; IIIa, relating to trait anxiety and IIIb, relating to state anxiety. In testable form, hypothesis IIIa reads:

IIIa Ha: Holding other variables constant, scores on the SSPS measure of alexithymia will not covary systematically with scores on the STAI-Y measure of trait anxiety.

Partialling other variables, scores on the STAI-Y trait anxiety measure made no unique contribution to variation in SSPS scores, F(1, 139) = 0, p > 1.0. The alexithymia by trait anxiety t-test also failed to discover significant differences between groups, t = .360, df = 148, p = .719. Hypothesis IIIa asserted the null hypothesis of no unique contribution and was upheld.

In testable form, hypothesis IIIb reads:

IIIb Ha: Holding other variables constant, scores on the SSPS measure of alexithymia will not covary systematically with scores on the STAI-Y measure of state anxiety.

Partialling other variables, scores on the STAI-Y

state anxiety measure did not make a unique contribution to variation in SSPS scores, F(1,139) = .74, p > 1.0. The alexithymia by state anxiety t-test found no significant differences between groups, t = .131, df = 148, p = .896. Hypothsis IIIb asserted the null hypothesis of no unique contribution and was supported.

IV. The fourth hypothesis concerned itself with the relationship between depression and alexithymia. In testable form it reads:

IV Ha: Holding other variables constant, scores on the SSPS measure of alexithymia will not covary systematically with scores on the BDI measure of depression.

Partialling other variables, scores on the BDI made a unique contribution to variation in SSPS scores, F(1, 139) = 11.67, p< .01. The alexithymia by BDI t-test did not reveal significant differences between groups, t = 1.098, df = 148, p = .274. Again, the bivariate test is a less powerful test due to strains on the underlying assumptions. Hypothesis IV asserted the null hypothesis and was rejected.

V. Hypothesis V concerned the relationship between alexithymia and the demographic variables of age, sex, race, and education.

Hypothesis Va pertained to the realationship between

Va Ha: Mean scores on the SSPS measure of alexithymia will not differ between subjects falling in different age categories.

The analysis of variance found no significant differences between age levels on the mean SSPS scores, F(4, 145) = .658, p = .622. Hypothesis Va asserted the null hypothesis of no differences and was supported.

Hypothesis Vb concerned the relationship between alexithymia and sex. In testable form it reads:

Vb Ha: Mean scores on the SSPS measure of alexithymia will not differ between males and females.

A two-tailed t-test found no significant difference between males and females on the mean SSPS scores, t = 1.54, df = 148, p = .125. Hypothesis Vb asserted the null hypothesis of no differences and was upheld.

Hypothesis Vc concerned itself with the relationship between race and alexithymia. In testable form it reads:

Vc Ha: Mean scores on the SSPS measure of alexithymia will not differ between subjects falling in different racial groups.

A two-tailed t-test found no significant difference between whites and others on the mean SSPS scores, t = 1.452, df = 148, p = .149. Hypothesis Vc asserted the null hypothesis of no differences and was supported. Hypothesis Vd pertained to the relationship between level of education and alexithymia. In testable form it reads:

Vd Ha: Mean scores on the SSPS measure of alexithymia will not differ between subjects differing in educational level.

An analysis of variance was conducted and discovered significant differences between levels of eduation on the mean SSPS scores, F(4, 145) = 4.619, p = .002. Hypothesis Vd asserted the null hypothesis of no differences between groups and was rejected.

Further analysis of the paired contrasts was conducted in order to better understand the relationship between alexithymia and education. Scheffe's correction formula was applied (Furguson, 1981). Table 4-18 presents the pairwise differences by level of eduation. An examination of Table 4-18 shows that only comparisons 1 & 3, 1 & 4, and 1 & 5 were found to be significant at the .05 level using the Scheffe correction, F'=9.72. While these results would appear to suggest that achieving an educational level at the highschool level or above is related to lower levels of alexithymia, the small number of subjects in level 1 (n=8) calls this conclusion into question.

Table 4-18

Educational	Educational Level				
Level	1	2	3	4	5
1	0.00				
2	3.29	0.00			
3	15.58*	4.19	0.00		
4	10.69*	2.27	0.07	0.00	
5	10.06*	1.67	0.68	0.19	0.00

Pairwise Contrasts for Education x SSPS

Note: * = signficant at .05 level

All-Subsets Analysis

An all-subsets regression analysis was conducted post-hoc on all of the independent variables. The all-subsets analysis examines all possible combinations of variables in order to find the model which produces the overall best 'fit'. The combinations that were examined were from single variables to different combinations of all six variables.

None of the resulting subsets produced a better R squared value than the original model. The subset R squared vaules ranged from .000133 to .29298. Therefor, no unique solutions were found which provided better predictive power than the original hierarchical model which produced an R squared value of .309.

Stepwise Regression Analysis

A stepwise regression analysis was stringently conducted in order to determine the single best predictor in the model by setting the alpha level for entry or removal of variables at .01. In order for any variable to appear in this model, it must contribute to the multiple R at or beyond the .01 level of significance. This analysis produced the following model:

$$SSPS = C + SMI - A$$

The value of R in this model was .477 and the R squared value was .227. As can be seen, only the mental imagery variable contributed significantly at the .01 level with all of the other variables dropping out of the model. The SMI-A accounted for 22.7% of the total variance in SSPS scores.

Summary

A number of hypotheses were tested in order to investigate the relationship between the dependent variable of alexithymia and several independent variables. The independent variables included mental imagery, affective differentiation, anxiety, depression and the demographic background variables of age, sex, race and educational level. Hypotheses I through IV were tested by conducting F-tests on the incremental unique contribution of successive variables to the total linear regression model for both hierarchical and stepwise analyses. Hypotheses I through IV were also tested using the bivariate analyses conducted with the Alexithymia variable. Hypotheses Va the grouped demographic variables.

1. Hypothesis I predicted that a relationship would exist between alexithymia and mental imagery. The null hypothesis of no unique contribution of variation on the SSPS scores was rejected beyond the .001 level, thereby supporting the prediction.

2. Hypothesis II predicted that a relationship would exist between alexithymia and affective differentiation. The null hypothesis of no unique contribution of variation on the SSPS scores was not rejected at the .05 level, thereby refuting the prediction.

3a. Hypothesis IIIa predicted that a relationship would not exist between alexithymia and trait anxiety. The null hypothesis of no unique contribution of variation on the SSPS scores was not rejected at the .05 level, thereby supporting the prediction.

3b. Hypothesis IIIb predicted that a relationship would not exist between alexithymia and state anxiety. The null hypothesis of no unique contribution of variation on the SSPS scores was not rejected at the .05 level, thereby supporting the prediction.

4. Hypothesis IV predicted that a relationship would not exist between alexithymia and depression. The null hypothesis of no unique contribution of variation on the SSPS scores was rejected at the .01 level. Therefor, the prediction was not supported.

5a. Hypothesis Va predicted that a relationship would

not exist between alexithymia and age. The null hypothesis of no differences between age categories on the SSPS scores was not rejected at the .05 level, thereby supporting the prediction.

5b. Hypothesis Vb predicted that a relationship would not exist between alexithymia and sex. The null hypohtesis of no differences between males and females on the SSPS scores was not rejected at the .05 level, thereby upholding the prediction.

5c. Hypothesis Vc predicted that a relationship would not exist between alexithymia and race. The null hypothesis of no differences between whites and others on the SSPS scores was not rejected at the .05 level, thereby supporting the prediction.

5d. Hypothesis Vd predicted that a relationship would not exist between alextihymia and educational level. The null hypothesis of no differences between educational levels on the SSPS scores was rejected at the .002 level, thereby failing to support the prediction.

A summary of the study together with a discussion of the results, the limitations of the study, and the implications for future research will be presented in Chapter Five.

CHAPTER V

SUMMARY AND CONCLUSIONS

The major purpose of the study was to examine the relationship between alexithymia and it's primary psychological concomitants, affective differentiation and mental imagery. A secondary purpose was to examine the relationship between alexithymia and manifestations of anxiety and depression. In Chapter Five, an overall summary of the study is provided followed by a discussion of the findings. The limitations of the study are next with a discussion of the implications for future research closing the chapter.

Summary

The primary purpose of the present study was to investigate the relationship between the presence of alexithymia and it's two essential psychological concomitants, poor affective differentiation and limited mental imagery. A secondary purpose was to examine the possible relationship between alexithymia and anxiety, depression, and demographic background variables.

While it has long been recognized that psychosomatic conditions present a significant drain on health care services, the available clinical literature has suggested that these conditions are difficult to diagnose and to treat effectively. Early models of psychosomatic

functioning centered around the Freudian concept of "conversion" which was based on an intrapsychic conflict resolution model of psychic functioning. There flourished a rich anecdotal clinical literature, based largely on individual analytic case studies, to back up the conversion and specificity hypotheses.

The work of Selye (1946), Cannon (1920), Alexander (1943) and others, began to broaden the horizons of psychosomatic thinking. A second large group of persons with psychophysiological complaints were seen as suffering from the effects of prolonged exposure to stress rather than converting their psychological conflicts into physical illnesses. This conceptual shift pointed physchosomatic researchers in the direction of better understanding the psychophysiological interfaces of the "mind/body" issue.

In the spirit of this latter perspective, Sifneos (1967) began to describe a group of psychosomatic patients with a clinical presentation that he labeled "alexithymic". These patients typically demonstrated a marked inability to describe their internal emotional experiences or to engage in forms of mental imagery. Their thinking tended to be very flat and detail oriented and, while they were relatively well adjusted in their social roles, they tended to demonstrate poor interpersonal relations.

Since the introduction of the concept of alexithymia, there has risen a large number of competing theories regarding the meaning and etiology of the alexithymic

condition. Nemiah, (1977) provided a beginning organization of these models and basically divided them into Psychological and Neuroanatomical theories. The former tend to revolve around the development and functioning of the mind or psyche while the latter tend to revolve around the development and functioning of the brain and nervous system proper.

Within the Psychological realm of theory, the most detailed articulation of the alexithymic problem comes from the object relations school of contemporary psychoanalysis. Clinical writers from this perspective suggest that alexithymia represents a fundamental developmental arrest in the transition from early, undifferentiated affective states of the infant to the more clearly pronounced and differentiated affective experiences of the young todler. This developmental arrest is seen as arising primarily through a disturbance in the relationship with the primary caretaker. This prevents the youngster from being able to tolerate highly emotionally charged experiences without being somatically overwhelmed. As a result, the child is not able to "metabolize" the affective experience, integrate the experience using newly forming language skills, or develop internal mental "representations" or images to comfort and soothe him or herself. This early developmental difficulty is then viewed as laying the foundation for a later tendency toward "somatization" as an adult. When faced with a stressful situation or the

elicitation of a strong emotional response, the adult is more likely to cope with the stimulus through bodily changes than through language, mental imagery, and adaptive behavior based on insight into internal psychological states and needs.

The Neuroanatomical theories are most clearly articulated in regard to a structural or functional disturbance in the relations between the right and left hemispheres of the brain. It has been proposed that alexithymia is primarily a result of poor cross-hemispheric connections that prevent the contents of the right hemisphere (spacial relations, imagery productions, certain affective experiences) to be translated into the language of the left hemisphere for logical representation and processing. Developmentally, there has been a suggestion that alexithymia may represent an inherited genetic defect in the relations between the hemispheres or a defect in the structures that produce emotional reponses themselves.

While many competing theories abound, Lesser (1981) and Nemiah (1977) point out the speculative nature of both the Psychological and the Neuroanatomical perspectives and call for an integrative approach. Lesser has gone on to criticize the literature for a premature emphasis on the etiology of a condition that has been inadequately validated as a viable clinical entity. It was in the spirit of this call for the empirical validation of the alexithymia concept that the current study was conducted.

A total of 150 subjects, drawn from the Isla Vista Medical Clinic and the Montecito Medical Offices, volunteered for full participation in the study.

The Schalling-Sifneos Personality Scale was used as the measure of alexithymia and was administered at the time that subjects volunteered for the project. Adminstration of the Beck Depression Inventory, the State-Trait Anxiety Inventory-Form Y, the Differential Emotions Scale-IV, and the Survey of Mental Imagery-Form A were scheduled and conducted in the months of June and July, 1987. All 150 subjects completed all measures.

The study was of an observational, non-experimental nature using a hierarchical multiple regression analysis to test the first four research hypotheses. All independent variables were ordered hierarchically prior to the regression analysis.

The initial hierarchical linear model presented for testing was: Alexithymia = Constant + Sex + Mental Imagery + Affective Differentiation + Anxiety + Depression. An F-test was performed in order to test the prediction of alexithymia by the overall model. F-tests were performed on the incremental contribution of each variable to the overall R squared in order to test the individual hypotheses. An exploratory all-subsets regression analysis was conducted post-hoc in order to refine the model. A stepwise regression analysis was performed in order to determine the best single predictor in the model In order to test Hypotheses Va through Vd, bivariate analyes were performed on the demographic variables of age, sex, race, and education by treating them as grouping variables and contrasting the mean scores on measured variables by level of demographic information. A bivariate analysis was also performed using a new variable, Alexithymia (ALEX), which was created using the cutoff score of 45 on the SSPS. The bivariate analyses using the ALEX variable provide an additional test of the major research hypotheses. The .05 level of significance was used for all hypothesis tests. Bartlett's Chi-Square Test for the homogeneity of variances was performed prior to all bivariate analyses and Scheffe's post-hoc correction was calculated where appropriate for pairwise contrasts.

Hypothesis I predicted that a relationship would exist between alexithymia and mental imagery. The hypothesis was supported beyond the .001 level of significance.

Hypothesis II predicted that a relationship would exist between alexithymia and affective differentiation. This hypothesis was not supported at the .05 level of significance.

Hypothesis IIIa predicted that a relationship would not exist between alexithymia and trait anxiety. The hypothesis was supported at the .05 level of significance.

Hypothesis IIIb predicted that a relationship would not exist between alexihtymia and state anxiety. The hypothesis was supported at the .05 level of significance.

Hypothesis IV predicted that a relationship would not exist between alexithymia and depression. This hypothesis was not supported at the .05 level of significance.

Hypothesis Va predicted that a relationship would not exist between age and alexithymia. This hypothesis was supported at the .05 level of significance.

Hypothesis Vb predicted that a relationship would not exist between sex and alexithymia. This hypothesis was supported at the .05 level of significance.

Hypothesis Vc predicted that a relationship would not exist between alexithymia and race. This prediction was supported at the .05 level of significance.

Hypothesis Vd predicted that a relationship would not exist between alexithymia and educational level. This prediction was not supported at the .05 level of significance.

The all-subsets analysis demonstrated that no alternative model using the independent variables included in the study provided a better correlational 'fit' than the original hierarchical model.

A stepwise regression analysis conducted at the .01 level of significance demonstrated that the measure of Mental Imagery, the SMI-A, was the single best predictor in the model presented.

Discussion

A discussion of the conclusions based on the results of the study will be presented below.

Hypothesis I

First, and foremost, the study provides empirical support for the imagery component of the alexithymia construct. It would appear that the alexithymic individuals in this sample, indeed, demonstrated a limited capacity for mental imagery compared to their non-alexithymic counterparts. The degree to which the SMI-A measures the "characteristic lack" of Marty and M'Uzan (1963) or the absence of fantasy production described by other workers in this field (Sifneos, 1967; Stephanos, 1975; Krystal, 1979) is still an open question. However, these results clearly demonstrate that the imaging capacity of alexithymic respondents is less well developed than non-alexithymics.

While the sample was too small to include the SMI-A subscale scores in the initial analysis, some interesting differences were observed between alexithymics and non-alexithymics on various modality subscales. For purely exploratory purposes, the modality subscale scores were examined. Appendix I contains the means and standard deviations on the modality subscales. Bartlett Chi-squares were performed and where non-significant at the .01 level, t-tests were conducted on the group mean differences. Considering the intercorrelation of the subscales along

with the inflation of Type I error using this method, some interesting results were still obtained. The summary of t-tests is presented in Appendix J. Significant differences were found beyond the .001 level on the following subscales; visual vividness, auditory vividness, olfactory control, olfactory vividness, gustatory vividness, tactile vividness, somesthetic control, somesthetic vividness, and kinesthetic vividness.

The heavy emphasis on the vividness subscales suggests that future research might pare the overall SMI-A to only the vividness subscales. The somesthetic, tactile and kinesthetic differences are interesting to ponder given the tendency toward somatization noted in alexithymic populations (Sifneos, 1967, 1977; Stephanos, 1975; Krystal, 1979; Martin, 1984). An interesting followup might include the administration of a physical symptom checklist and the Hypocondriasis and Hysteria subscales of the MMPI in order to examine the relationship between these imagery modalities and tendencies toward somatization.

Hypothesis II

The second hypothesis regarding the relationship between alexithymia and affective differentiation was not supported by the F-test performed on the incremental contribution of the DES-IV to the variance in SSPS scores. However, the t-test performed on the mean DES-IV scores between alexithymics and non-alexithymics found significant differences between the groups in the predicted direction.

As Chronbach points out (1972), results that do not converge based on different methods of analysis point to the possibility of method-specific differences rather than data-specific differences. In this case, it was felt that the violation of the assumptions underlying the t-test were serious enough to weaken its statistical power. The most prudent conclusion would be that, while the relationship between alexithymia and affective differentiation (as measured by the DES-IV) was not strong enough to reach statistical significance, there does still appear to be a weak and inverse relationship between the two.

There could be several reasons why the F-test was not significant. First, as mentioned in Chapter One, it may be that affective differentiation does not reflect an underlying independent status from cognition and, by extension, is not a significant concomitant of alexithymia. This would suggest that the lack of affective differentiation might possibly be overshadowed by, or embedded in, the general impoverishment of the capacity to access inner experience via fantasy and cognition. This conclusion would support the cognition-arousal theory of affect (Schacter & Singer, 1962). An alternative explanation is that affective differentiation is a viable component of the alexithymia construct but that it was poorly measured by the DES-IV. This seems like a more plausible explanation given the lack of psychometric evaluation of the instrument. It may simply be that the

original "state" aspect of the instrument is not sufficiently transformed into a "trait" measure only by changing the wording of the instructions. As a result, the demand characteristics of the DES-IV may elicit more of the experience of affective states rather that the capacity for differentiated expression of those states. Further, the bulk of the individual items on the DES-IV elicit responses pertaining to negative affect which may, in fact, result in the DES-IV measuring more of general factor of psychological distress than a capacity for emotional differentiation. The tendency for the DES-IV scores to correlate highly with the other measures of emotional distress supports this possibility. Rosenberg (1984) used an adaptation of the Response To Situations Test (RTS) in a psychoeducational study involving college students and found significant results on the Differentiation of Affects subscale. Perhaps this instrument would be an improvement over the DES-IV. However, imbeddedness of affect in imagery remains a problem with this instrument as well.

Similarly to the SMI-A, the sample was too small to meaningfully include all of the DES-IV subscales in the statistical analysis. Again, however, there were interesting, if speculative, differences between alexithymics and non-alexithymics. The DES-IV subscale means and standard deviations are summarized in Appendix K. Again, Bartlett Chi-squares were calculated and, when found to be non-significant at the .01 level, t-tests were again

performed. In this case only two subscales demonstrated signficant differences beyond the .001 level; interest and surprise. Differences were found on two further subscales but at nonsignificant levels: guilt, p = .051; and shame, p = .093.

Interestingly, the non-alexithymic individuals showed higher levels of guilt and shame along with higher levels of interest and surprise which seems to suggest a generally broader range of affective experience and expression for non-alexithymic individuals. This would be consistent with the theory. The significant differences on the interest and surprise subscales point, speculatively, toward higher levels openness and emotional flexibility, also consistent with the theory (Sifneos, 1967; Krystal, 1979).

Hypothesis III

The overall results of the study support the findings reported elsewhere (Blanchard, et. al., 1981; Taylor, et. al., 1981; Martin, et. al., 1984) of no significant relationship between alexithymia and State or Trait anxiety. The fact that scores on the SSPS were correlated the least with the state-anxiety measure of the STAI-Y of any of the variables lends support to the trait conception of alexithymia. It would suggest that alexithymia is relatively impervious to state the fluctuations in anxiety. As psychological defense mechanisms are erected in order to fend off the experience of anxiety, one might expect alexithymia to be high when subjective anxiety is low and

alexihtymia to be low when anxiety is high if alexithymia were simply a different name for defense mechanisms such as repression or denial. This was not found to be the case which supports Nemiah's contention (1977) that alexithymia represents a more profound and global condition. This leaves open the question, however, of whether alexithymia is primarily a psychological phenomenon or a neuroanaotomical one, or both. The above result could support both conclusions equally well. The addition of physiological measures would be necessary to address this differentiation.

Hypothesis IV

Hypothesis IV concerned the relationship between alexithymia and depression. Several previous studies have found an insignificant relationship between depression and scores on the SSPS (Blanchard, et. al., 1981; Taylor, et. al., 1981; Martin, et. al., 1984). Recently, however, Bagby, et. al. (1986) conducted a study involving college students in an attempt to validate yet another alexithymia measure. They found that the BDI correlated .596 with the new instrument, the Toronto Alexithymia Scale. The results of the present study were mixed as the BDI was found to add significantly to the variation in SSPS scores on the F-test, yet no significant differences were discovered between alexithymics and non-alexithymics on the bivariate analyses. To the extent that the significant results reflect a method-dependent finding, they are inconclusive.

The bivariate analysis was a weaker secondary test of the hypothesis. The prudent conclusion remains that, in the present sample, depression (as measured by the BDI) showed a moderate and positive relationship with alexithymia.

Again, several possibilities exist. Perhaps the literature is insufficient to support a reliable hypothesis of the independence of alexithymia and depression. The results of the Bagby study (1986) showed a high correlation between alexithymia and the BDI as well as a correlation of .466 between alexithymia and the depression subscale of the Basic Personality Inventroy (BPI). Both of these correlations were significant beyond the .001 level. The results of the present study would support the Bagby findings.

Another possibility would be to suggest that the BDI is a poor measure of depression. Although the BDI has been used extensively in psychological research it has been criticised for its sensitivity to the effects of social desireability (Beck, in press).

Yet another possibility is that this particular sample is anomolous in respect to the coexistence of depression and alexithymia. Perhaps another sample would not demonstrate this relationship. The mixed results of the present study reflect the mixed results of the literature on this point and further clarification is left to future study.

Hypothesis V

Hypothesis V pertained to the relationship between alexithymia and demographic background variables. The data analysis supported hypotheses Va through Vc in the prediction of no significant relationship between alexithymia and age, sex, and race respectively. These findings support the previous literature in this regard (Lesser, 1981).

The results for the education variable showed a significant difference between levels of education on the SSPS scores. This overall finding refuted hypothesis Vd. Upon closer pairwise examination it was discovered that the only significant differences were between educational level 1 (less than high school) and levels 3 (partially completed college), 4 (completed 4 year degree), and 5 (professional or graduate school). It would be inviting to speculate about the implied effects of education on alexithymia except for the fact that level 1 contained only eight subjects and there were not significant pairwise differences between levels 2 & 3, 3 & 4, or 4 & 5. If the implication of a positive relationship existed in fact, one might expect a consistent difference between levels as education increased or at least some other confirmatory difference. This was not the case. The prudent conclusion is that the significant finding for education by alexithymia in this sample was an artifact of the sampling procedure which produced too few subjects in the lower end

of the educational range to provide confidence in the result.

All-Subsets Analysis

The results of the all-subsets analysis indicated that no alternative ordering of the independent variables included in the study provided a better correlational `fit' than the original hierarchical model tested. There is, of course, no implication regarding alternative models using other variables that might have contributed in such a manner to provide a better overall predictive model. In relation to the present study, the conclusion is supported that the hierarchical model ordered a prioi based on the existing theory was the best possible ordering of those variables studied.

Stepwise Analysis

The result of the stepwise analysis indicated that the SMI-A was the single most powerful predictor in the model. It contributed 22.7% of the total variation in the scores on the SSPS.

Clearly, alexithymia is a multidimensional construct. The capacity for mental imagery appears to account for one meaningful dimension in its overall understanding.

Limitations of the Study

A number of limiting factors were inherent in the present study and will be summarized in the following section.

Several limitations in respect to the sample characteristics deserve attention. Of some concern was the size of the overall sample. There were six independent variables included in the initial hierarchical regression analysis. Following Cohen & Cohen (1983), a power analysis was conducted using a moderate effect size for the population of .15 and a 99% confidence level. This yielded a desired N of 159.37, very close to the sample size of the study. One particular advantage of a larger sample would have been the opportunity to include the subscales of the DES-IV in the regression analysis. It is quite possible that, while the correlation between the SSPS scores and the DES-IV total scores proved to be insignificant, meaningful subscale correlations with the SSPS might have emerged. This would have provided useful information regarding the affective patterning of the alexithymic individuals in the sample. While it is always desireable to maximize the power of our statistical tests by maximizing the sample size, the reality facing most non-funded applied researcher involves logistical and resource limitations directly influencing sample size. Such was the case with the present study.

Of greater concern, in this instance, was the biased nature of the sample in question. The overwhelming majority of subjects were white, female, well-educated, young and, most likely, middle class. The physical proximity of the participating medical clinics to the

University of California, Santa Barbara campus suggests that the study sample was largely constituted of UCSB students. The sample demographics support this conclusion. The resulting restriction in the generalizability of the conclusions offered by the study is considerable. However, the existing literature on the measurement of alexithymia is similarly biased and the current study is within the demographic parameters established by earlier work in this area. Still, a broader sampling would be desireable.

In addition to demographic bias, the sample may have been biased by the self-selection effects of volunteering for participation in the study. While volunteerism is generally considered a threat to the external validity of a study, in this case it may be even more critical by virtue of the nature of the variables under study and the sample selection procedure. Participants were asked to fill out the SSPS at the time of volunteering for the project. While the SSPS is not considered a particularly psychologically threatening instrument, a number of the items potentially suffer from the effects of social desireability. Social desireability might have influenced response patterns or the choice to participate in the study at all. Unfortunately, these potential social desireability effects are likely to influence racial groups differentially in respect to the trust level necessary for cooperating with a predominantly white, middle class medical facility in the conduct of this type of research.

This may have further hampered the recruitment of non-white participants.

Another consideration involves the effects of time. While the time lapse between the administration of the SSPS and the remainder of the instruments was relatively brief, generally varying between three to ten days, it is possible that maturation may have had a uneven effect on the more state-oriented measures such as the STAI-Y State Anxiety measure, the DES-IV and the BDI. Administration of all measures at one time would perhaps increase the consistency of response patterns across instruments and across subjects.

Several considerations are in order regarding the measures use in the study. All of the measures were of the self-report variety which often suffer uduly from the effects of social desireability. The researcher is at the mercy of the triangulation of socio-cultural values, consciously determined honesty and unconsciously determined defensiveness on the part of the individual subjects. Internal and external press from these three sources may have unevenly affected the response patterns of the participants. In addition, two of the instruments, the DES-IV and the SMI-A are new and more psychometric research is needed to establish the validity and reliability of each. Further, the constructs of mental imagery and affective differentiation are instrospective and unstable by nature and, as such, difficult to reliably quantify

given a single administration. It may be that mental imagery and affective differentiation, like blood pressure, are sufficiently labile to require the averaging of several observations over time in order to determine a relatively stable range. If this were the case, intra-individual variation might exceed inter-individual variation with a single observation, providing very misleading results.

The SSPS, while being currently the most widely used instrument in the assessment of alexithymia, has accumulated limited normative data and is continually under revision (Blanchard, 1981; Martin, 1984, 1986, 1987; Shipko & Noviello, 1984; Sifneos, 1986). Sifneos (1986) has recently noted the tendency in respondents to avoid the extremes of the response categories and has proposed a yes-no format in place of the original four point likert scale. Much work is needed in bolstering the validity and reliability of this instrument.

Another limitation of the study was the categorical coding of the demographic variables of age and education. This prevented their inclusion in the regression analysis, necessitating separate bivariate statistical treatment which was a less powerful test of their respective relationships with the dependent variable, alexithymia.

In addition to the threats to the external validity posed by the sample characteristics, there exist threats to the internal validity of the study in respect to both the regression analyses and the bivariate analyses.

Several factors may have affected the size of the correlations between the dependent variable and the independent variables. The distributions of the variables departed considerably from normal. When the skewness of distributions takes the opposite direction, reduction in r is markedly increased along with the heteroscdasticity of the residuals. The reliability of the individual measures will also affect the size of r and, as discussed above, the reliability estimates of the instruments used in the study are not high. A limitation related to reliability, particularly under the condition of heteroscedastic residuals, is one of restriction of range on any of the variables due to the sampling procedure. A wider range of scores as a result of a less restricted sample may have provided a more reliable measure of the variables under consideration and higher r's.

Finally, there were threats to the assumptions underlying the confident interpretation of the bivariate analyses. The lack of experimental controls such as randomization and balancing allowed for the violation of the assumptions of the normality of the distributions and the homogeneity of variances across groups. Hays discusses the importance of these violations in the fixed-effects model of the analysis of variance and asserts that meaningful results can still emerge if the sample is of sufficient size and the results are presented conservatively (Hays, 1981, pg.347.).

Implications for Future Research

The results of the present study show partial validation of the alexithymic construct in a sample of primarily college-age, white females presenting for medical services.

There are several implications for continued study. Of serious concern is the validity and reliability of the measures used to tap the constructs of mental imagery and affective differentiation. While the present study found significant results with the SMI-A, this was not the case with the DES-IV. The results should not be taken, directly or indirectly, as a validation of the instruments used. A larger sample would allow the examination of the contribution of the subscales of the DES-IV to variation in SSPS scores. While the present study found no significant correlation between the SSPS and the DES-IV total score, it is possible that individual or groups of subscale scores might have correlated highly with the dependent measure, providing useful insights into affective patterning and alexithymia. However, the demand characteristics of the DES-IV may focus more on emotional experience rather than emotional expression and its use in future research on alexithymia should be approached cautiously. Perhaps use of the RTS Differentiation of Affect subscale (Rosenberg, 1984) would be an improvement over the DES-IV in the ability to measure acutal expression of differentiated affective experience.

The results of the study do suggest that the continued use of the SMI is warranted in future research on alexithymia. Perhaps paring the instrument to the vividness subscales would be prudent. Focusing specifically on the kinesthetic, somesthetic and tactile modality subscale scores together with the addition of a symptom checklist might provide interesting insights into the psychophysiological phenomenon of somatizastion.

A related measurement issue pertains to a single observation vs multiple observations of the mental imagery and affective differentiation constructs. As indicated in the previous section, the constructs may be sufficiently labile to obscure the person x situation interaction. Future researchers might consider taking several measures over several day's time in order to smooth out the state (situation) fluctuations which is a within-subject factor. This would allow for a clearer delineation of the trait (person) component of mental imagery and affective differentiation as stable capacities over time, or between-subjects factor. It is this between-subjects trait factor that should be most highly correlated with the measurement of alexithymia.

A number of investigators have worked with the physiological concomitants of alexithymia (Kaplan & Wogan, 1976/77; Martin, 1984, 1986; Hoppe, 1977, Nemiah, 1975, 1977). Future research might include physiological measures so that the psychophysiological interplay can be
more clearly articulated. Martin (1986) has measured frontal EMG, digital blood volume pulse amplitude and heart rate. These measures could be built into future studies. However, the problem of the effect of instrumentation is increased whenever the complexity of the measuring devices is increased. Physiological measurements obscure the natural phenomena that they seek to isolate simply by virtue of their artificiality and uneven impact across individuals. Unlike eduational research, where it can be expected that the results can be generalized to populations accustomed to paper and pencil testing situations, it's difficult to imagine a population that could be expected to routinely encounter frontal EMG measurement.

Another group of implications cluster around sampling procedures. Unless we plan to restrict our applications of research findings to college counseling centers only, future study must take place with a broader sample base. The college sophomore analogue study has severe limitations in its generalizability. The present study attempted to broaden this sample base by recruiting subjects off campus. It's aim was only minimally achieved. It is recommended that future study be conducted with samples that more nearly approximate the broader population to which we can usefully generalize our results.

Summary

In summary, the results of the present study contributed to the empirical understanding of the

alexithymic construct. Validation of the mental imagery component was achieved. The findings of previous workers in relation to the independence of alexithymia from anxiety were supported. The results suggested that depression may be related to alexithymia in the present sample. This finding is contrary to several previous studies and possible explanations were discussed. The relative independence of alexithymia from the background variables of age, sex, and race was also supported. It was found that level of education may be related to alexithymia but findings were weak. In this study, the validation of the affective differentiation component of alexithymia was not achieved. Possible explanations for this finding were offered.

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APPENDICES

APPENDIX A

SCHALLING-SIFNEOS PERSONALITY SCALE-REVISED

APPENDIX A

SSPS-R

1) Does not apply at all. 2) Does not apply very much. 3) Applies very much.4) Applies completely. Please indicate only ONE: 1,2,3 or 4 1. I find it hard to describe how I feel about people. . . . ____ Shen something unpleasant happens, I feel as if I 2. 3. I often remember the content of dreams very vividly. . . I prefer movies with action rather than psychological 5. 6. I do not tend to examine my own feelings. 7. I think it is not worthwhile discussing how one feels, 8. I find life pretty boring most of the time..... 10. I hardly ever cry except when I'm frustrated. ____ 11. It is important to find out how one feels about people. . ____ 13. I find it hard to find the right words for my feelings. . ____ 14. I spend much time daydreaming whenever I have nothing 15. I prefer taking action rather than thinking. 16. I don't seem to get really excited about anything. . . . ____ 17. It is easy for me to describe events in detail. ___

Code #_____

APPENDIX B

DIFFERENTIAL EMOTIONS SCALE-IV

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APPENDIX B

DES-IV

Take a few moments and think over the past month or so, the events in your life and your reactions to them. After you've done so, mark your responses to the following items in terms of <u>how often</u> you have felt the way indicated in the item.

		Rai or 1	rely <u>Never</u>	Hardly Ever	Som e- times	<u>Often</u>	Very <u>Often</u>
1.	Feel regret, sorry about something you did	••••	1	2	3	4	5
2.	Feel sheepish, like you do not want to be seen	••••	1	2	3	4	5
3.	Feel glad about something	• • • •	1	2	3	4	5
4.	Feel like something stinks, puts a bad taste in your mou	th	1	2	3	4	5
5.	Feel you can't stand yoursels	f	1	2	3	4	5
6.	Feel embarrassed when anybod sees you make a mistake	y ••••	1	2	3	4	5
7.	Feel unhappy, blue, downhear	ted.	1	2	3	4	5
8.	Feel surprised, like when son thing suddenly happens you ha no idea would happen	ne- ad	1	2	3	4	5
9.	Feel like you are blushing	• • • •	1	2	3	4	5
10.	Feel like somebody is a low- life, not worth the time of o	iay.	1	2	3	4	5
11.	Feel like you are not worth anything	• • • •	1	2	3	4	5
12.	Feel shy, like you want to ha	ide.	1	2	3	4	5
13.	Feel like what you're doing or watching is interesting	• • • •	1	2	3	4	5
14.	Feel scared, uneasy, like something might harm you	• • • •	1	2	3	4	5
15.	Feel mad at somebody	• • • •	1	2	3	4	5
16.	Feel mad at yourself		1	2	3	4	5

DES-IV, Page 2

		Rarely or Never	Hardly Ever	Some- times	<u>Often</u>	Very Often
17.	Feel ashamed because you do not know what to do	1	2	3	4	5
18.	Feel happy	1	2	3	4	5
19.	Feel like somebody is a "good-for-nothing"	1	2	3	4	5
20.	Feel you are a "good-for-nothing"	1	2	3	4	5
21.	Feel like someone made you look like a fool	1	2	3	4	5
22.	Feel so interested in what you're doing that you're caught up in it	1	2	3	4	5
23.	Feel amazed, like you can't believe what's happened, it was so unusual	1	2	3	4	5
24.	Feel fearful, like you're in danger, very tense	1	2	3	4	5
25.	Feel like you are dumb	1	2	3	4	5
26.	Feel like screaming at somebody or banging on something	1	2	3	4	5
27.	Feel sad and gloomy, almost like crying	1	2	3	4	5
28.	Feel like you did something wrong	1	2	3	4	5
29.	Feel bashful, embarrassed	1	2	3	4	5
30.	Feel disgusted, like something is sickening	1	2	3	4	5
31.	Feel joyful, like everything is going your way, everythin is rosy	5 lg 1	2	3	4	5
32.	Feel like people laugh at yo	ou 1	2	3	4	5

DES-IV, Page 3

		Rarely or Never	Hardly <u>Ever</u>	Som e- times	<u>Often</u>	Very <u>Often</u>
33.	Feel like things are so rotten they could make you sick	1	2	3	4	5
34.	Feel sick about yourself	1	2	3	4	5
35.	Feel worried abou the way you look	1	2	3	4	5
36.	Feel like you are better than somebody	1	2	3	4	5
37.	Feel you are no good, a nobo	dy. 1	2	3	4	5
38.	Feel like you ought to be blamed for something	1	2	3	4	5
39.	Feel like whatever you do winot be very good	.11	2	3	4	5
40.	Feel the way you do when something unexpected happens	1	2	3	4	5
41.	Feel alert, curious, kind of excited about something	1	2	3	4	5
42.	Feel angry, irritated, annoyed with somebody	1	2	3	4	5
43.	Feel angry and annoyed with yourself	1	2	3	4	5
44.	Feel like you cannot say wha you want to say as well as others	1	2	3	4	5
45.	Feel discouraged, like you can't make it, nothing's goi right	ng 1	2	3	4	5
46.	Feel ashamed, like you want to disappear	1	2	3	4	5
47.	Feel afraid	1	2	3	4	5
48.	Feel like people always look at you when anything goes wrong	1	2	3	4	5
49.	Feel Lonely	1	2	3	4	5
				Code	#	_

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APPENDIX C

SURVEY OF MENTAL IMAGERY: FORM A

Devised by Joseph E. Switras

Instructions to examinees:

The following is a questionaire designed to determine the type of mental images that you are able to produce and manipulate. But first, what are mental images? In the past they have been called pictures in the mind, but actually images can be tastes, sounds, feelings, sensations, as well as visual scenes. They can also be combinations of sights, tastes, feelings, etc. An image can be something that you see when your eyes are closed; something that may look as if you can just reach out and pick it up, but which is really not there. An image can be the taste of an orange when you have not actually eaten one. An image may be the smell of a flower when you try to remember what one smells like. As a last example, the picture in your mind of your home as you try to recall what it looks like, is also an image. An image can be experienced as a photograph, a movie or as if you are really there and it is really happening.

In responding to this questionnaire you will be asked to imagine that a variety of things are actually happening. You may be asked to close your eyes and try to see a flowerpot, one with a large red flower growing out of it. You may be asked if you can smell the flower and maybe even water it. All this will occur in your thoughts only, but at the time may seem as real as the chair in which you are seated. For most people this is a new and exciting experience, one that proves quite interesting.

With the actual image proposals, please choose the answer that is closest to describing what it is that you are experiencing. Answer every question, even if the answers do not express precisely how you feel. Mark your answers on the booklet as indicated on the next page.

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The following sections will deal with actual images that you will attempt to produce. These will involve seeing, hearing, smelling, tasting, feeling and doing things that occur in your mind and imagination only. Respond to each test item in the following manner. First read the item, then close your eyes and try to have the proposed experience. Whatever the task indicated by the item (visualizing a picture, tasting a fruit, etc.), pay attention to two elements of what is occurring: (1) How well you can <u>control</u> or <u>manipulate</u> the image, and (2) How <u>vivid</u> or <u>real</u> is the scene, taste, sensation, etc. By control is meant experiencing the scene as close to the item instructions as possible. For example, being able to form a mental picture of a squirrel eating an acorn.

Each item is followed by two opportunities to respond. (1) Since each item is in the form of a question, it is possible to respond with either a 'yes', 'no', or 'unsure'. On the answer sheet black blacken over the number <u>three</u> (yes) if you produced the proposed image; blacken over the number <u>one</u> (no) if you did not produce the image. If you are really not sure if the image was there, blacken over the number <u>two</u> (unsure). (2) Next, five numbers follow preceded by the word 'vividness'. Each number tells how vivid or real the image was as you experienced it. On the answer booklet blacken in the number <u>one</u> (1) if there is <u>absolutely no image</u>, and all that is happening is that you are thinking of the scene, odor, sound, etc. Blacken over the number <u>two</u> (2) if you are uncertain of the image, if the image is <u>indistinct</u>, vague, <u>ambiguous</u>, <u>dim</u>, <u>hazy</u>, <u>doubtful</u>, etc. Blacken over the number <u>three</u> (3) if the image is <u>limited</u> or <u>moderately</u> <u>clear</u>, <u>vivid</u>, and <u>perceptible</u>. Blacken over the number <u>four</u> (4) if the proposed experience is <u>reasonably</u> <u>unobscure</u>, <u>vivid</u>, and <u>clear</u>. Finally, blacken over the number <u>five</u> (5) if the experience (image) seems as if it is <u>really happening</u>. Here the image should be <u>distinct</u>, '<u>photographic</u>', and <u>perfectly clear</u> and <u>vivid</u>; exactly the experience proposed.

Be sure that you attempt each item, and respond to both questions that follow the item.

An example of how to respond:

Q. Can you visualize a book? 1. 1-no 2-unsure dyes 2. Vividness 1 2 3 4

Responses one and two indicate that the image of a book did occur, and that it seemed as if a real book was actually there.

2

Example two:

Q. Can you taste sour milk? 3. 1-no -unsure 3-yes 4. Vividness 1 - 3 4 5

Responses three and four indicate that this person could not be sure if the image was there. However, some indistinct, vague, trace of a taste occurred that seemed to resemble sour milk.

When ready, you may begin. Be sure to respond to each item.

VIVIDNESS SCALE: Absolutely no image.
 Indistinct, vague, ambiguous, dim, hazy, doubtful.
 Limited, moderately clear, vivid and perceptible. 4) Reasonably unobscure, vivid and clear. 5) Really happening; distinct, photographic, perfectly clear and vivid. I. ATTEMPT THESE ITEMS WITH YOUR EYES CLOSED. TRY TO GET A MENTAL PICTURE (VISUALIZE) OF WHAT IS PROPOSED IN EACH ITEM. Can you see the color red? 1. 1-no 2-unsure 3-yes 2. Vividness 1 2 3 4 5 Can you see a horse standing alone? 3. 1-no 2-unsure 3-yes 4. Vividness 1 2 3 4 5 Can you see the horse trot away? 5. 1-no 2-unsure 3-yes 6. Vividness 1 2 3 4 5 Can you see a bird sitting on a telephone wire? 7. 1-no 2-unsure 3-yes 8. Vividness 1 2 3 4 5 Can you see the bird jump from the wire and fly to the ground? 9. 1-no 2-unsure 3-yes 10. Vividness 1 2 3 4 5 Can you see the bird fly up to and land on the branch of a tree? 11. 1-no 2-unsure 3-yes 12. Vividness 1 2 3 4 Can you see a bottle on a picnic table? 13. 1-no 2-unsure 3-yes 14. Vividness 1 2 3 4 5

VIVIDNESS SCALE: Absolutely no image.
 Indistinct, vague, ambiguous, dim, hazy, doubtful. 3) Limited, moderately clear vivid and perceptible. 4) Reasonably unobscure vivid and clear.
5) Really happening; distinct, photographic, perfectly clear and vivid. Can you see the same bottle on the picnic table. filled with a colored liquid? 15. 1-no 2-unsure 3-yes 16. Vividness 1 2 3 4 5 Can you now see the same bottle with a different colored liquid? 17. 1-no 2-unsure 3-yes 18. Vividness 1 2 3 4 5 Can you see a girl with red hair eating a green apple? 19. 1-no 2-unsure 3-yes 20. Vividness 1 2 3 4 5 Can you see a tobacco pipe? 21. 1-no 2-unsure 3-yes 22. Vividness 1 2 3 4 5 Can you visualize the number 123 written on a blackboard? 23. 1-no 2-unsure 3-yes 24. Vividness 1 2 3 4 Can you visualize a circle with the letter 'B' inside? 25. 1-no 2-unsure 3-yes 26. Vividness 1 2 3 4 5 Can you see a dog dancing? 27. 1-no 2-unsure 3-yes 28. Vividness 1 2 3 4 5 Can you see a bird reading? 29. 1-no 2-unsure 3-yes 30. Vividness 1 2 3 4 5 Can you see a woman lifting an automobile over her head? 31. 1-no 2-unsure 3-yes 32. Vividness 1 2 3 4 5 II.ATTEMPT THE FOLLOWING ITEMS WITH YOUR EYES CLOSED. TRY TO HEAR THE SOUND PROPOSED IN EACH ITEM. Can you hear the voice of a woman talking to someone? 33. 1-no 2-unsure 3-yes 34. Vividness 1 2 3 4 5 Can you hear a woman's voice in the distance yelling something out loud? 35. 1-no 2-unsure 3-yes 36. Vividness 1 2 3 4 5

4

VIVIDNESS SCALE: 1) Absolutely no image. 2) Indistinct, vague, ambiguous, dim, hazy, doubtful. 3) Limited, moderately clear vivid and perceptible. 4) Reasonably unobscure vivid and clear. 5) Really happening; distinct, photographic, perfectly clear __and_vivid.____ Can you hear a masculine voice humming a tune? 37. 1-no 2-unsure 3-yes 38. Vividness 1 2 3 4 5 Can you hear the sound of a train whistle? 39. 1-no 2-unsure 3-yes 40. Vividness 1 2 3 4 Can you hear the sound of a police siren? 41. 1-no 2-unsure 3-yes 42. Vividness 1 2 3 4 5 Can you hear the sound of a record being played loudly? 43. 1-no 2-unsure 3-yes 44. Vividness 1 2 3 4 5 Can you hear someone lower the volume on the record player? 45. 1-no 2-unsure 3-yes 46. Vividness 1 2 3 4 5 Can you hear a trumpet being played? 47. 1-no 2-unsure 3-yes 48. Vividness 1 2 3 4 5 Can you hear a bathtub filling with water? 49. 1-no 2-unsure 3-yes 50. Vividness 1 2 3 4 5 Can you hear a child crying? 51. 1-no 2-unsure 3-yes 52. Vividness 1 2 3 4 5 Can you hear someone with heavy leather boots walking across a wooden floor? 53. 1-no 2-unsure 3-yes 54. Vividness 1 2 3 4 5 Can you hear two people whistling while a third person sings? 55. 1-no 2-unsure 3-yes 56. Vividness 1 2 3 4 5 Can you hear water splashing? 57. 1-no 2-unsure 3-yes 58. Vividness 1 2 3 4 5 III. AGAIN WITH YOUR EYES CLOSED, ATTEMPT TO SMELL THE FOLLOWING ODORS AND FRAGRANCES.

5

Code #_____

VIVIDNESS SCALE: 1) Absolutely no image. A) Indistinct, vague, ambiguous, dim, hazy, doubtful.
 A) Limited, moderately clear vivid and perceptible.
 A) Reasonably unobscure vivid and clear. 5) Really happening; distinct, photographic, perfectly clear and vivid. Can you smell the odor of a gasoline station? 59. 1-no 2-unsure 3-yes 60. Vividness 1 2 3 4 5 Can you smell a raw onion? 61. 1-no 2-unsure 3-yes 62. Vividness 1 2 3 4 5 Can you smell a rose? 63. 1-no 2-unsure 3-yes 64. Vividness 1 2 3 4 5 Can you smell an odor that you really like? 65. 1-no 2-unsure 3-yes 66. Vividness 1 2 3 4 5 Can you smell the odor of a freshly mown lawn? 67. 1-no 2-unsure 3-yes 68. Vividness 1 2 3 4 5 Can you smell a hambuger? 69. 1-no 2-unsure 3-yes 70. Vividness 1 2 3 4 5 Can you smell the odor of a new pair of shoes? 71. 1-no 2-unsure 3-yes 72. Vividness 1 2 3 4 Can you smell the scent of a new bar of scap? 73. 1-no 2-unsure 3-yes 74. Vividness 1 2 3 4 5 Can you smell incense burning? 75. 1-no 2-unsure 3-yes 76. Vividness 1 2 3 4 5 Can you smell the odor of sausage frying? 77. 1-no 2-unsure 3-yes 78. Vividness 1 2 3 4 Can you smell the strong odor of amonia? 79. 1-no 2-unsure 3-yes 80. Vividness 1 2 3 4 IV. WITH EYES CLOSED, ATTEMPT TO EXPERIENCE THE PROPOSED TASTES. Can you taste fresh raw lemon juice? 81. 1-no 2-unsure 3-yes 82. Vividness 1 2 3 4 5

6

Code #_____

VIVIDNESS SCALE: 1) Absolutely no image. 2) Indistinct, vague, ambiguous, dim, hazy, doubtful. 3) Limited, moderately clear vivid and perceptible.
4) Reasonably unobscure vivid and clear.
5) Really happening; distinct, photographic, perfectly clear _____and_vivid.______ Can you taste salt? 83. 1-no 2-unsure 3-yes 84. Vividness 1 2 3 4 5 Can you taste something sweet? 85. 1-no 2-unsure 3-yes 86. Vividness 1 2 3 4 5 Can you taste a chocolate bar? 87. 1-no 2-unsure 3-yes 88. Vividness 1 2 3 4 5 Can you taste jelly? 89. 1-no 2-unsure 3-yes 90. Vividness 1 2 3 4 5 Can you taste an apple? 91. 1-no 2-unsure 3-yes 92. Vividness 1 2 3 4 5 Can you taste soup? 93. 1-no 2-unsure 3-yes 94. Vividness 1 2 3 4 5 Can you taste fried chicken? 95. 1-no 2-unsure 3-yes 96. Vividness 1 2 3 4 5 Can you taste salad dressing? 97. 1-no 2-unsure 3-yes 98. Vividness 1 2 3 4 Can you taste a piece of pizza? 99. 1-no 2-unsure 3-yes 100. Vividness 1 2 3 4 5 Can you taste Coca-Cola? 101. 1-no 2-unsure 3-yes 102. Vividness 1 2 3 4 5 Can you taste a pear? 103. 1-no 2-unsure 3-yes 104. Vividness 1 2 3 4 5 Can you taste fried eggs? 105. 1-no 2-unsure 3-yes 106. Vividness 1 2 3 4 5

7

160

VIVIDNESS SCALE: 1) Absolutely no image. 2) Indistinct, vague, ambiguous, dim, hazy, doubtful. 3) Limited, moderately clear vivid and perceptible. 4) Reasonably unobscure vivid and clear.
5) Really happening; distinct, photographic, perfectly clear _________ V. NEXT, SEE IF YOU CAN FEEL THE FOLLOWING PROPOSED EXPERIENCES. ONCE AGAIN, ATTEMPT TO HAVE THESE EXPERIENCES WITH YOUR EYES CLOSED. Can you feel a toothbrush rubbing against your gums and teeth? 107. 1-no 2-unsure 3-yes 108. Vividness 1 2 3 4 Can you feel long cool grass against the bottom of your bare feet? 109. 1-no 2-unsure 3-yes 110. Vividness 1 2 3 4 5 Can you now feel a rough scouring-pad rubbing over your fingertips? 111. 1-no 2-unsure 3-yes 112. Vividness 1 2 3 4 Can you feel a feather tickling your nose? 113. 1-no 2-unsure 3-yes 114. Vividness 1 2 3 4 5 Can you feel a hand on your shoulder? 115. 1-no 2-unsure 3-yes 116. Vividness 1 2 3 4 5 Can you feel fingers scratching your scalp? 117. 1-no 2-unsure 3-yes 118. Vividness 1 2 3 4 5 Can you feel a warm cup pressed against your lips? 119.1-no 2-unsure 3-yes 120. Vividness 1 2 3 4 5 Can you feel your hand on a doorknob? 121. 1-no 2-unsure 3-yes 122. Vividness 1 2 3 4 5 Can you feel fur-lined gloves on your hands? 123. 1-no 2-unsure 3-yes 124. Vividness 1 2 3 4 5 Can you feel warm soup in your mouth? 125. 1-no 2-unsure 3-yes 126. Vividness 1 2 3 4 VI. WITH EYES CLOSED, TRY TO IMAGE (EXPERIENCE) THE FOLLOWING PHYSICAL SENSATIONS. Can you imagine yourself being extremely hungry? 127. 1-no 2-unsure 3-yes 128. Vividness 1 2 3 4 5

8

Code #____

______ VIVIDNESS SCALE: 1) Absolutely no image. Indistinct, vague, ambiguous, dim, hazy, doubtful.
 Limited, moderately clear vivid and perceptible.
 Reasonably unobscure vivid and clear. 5) Really happening; distinct, photographic, perfectly clear _____and_vivid._____ Can you imagine (feel yourself) becoming sick to your stomach? 129. 1-no 2-unsure 3-yes 130. Vividness 1 2 3 4 5 Can you feel your mouth become dry? 131. 1-no 2-unsure 3-yes 132. Vividness 1 2 3 4 5 Can you feel your mouth now become very moist? 133. 1-no 2-unsure 3-yes 134. Vividness 1 2 3 4 5 Can you feel a headache? 135. 1-no 2-unsure 3-yes 136. Vividness 1 2 3 4 5 Can you now feel your body surge with energy? 137. 1-no 2-unsure 3-yes 138. Vividness 1 2 3 4 5 Can you feel a tickle in your arm? 139. 1-no 2-unsure 3-yes 140. Vividness 1 2 3 4 5 Can you feel a numbness in your foot? 141. 1-no 2-unsure 3-yes 142. Vividness 1 2 3 4 Can you feel the numbness move up to your hand? 143. 1-no 2-unsure 3-yes 144. Vividness 1 2 3 4 5 Can you feel an itch on your left cheek? 145. 1-no 2-unsure 3-yes 146. Vividness 1 2 3 4 5 VII. WITH EYES CLOSED, TRY TO EXPERIENCE THE FOLLOWING MOVEMENTS, AS IF YOU WERE ACTUALLY DOING THEM. Can you feel yourself running down some stairs? 147. 1-no 2-unsure 3-yes 148. Vividness 1 2 3 4 5 Can you feel yourself jumping up and down? 149.1-no 2-unsure 3-yes 150. Vividness 1 2 3 4 5

9

Code #_____

VIVIDNESS SCALE: Absolutely no image.
 Indistinct, vague, ambiguous, dim, hazy, doubtful.
 Limited, moderately clear vivid and perceptible.
 Reasonably unobscure vivid and clear. 5) Really happening; distinct, photographic, perfectly clear __and_vivid.____ Can you feel yourself throwing a heavy rock? 151. 1-no 2-unsure 3-yes 152. Vividness 1 2 3 4 5 Can you feel yourself drawing a triangle? 153. 1-no 2-unsure 3-yes 154. Vividness 1 2 3 4 5 Can you feel yourself writing your name? 155. 1-no 2-unsure 3-yes 156. Vividness 1 2 3 4 5 Can you feel yourself kicking a football? 157. 1-no 2-unsure 3-yes 158. Vividness 1 2 3 4 5 Can you feel yourself swinging a baseball bat? 159. 1-no 2-unsure 3-yes 160. Vividness 1 2 3 4 5 Can you feel yourself tying a rope knot? 161. 1-no 2-unsure 3-yes 162. Vividness 1 2 3 4 5 Can you feel yourself swinging on a park swing? 163. 1-no 2-unsure 3-yes 164. Vividness 1 2 3 4 5 Can you feel yourself shuffling a deck of playing cards? 165. 1-no 2-unsure 3-yes 166. Vividness 1 2 3 4 5 Can you feel yourself bending down to pick up a dime? 167. 1-no 2-unsure 3-yes 168. Vividness 1 2 3 4 5 Can you feel yourself standing up from a seated position? 169. 1-no 2-unsure 3-yes 170. Vividness 1 2 3 4 5 Can you feel yourself singing a song? 171. 1-no 2-unsure 3-yes 172. Vividness 1 2 3 4 5

10

Code #_____

APPENDIX D

STATE-TRAIT ANXIETY INVENTORY-FORM Y

•

APPENDIX C

SURVEY OF MENTAL IMAGERY-FORM A

APPENDIX D

SELF-EVALUATION QUESTIONNAIRE

Developed by Charles D. Spielberger in collaboration with R. L. Gorsuch, R. Lushene, P. R. Vagg, and G. A. Jacobs

STAI Form Y-1

Name	Date _			_ s _	
Age Sex: M F				1_	
DIRECTIONS: A number of statements which people have used to describe themselves are given below. Read each statement and then blacken in the appropriate circle to the right of the statement to indicate how you feel <i>right</i> now, that is, <i>at this moment</i> . There are no right or wrong answers. Do not spend too much time on any one statement but give the answer which seems to describe your present feelings best.	ارد را	11.111 51.111111 111		111 - J.	Se,
1. 1 teel calm			,	3	٠
2. 1 teel secure		,	:	;	•
3. 1 am tense		;	;	3	•
4. I feel strained		;	1	3	٠
5. I teel at ease			;	3	•
6. 1 feel upset	• • •	,	:	J	•
7. I am presently worrying over possible misfortunes	• • • • • • •	î	ł	ı	•
8. I feel saushed		÷	2	ĩ	•
9. 1 teel frightened		î	2	ſ	•
10. 1 feel comfortable		ĩ	ì	ć	•
11. I teel self-confident	• • • • • •	1	ì	ı	•
12. 1 teel nervous	• • • • • •	ī	2	ć	٠
13. I am jutery	•••••	ì	i	ı	٠
14. 1 teel indecisive		1	:	ĩ	٠
15. I am relaxed		°1	:	ć	٠
10 Fired content					4
17. 1 am worried			:	د	4
18. I feel confused		1	ŗ	ż	•
19. I feel steady		,	2	;	•
20. I feel pleasant	•••••	i	5	î	•
Consulting Psychologists 577 College Avenue, Palo Alto, Californ	Press	i C	ode	#	



SELF-EVALUATION QUESTIONNAIRE STA1 Form Y-2

Name	Date _				
DIRECTIONS: A number of statements which people have used to describe themselves are given below. Read each statement and then blacken in the appropriate circle to the right of the statement to in- dicate how you generally feel. There are no right or wrong answers. Do not spend too much time on any one statement but give the answer which seems to describe how you generally feel.	⁴ / ¹ / ₁	5-314,11, 1,4	4 11 11 11 11 1		, ,
21. I feel pleasant		Ĵ.	ĩ	ĩ	à
22. I feel nervous and restless		Ō	Ĩ	Ĵ	Ĩ
23. 1 feel satisfied with myself		0	(j	Ĵ	7
24. I wish I could be as happy as others seem to be		î	į	3	i
25. I feel like a tailure	••••	Û	ł	5	â
26. I feel rested		I	ĩ	Ĵ	â
27. 1 am "calm, cool, and collected"	· · · · ·	Ĵ	î	ć	ĩ
28. I feel that difficulties are piling up so that I cannot overcome th	nem	Î	į	ĵ	Ŧ
$29.$ I worry too much over something that really doesn't matter \sim		Ĵ	Ĩ	Ĩ	Ĩ,
30. 1 am happy		I	ĩ	Ĩ	ī
31. I have disturbing thoughts		Ĵ	1	3	i
32. I lack self-confidence	· · • • • •	I	Û	ĩ	â
33. 1 feel secure		Ŀ	Ĩ	Ĵ	Ð
34. I make decisions easily		T	Ĵ	Ĩ	T
35. 1 feel inadequate		D	ą	Ĩ	£
36. I am content		ĵ,	ĩ	î	ā
37. Some unimportant thought runs through my mind and bother	s me	Ĩ	į	ĩ	â
38. I take disappointments so keenly that I can't put them out e	of my				
mind		;	:	د	•
39. I am a steady person		Ĵ	Ĩ	Ĵ.	Ì
40. I get in a state of tension or turmoil as I think over my recent con	cerns				
and interests		ſĴ	ં	į	â

APPENDIX E

BECK DEPRESSION INVENTORY
APPENDIX E

The Beck Depression Inventory

Please read each item carefully on this multiple-choice questionnaire and circle the number next to the answer that best reflects how you have been feeling during the past week. If you cannot decide between two answers, circle the higher number.

- 0 I do not feel sad. 1.
 - 1 I feel sad.
 - 2 I am sad all the time and I can't snap out of it.
- 3 I am so sad or unhappy that I can't stand it. 2.
 - 0 I am not particularly discouraged about the future.
- 1 I feel discouraged about the future.
- 2 I feel I have nothing to look forward to.
- 3 I feel that the future is hopeless and that things cannot improve.
- з. 0 I do not feel like a failure.
 - 1 I feel I have failed more than the average person.
 - 2 As I look back on my life, all I can see is a lot of failures.
- 3 I feel I am a complete failure as a person. 4. 0 I get as much satisfaction out of things as I used to. 1 I don't enjoy things the way I used to.
 - 2 I don't get real satisfaction out of anything anymore.
 - 3 I am dissatisfied or bored with everything.
- 5. 0 I don't feel particularly guilty.
 - 1 I feel guilty a good part of the time.
 - 2 I feel quite quilty most of the time.
- 3 I feel guilty all of the time.
- 6. 0 I don't feel I am being punished.
- 1 I feel I may be punished.
- 2 I expect to be punished.
- 3 I feel I am being punished.
- 7. 0 I don't feel disappointed in myself.
 - 1 I am disappointed in myself.
 - 2 I am disgusted with myself.
 - 3 I hate myself.
- 0 I don't feel I am any worse than anybody else. 8.
 - 1 I am critical of myself for my weaknesses or mistakes.
 - 2 I blame myself all the time for my faults.
 - 3 I blame myself for everything bad that happens.
- 9. 0 I don't have any thoughts of killing myself.
 - 1 I have thoughts of killing myself, but I would not carry them out.
 - I would like to kill myself. 2
- 3 I would kill myself if I had the chance. 10.
 - 0 I don't cry any more than usual.
 - 1 I cry more now than I used to.
 - 2 I cry all the time now.
 - 3 I used to be able to cry, but now I can't cry even though I want to.

Code #____

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The Beck Depression Inventory

page 2

11.	0	I am no more irritated now than I ever am.
	1	I get annoyed or irritated more easily than I used to.
	2	I feel irritated all the time now.
	3	I don't get irritated at all by the things that used to irritate me.
12.	0	I have not lost interest in other people.
	1	I am less interested in other people than I used to be.
	2	I have lost most of my interest in other people.
	3	I have lost all of my interest in other people.
13.	0	I make decisions about as well as I ever could.
	1	I put off making decisions more than I used to.
	2	I have greater difficulty in making decisions than before.
14	3	1 Can't make decisions at all anymore.
14.	1	I don't reel I look any worse than I used to.
	2	I am worried that I am looking old or unattractive.
	4	I real that there are permanent changes in my appearance that make
	٦	Thelieve that I look welv
15.	ŏ	I can work about as well as before
	ī	It takes an extra effort to get started at doing something.
	2	I have to push myself very hard to do anything.
	3	I can't do any work at all.
16.	0	I can sleep as well as usual.
	1	I don't sleep as well as I used to.
	2	I wake up 1-2 hours earlier than usual and find it hard to get back
		to sleep.
	3	I wake up several hours earlier than I used to and cannot get back
		to sleep.
17.	0	I don't get more tired than usual.
	1	I get tired more easily than I used to.
	2	I get tired from doing almost anything.
10	3	I am too tired to do anything.
18.	1	My appetite is no worse than usual.
	-	my appetite is not as good as it used to be.
	2	There appetite is much worse now.
19.	0	I have no appette at all anymore. I haven't lost much weight if any lately
	ĩ	I have lost more than 5 monds
	2	I have lost more than 10 nounds.
	3	I have lost more than 15 pounds.
		I am purposely trying to lose weight by eating less. Yes No
20.	0	I am no more worried about my health than usual.
	1	I am worried about physical problems such as aches and pains; or upset
		stomach; or constipation.
	2	I am very worried about physical problems and it's hard to think of
		much else.
	3	I am so worried about my physical problems, that I cannot think about
		anything else.

- 0 I have not noticed any recent change in my interest in sex.
 1 I am less interested in sex than I used to be.
 2 I am much less interested in sex now.
 3 I have lost interest in sex completely. 21.

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Code #_____

APPENDIX F

STUDY INTRODUCTION

APPENDIX F

STUDY INTRODUCTION

Dear clinic user,

You are being invited to spend a few minutes while you wait for your abbointment filling out the attached questionnaire as part of a research project being conducted in cooperation with the Isla Vista Medical Clinic and Michigan State University. We are looking into the role of imagination in health care management. By voluntarily filling out the questionnaire and providing your name and phone number you would be giving permission to be contacted in the next few days for a more complete description of the project and an invitation to participate further. Filling out this questionnaire <u>does not</u> obligate you in any way to participate beyond the follow up phone call. Your name and phone number will be held in strictest confidence whether or not you decide to participate fully in the project.

Please feel free to direct any questions you might have to Mr. Bradley at the phone number given below.

Thank you very much for your time and consideration.

Please return the completed questionnaire to the receptionist.

Terence L. Bradley, M.A. Project Director 968-4455

name (please print)

Code #_____

phone number

day & time I can most conveniently be reached APPENDIX G

CONSENT FORM

APPENDIX G

Consent Form

This is to acknowledge that I have been fully informed about the research project being conducted by Terence L. Bradley and that I understand the proposal and my participation to my satisfaction.

With the understanding and assurance that my name and/or identifiable test responses will be held in strictest confidence, I freely agree to participate in the study as outlined to me. However, I also understand that I may withdraw from the project at any time without penalty.

I further understand that there are no guarantees of benefits offered as a result of my participation and that, within the restrictions of confidentiality, the general results of the study and my questionnaire results will be made avialable to me upon request.

Vitness

Participant

Date

Date

Project Director:

Terence L. Bradley 22 W. Micheltorena Santa Barbara, CA 93101 965-1915

Code #_____

APPENDIX H

DEMOGRAPHIC SHEET

•

APPENDIX H

DEMOGRAPHIC SHEET

AGE:	15-19	SEX:Male
	20-24	Female
	25-29	
	30-34	RACE:Black
	35-39	Hispanic
	40-44	White
	<u> </u>	Asian
	50-54	Native American
	55-59	Other
	60 +	

EDUCATION: ____Less than high school ____High school graduate _____Partially completed college _____Completed four year college degree _____Graduate or professional school

If you would like to receive a brief written summary of the results of the study, please provide your mailing address below.

street and #

city, state, zip

Thank you for your time and cooperation.

Code #____

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APPENDIX I

MEANS & STANDARD DEVIATIONS ON SMI-A SUBSCALES x ALEXITHYMIA

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Means & Standard Deviations on SMI-A Subscales x Alexithymia

SMI-A	Alexithymic		Non-Alexithymic	
Subscales	Mean		Mean	<u></u>
Visual Cont.	40.067	8.642	45.042	5.159
Visual Viv.	50.600	17.093	62.458	12.942
Auditory Cont.	30.233	7.290	36.092	3.282
Auditory Viv.	35.900	11.751	49.375	10.050
Olfactory Cont.	23.500	7.551	28.100	5.425
Olfactory Viv.	26.700	9.487	35.850	11.219
Gustatory Cont.	31.233	8.232	35.367	5.299
Gustatory Viv.	37.133	13.117	46.683	12.673
Tactile Cont.	23.400	6.112	28.158	3.095
Tactile Viv.	27.067	9.336	38.858	8.866
Somesthetic Cont.	22.000	5.146	26.308	3.759
Somesthetic Viv.	26.433	8.858	34.875	8.091
Kinesthetic Cont.	31.000	8.238	37.167	3.158
Kinesthetic Viv.	37.133	13.006	52.117	9.574

APPENDIX J

T-TESTS FOR SMI-A SUBSCALES x ALEXITHYMIA

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T-tests for SMI-A Subscales x Alexithymia

SMI-A Subscale	Chi-Square	t	р
Visual Viv.	.046	4,193	<.000
Auditory Viv.	.273	6.344	<.000
Olfactory Cont.	.017	3.818	<.000
Olfactory Viv.	.272	4.112	<.000
Gustatory Viv.	.814	3.666	<.000
Tactile Viv.	.723	6.447	<.000
Somesthetic Cont.	.024	5.188	<.000
Somesthetic Viv.	.532	5.014	<.000
Kinesthetic Viv.	.028	7.101	<.000

APPENDIX K

MEANS & STANDARD DEVIATIONS ON DES-IV SUBSCALES x ALEXITHYMIA

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DES-IV	Alexithymic		Non-Alexithymic	
Subscales	Mean	S.D.	Mean	S.D.
Guilt	5.633	1.752	6.525	2.315
Shame	20.433	6.129	22.717	6.724
Inner-Hostil.	12.033	4.476	12.500	4.476
Anger	7.700	2.409	8.075	2.450
Fear	5.833	2.679	5.775	2.842
SadDist.	9.400	3.558	9.800	3.592
Interest	9.367	2.710	11.867	2.070
Enjoyment	9.267	3.619	12.008	2.213
Surprise	6.367	2.785	8.275	2.394
Disgust	4.900	2.468	5.000	2.257
Contempt	5.667	2.040	6.358	2.289
Shyness	5.233	2.096	5.867	2.219

Means & Standard Deviations on DES-IV Subscales x Alexithymia

APPENDIX L

T-TESTS FOR DES-IV SUBSCALES x ALEXITHYMIA

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174 APPENDIX L

T-tests for DES-IV Subscales x Alexithymia

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DES-IV Subscale	Chi-Square	t	р
Guilt	.074	1.971	.051
Shame	.537	1.692	.093
Interest	.054	5.542	<.000
Surprise	.290	3.777	<.000