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A Syntactic Language Computer Analysis of Depressed Versus Non-Depressed Females.

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A syntactic language computer analysis of depressed versus non-depressed females

Christy, Daniel Merton, Ph.D.
The Louisiana State University and Agricultural and Mechanical Col., 1991
A SYNTACTIC LANGUAGE COMPUTER ANALYSIS
OF
DEPRESSED VERSUS NON-DEPRESSED FEMALES

A Dissertation
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in
The Department of Psychology

by
Daniel Merton Christy
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ABSTRACT

This study sought to examine the interrelationship of cognition and language in the clinical syndrome of depression. It was proposed that the types of cognitive differences in depression proposed by Beck and other cognitive theorists would be reflected in language usage, and especially in syntax. Using the Beck Depression Inventory (BDI), subjects were classified as either depressed (BDI ≥ 16) or non-depressed (BDI ≤ 4). Subjects were asked to speak into a tape recorder for 3-5 minutes on each of three stimuli, a positive event, a negative event, and a neutral opinion stimulus. The language samples were then analyzed using the Syntactic Language Computer Analysis program (SLCA-III) which generated 36 variables from the samples. From the ANOVAS done on the 36 variables, 6 hypothesized differences between depressed and non-depressed subjects were found to be significant. Depressed persons used greater frequencies of (a) intransitive verbs and the passive voice; (b) state of being verbs; (c) negated information units (nouns); and (d) unsensed (abstract) nouns. Non-depressed persons were found to use greater numbers of qualifiers in general and to use more non-negated qualifiers in specific. A forward stepwise discriminant function analysis used state of being verbs, negated nouns, and unsensed (abstract) nouns to correctly classify 72% of the subjects according to group membership.
INTRODUCTION

Overview

This study proposes to examine the interrelationship of cognition, language, and maladaptive behavior; and in particular, the clinical syndrome known as depression. To adequately explore each of these areas, a brief theoretical overview will be presented. It is proposed that some portion of maladaptive behavior, particularly in depression, is maintained by the encoding of experience into an analog of behavior governed by rules for information processing and decision making commonly referred to as cognition, and that language is the primary medium through which this encoding occurs and is maintained.

A summary of the assertions on which this study is based will first be considered. The literature relevant to these assertions will be presented in the subsequent sections. These assertions are the following:

1) Cognition is a set of processes used to store experience as information resulting in an analog or model of experience that functions as a guide for future behavior (Goldstein & Blackman, 1978; Palmer & Kimchi, 1986; Williams, Watts, Macleod, & Mathews, 1988).

2) Cognition, while composed of three media or modes,
reaches its most effective, complex, and subtle form in the symbolic mode, of which language is the best representative (Bruner, 1964).

3) While language is studied in a wide variety of ways, including the analysis of semantics, syntax, and pragmatics; (Morris, 1946), the focus of this study will be the analysis of certain features of language syntax, because of the current availability of reliable computer methods for analysis and measurement.

4) Maladaptive or pathological behavior, while admittedly multidetermined, can be conceived of as being partly the result of a "faulty" or inadequate cognitive model (Beck; 1979, 1967, 1963: Bandura; 1980: Derry & Kuiper; 1981, 1980: Epstein; 1986: Mandler; 1985).

5) The syndrome of depression is a particular subset of maladaptive behavior for which a number of explanations or theories has been presented (Akiskal & McKinney, 1975). A number of these theories rely heavily on cognitive processes as central mediators in the formation and maintenance of depression.

6) Therefore, if language and syntax serve as a primary medium through which the cognitive analog is built, stored, and manipulated, and if depressive symptoms include cognitive distortion, then differences in the use of language and in syntax, should be found between depressed and non-depressed persons.

The remainder of this introductory chapter will examine each of these assertions in greater detail and will cite the
Cognition

Cognition and the place of symbolic processes within the study of human behavior have consistently presented a difficult task to the science of psychology (Baars, 1986; Mandler, 1985). While early psychologists were concerned with the description of consciousness through the process of introspection, the arrival of behaviorism changed the focus of study to events that were observable, objectively verifiable, and corresponded to environmental cues (Baars, 1986; Mandler, 1985; Murphy & Kovach, 1972). Mentalistic concepts such as motivation, purpose, intention, and cognition were thought to be of secondary importance. At the extreme these cognitive domains were thought to follow behavior rather than to control or mediate it. Thus, behaviorism in its strictest form, posits a simple Stimulus-Response (S-R) or non-mediational model as an explanation of human behavior.

While the behavioral approach has the advantage of simplicity, it cannot adequately explain behavior that is elicited quite separate, spatially and temporally, from the conditions thought to be necessary to elicit it. Additionally, whole classes of interesting and experimentally replicable phenomena such as hypnosis, altered states of consciousness, and dissociation; could not be accounted for in strict-
ly behavioral terms (Hilgard;1980,1977). These deficiencies in a simple S-R model lead to the development of a viewpoint that can be summarized as the Stimulus-Organism-Response (S-O-R) or the mediational models. In these approaches the \( O \) represents some form of mediational processes that intervene between the stimulus conditions and the behavioral response. While this approach has a great deal of empirical and theoretical support, the problem for psychology and, for that matter, for the developing discipline of cognitive science (Sharkey, 1986; Mandler;1985), is in the specification of precisely what these mediating processes do, how they develop, and how they function in the determination of behavior.

It is at this point in the developmental history of psychological theory that the study of such constructs as cognition were reintroduced (Baars, 1986). The study of cognition, then, became the attempt to specify how organismic mediational processes influence behavior; how they are learned or develop; how they are maintained and encoded; how sensitive they are to change; and what is necessary to change them.

To examine cognition properly some form of definition is necessary. While such definitions abound (Garfield, 1990) a working definition is that cognition is the process by which environmental information is acquired, stored, and manipulated. In addition cognition encompasses the process of decision making based on that acquired information.
Mandler (1985) referred to these functions as "representation and processes". Walker (1978) referred to cognition as "the study of the principles by which intelligent entities interact with their environment". Sharkey (1986) defined cognitive science as the "study of possible cognitive architectures (including representation and rules) and processes involved in understanding various parts of the world, including ourselves." (p.14)

The importance of the information processing and decision making function of the organism is the heart of the S-O-R approach. The organism responds to stimuli on the basis of its own cognitive structure or its own decision rules and less to the stimuli themselves. Thus, within the organism a representation is created of the varying antecedent and consequent stimuli. This representation is then used in the guidance of behavior. That such cognitive structures can and do influence outward behavior is by no means a new concept. Meichenbaum (1977), in an overview of the development of cognitive behavior therapy, quoted such philosophers as Epictetus, Kant, and Adler who, each in his own way, has commented on the relationship between cognition, emotion, and behavior. Mahoney (1977) stated that an organism responds to its cognitive construction of the environment rather than to objective reality. Goldstein and Blackman (1978) stated that cognitive style is the hypothetical construct that attempts to explain the process of mediation between stimuli and response. They reasoned that cognitive style refers to the way that an individual characteristically conceptualizes,
organizes and interprets information about the environment. Bieri (1979) stated that individuals learn strategies, programs, and other processes to transform objective stimuli into meaningful dimensions. Also, Zajonc (1980) defined cognition as an active process whereby information is organized, processed, and mediates between the individual and the environment. Zajonc further stated that such an organization of information also affects the organism's behavior. Cantor and Kihlstrom (1981) stated that "the operative factors in human behavior were not the objective stimulus conditions, but the ways in which situations were perceived and the meanings attributed to them by the individual." This "led investigators to take seriously the cognitive processes by which the individual construes situations and plans behavior in a psychological environment." (p. xi)

If cognition or cognitive structures have such an impact on behavior, then what exactly is such a cognitive structure? How is it formed and what is the relationship between cognitions and the environmental events that they represent?

The meta-explanation of cognition is that it is an analog or model of the environment and corresponds in a mathematical, representational, or analogical way to the external environment. Such a view is proposed by a number of theorists including Bandler and Grinder (1975), Garfield 1990), Jaynes (1976), Mandler (1985), Minsky (1986), and Williams, et al.(1988). For a more detailed discussion of
this process of representation or modeling of experience through analogs in cognition and some of the implications for human consciousness, refer to Appendix A.

While the meta models of cognition as an analog or map of experience provide for an overview of the function of cognition, they are clearly too broad for practical utility. They can provide clues as to the function of cognition in the guidance of behavior, but they do not provide guidelines for prediction or a way of altering maladaptive (or mistaken) behaviors. Minsky (1986) made note of this problem of specification when he states, "To explain the mind we have to show how minds are built from mindless stuff, from parts that are much smaller and simpler than anything we'd consider smart. Unless we can explain the mind in terms of things that have no thoughts or feelings of their own, we'll have only gone around in a circle."(p. 18)

For this reason, the analysis of cognition must be broken down into smaller units. Once such a reduction of the scope of cognition is undertaken, literally hundreds of sub areas can be identified, including: memory, information processing, sensory perception, concept formation, attitude formation, computational abilities, logic, decision rules, and problem solving, to name just a few. For this paper, the focus of the discussion will be on the role that language plays in cognition as it is involved in individuals with disordered behavior, particularly depression. I will use as a starting point models of cognition described by Mahoney (1974).
Cognitive Models

When examining cognitive models from a behavioral perspective, Mahoney identified three types. The first model he called the covert conditioning approach. According to this view, cognitive events are covert forms of overt phenomena. Basically, this view extends the more classical principles of learning and conditioning to apply to the covert events of cognition. Through learning principles, internal states become representations of external stimuli, consequences, and responses, so that the organism responds to internal events as it does to more observable external phenomena.

The second general model described by Mahoney is the information processing model. He states,

As the name implies, the information processing model places emphasis on the acquisition, storage and utilization of information. Although stimulus input and performance output are still employed as anchors, the information processing viewpoint invokes very different mediators in relating these two events. Rather than positing covert stimulus response mechanisms, it borrows structural and functional features from several other disciplines. Cybernetic theory, linguistics, perception and computer analogs are generous contributors to the information processing model. (p.125)

The third model described by Mahoney is a synthesis of the other two. It is called the cognitive learning model and it is composed of theoretical positions and hypotheses of many different thinkers. Consequently, the definition of just what a cognitive learning model entails will vary with the
user of this model. Mahoney describes this approach in this way.

Man is viewed as a complex organism capable of impressive adaptation. He is in continuous reciprocity relationship with his environment, a relationship which might be analogized as a cybernetic feedback loop. Behavior changes are influenced by the current physiological state of the organism, his past learning history and a variety of interdependent cognitive processes (e.g. selective attention, anticipated consequences, etc.) (p.145).

The three models described by Mahoney are best viewed as a second level of analysis in the examination of cognition; more precise than the meta-models referred to earlier but still dealing with general processes. The task at the next level of analysis is the specification of the nature and function of discrete cognitive processes, the circumstances under which they operate, what they consist of, and how they are interrelated with observable behavior. The focus of this paper is a small example of just such a specification. It will briefly examine how cognition is functionally related to language and how language provides the informational field upon which human information processing depends. Further, cognition will be examined as it relates to the syndrome of depression, as will the role that language plays in the maintenance of depression.

Mechanisms of Cognition

As has been suggested here and discussed in greater
detail in Appendix A, the overall function of cognition is to serve as a model of or a processor of experience
and can be likened to mechanical processors of information. The next step in the analysis is to specify the mechanisms and/or algorithms by which human cognition operates in the processing of experience. Such a specification begins with what is called thinking.

Bruner (1964) stated that thinking occurs in three primary modes. The first of these modes is called the enactive mode whereby information is stored as muscle sensations, motor responses, and/or visceral sensations. The second mode is called iconic representation, where images from the senses, primarily visual and/or auditory senses, form the substance of thought. These are the visual pictures and remembered sounds and they can become quite vivid and complex. The third mode is called the symbolic mode and is in fact an extension of the iconic mode. Here, remembered auditory images, words, become symbolic representations of other forms of experience.

While each of these three modes is interrelated and information is represented, stored and transferred, from all three, the symbolic mode is the most complex and subtle. According to such theorists as Jaynes (1976), Luria (1961), and Vygotsky (1961), the complexity and subtlety of the symbolic form results in a number of uniquely human properties. Luria and Jaynes went so far as to suggest that human consciousness of self is a direct result of our linguistic-symbolic thought processes and that the full development of self consciousness depends on them.
Jaynes presented an intricate theory of the growth and development of human cognition that is based on the process of the metaphor. Through a constant process of comparing familiar, understood items with less understood ones, a rich cognitive field is built up. The familiar item becomes an analog for the unfamiliar and the new item can then serve as an analog for an even newer one. Through the countless associations of attributes of both analog and phenomenon, extremely complex networks of comparison and understanding are formed. Thus, according to Jaynes, linguistic and cognitive development is a reciprocal process in which longer and longer associative chains are formed between symbols and experience. This process becomes so automatic that we no longer see the metaphorical nature of much of our everyday speech, such as; "head of the family", "foot of the bed", etc. or how many of our words are metaphors from other languages. Jaynes (1976) summarized by stating.

Subjective conscious mind is an analog of what is called the real world. It is built up with a vocabulary or lexical field whose terms are all metaphors or analogs of behavior in the physical world. Its reality is of the same order as mathematics. It allows us to shortcut behavioral processes and arrive at adequate decisions. Like mathematics it is an operator rather than a thing or repository. And it is intimately bound up with volition and decision. (p.55)

For a more extensive discussion of Jaynes' conception and the implications for consciousness in human beings see Appendix A.
Cognition and Language

Jaynes' theory is a complex one and it touches on what has been a controversial area in the study of human thought; the interrelationship of cognition and language. Essentially, there are two positions concerning the relationship between cognition and language. The first position states that language and thought are related in some way and parallel one another, but that each is in reality separate and distinct. According to this view, a thought is formed and is then put into words. Chomsky's (1972, 1959) conceptions of "deep" and "surface" structures represent one form of this point of view.

The other position concerning the relationship of language to thought is that embodied in the Whorf-Sapir hypothesis of linguistic relativity. This position, as described by Sapir (1921), states that the language community into which a person is placed has profound implications for his perceptions of the world around him. The language structure and habits that one learns determine one's view of the world and one's cognitions. Basically, this view is that language is thought. Jaynes' position, at least relative to the particular form of thought called consciousness, is that it depends on language and is based upon it, and thus consciousness developed later in human evolution than had been previously supposed.

The most extreme form of linguistic relativity is called the "mold theory" (Carroll, 1958). This theory states that the structure of one's native language sets limits on
and determines the cognitions of the speaker. In a more moderate position, the "lattice theory", (Carroll, 1958) stated that the structure of one's native language provides a framework for cognition with considerable latitude within that framework for individual difference based on experience.

This hypothesis of linguistic relativity is generally considered to suggest that there are cognitive differences between speakers of different languages. However, Vetter (1969) suggested that, at the level of the idiolect, the individuals unique usage or dialect, individualized differences in learned language patterns can also reflect individual cognitive differences. Cummings and Renshaw (1979) built upon this view when they stated, "We believe that language can best be viewed systematically as interdependent with perception and cognition, as a symbolic identifier or marker of discriminable elements and their relations perceived to exist in the real or imaginary environment of a living organism. It may be that language behavior is best conceived as a barometer of experience." (p. 291)

**Cognitive Development and Language**

The area of cognitive development in children is a complex one and far beyond the scope of this paper. However, a brief overview of a number of different viewpoints is needed to show the interrelationships of cognitive development to language.

Not surprisingly, conceptual differences exist to explain cognitive development. For example, theorists such as
Piaget (1968), Sinclair (1970), and Slobin (1973) argued that language acquisition is dependent on cognitive maturation which results from a person's physical maturation. However, theorists such as Vygotsky (1961), Luria (1976), Bruner (1964) and Sokolov (1972), asserted that language acquisition is a necessary condition for cognitive development. They believed that the linguistic environment of the child is a significant factor in the development of the child's subsequent cognitive processes. Of these researchers Luria's position is the most extreme. He stated that language and speech are central mediators in all higher mental processes.

Piaget stated that children first go through a period where their language is egocentric, then language is social or interactional, and finally, language becomes internalized as thought. Vygotsky, somewhat differently, described the developmental process by which children learn to control their overt behavior as the process of speech mediation. He noted that the motor activities of the child first come under the control of spoken directions from others, notably parents. Secondly, these motor activities come to be controlled by the child speaking to himself, and, finally, these self instructions are overlearned and internalized as thought. Luria (1976), in discussing the work of Vygotsky stated,

Language, which mediates human perception, results in extremely complex operations; the analysis and synthesis of incoming information, the perceptual ordering of the world and the encoding of impressions into systems.
Thus words -- the basic linguistic units -- carry not only meaning but also the fundamental units of consciousness reflecting the external world. (p.9)

Later in the same work, he said,

Thus the formation of complex forms of the reflection of reality and activity goes hand in hand with radical changes in the mental processes that affect these forms of reflection and underlie activity. Vygotsky called this thesis the semantic and system structure of consciousness. (p.11)

This view is similar to that expressed by Jaynes, discussed earlier. Thus, consolidating these positions; human cognition and even consciousness result from a process by which motor functions and visceral sensory information become associated with and under the control of the speech directives of others. The child then learns to control and monitor his/her own behavior through self vocalizations and external speech. Subsequently, self instructions become learned and internalized, resulting in an almost automatic response and what is called thought. The self directive or self instructional aspects of this process have been of significant interest in the development of cognitive theories of psychopathology identified by Meichenbaum (1977, 1974,). The work of Meichenbaum has been used to assist clients in cognitive restructuring through changes in linguistically based maladaptive self-instructions.

Language

This paper is an attempt to study the processes of cognition and how they relate to disordered behavior, parti-
cularly depression. The discussion to this point has begun with a macro-analysis of cognition, in general and is proceeding in increments to a micro-analysis of the contents and processes of cognition, specifically linguistic properties. At this point, it is necessary to examine some of the ways that language itself is studied and conceptualized. For an extended discussion of some of the approaches to linguistic analysis refer to Appendix B. For the discussion at this point all that is necessary is reference to Morris' (1946) description of three modes of linguistic analysis. The first mode is semantics, the study of the meaning of words and the relationships of words as symbols to the referents they represent. The second mode is syntactics, the structure of the language or the classes of symbols and the way in which they relate to one another. The third mode is pragmatics, the relationship between the symbols or the symbolic process and the uses to which they are put. Pragmatics relates to the application and use of language symbols.

Like many classification systems used for the analysis of phenomena, Morris' taxonomy is somewhat arbitrary and its utility is one of convenience and ease of conceptualization. As such an arbitrary distinction, the boundaries of each classification are unclear and blend into one another. In fact, Bates (1976) said "that as syntactics are derived ontogenetically from semantics so are semantics derived ontogenetically from pragmatics." (p.354)

Both semantics and pragmatics are discussed in more detail in Appendix B. Of relevance to the discussion at this
point is the area of syntactics, the area that serves as the focus of this study.

According to Lyons (1968), syntax is the way in which words combine to form sentences. Commonly, syntax is thought of as the rules of grammar. However, the main premise of this paper is that syntax is much more: that by structuring and ordering language, syntax structures and orders thought.

While a complete history of syntactic analysis, like many other topics mentioned here, would prove far too comprehensive for this paper, it is important to understand that the initial purpose for the study of syntax was philosophical, not merely linguistic. To the Greeks, the study of syntax was an attempt to classify thought. It began with simple subjects and predicates (the topics of thought or content, and statements about that content) and developed into the classification of the familiar parts of speech we use today. However, each part of speech had a specific function in thinking. Nouns, verbs, and adjectives were each thought to deal with a specific attribute of thought. It was only during the Middle Ages that syntax was applied to the study of literature and was relegated to the simple grammatical approach that we think of today.

The viewpoint that syntax is a determinant of thought is not without support. Brown (1957) stated:

In recent years the anthropologists Whorf (1956), Lee (1938) and Hoijer (1954) have put forward the view that language is a determinant of perception and thought. The nature of the determining influence exerted by the vocabulary of a language is clear, but it is
less easy to see how the grammatical features of a language can affect cognition. Yet it is just the grammatical differences between languages that are most striking and it is their determining force that the anthropologist has stressed. This paper undertakes to show how one kind of grammatical practice, the allocation of words to one or another part of speech does affect cognition. (p.1)

In taking such a stance, Brown shows once again that the artificial separation of linguistic phenomena into the three classes of semantics, pragmatics, and syntactics is an arbitrary one. The classes chosen, the parts of speech, have semantic meanings of a larger order associated with them. They define classes of cognition. Nouns have characteristic properties of representing persons, places, or things, verbs represent relationships or actions of some form, and adjectives and adverbs represent some form of qualifier or description of characteristics. Cummings and Renshaw (1979), interpreting grammatical categories in light of Gaito's (1964) information extraction model of cognition and perception, have stated, "Thus, language behavior is a reflector of the information units of our perception (nouns), together with cognated relations between information units (verbs), and the quality-quantity of both information units (adjectives) and relations (adverbs)." (p.293)

While these classifications of parts of speech are generally accepted, there are many exceptions. The "thing" quality of a noun such as "book" is clear; but what of a noun such as "beauty"? Brown (1957) took note of these abstractions and examined the nature of noun usage in children. He found that younger children's usage of nouns more
nearly matched the grammatical definition. The nouns that they used were more likely to be "concrete". However, older children and adults used more "abstract" nouns. He made the point that linguistic familiarity with the supposed function of a noun was carried over so that such concepts as beauty, truth, and the like behave in cognition as things precisely because of their grammatical classification. Brown stated:

While the part of speech membership of a word does not give away the particular meaning, it does suggest the general type of that meaning, whether action, object, substance or whatever. . . . It now seems quite probable that speakers of other languages will also know about the semantics of their grammatical categories. Since these are strikingly different in unrelated languages, the speakers in question may have quite different cognitive categories. It remains to be determined how seriously and how generally thought is affected by these semantic distinctions. (p. 5)

It is precisely these nuances of syntactic usage and their relationship to "meta" semantic features in cognition that form the principle tenet of this paper. The specific form of an utterance carries with it a particular set of syntactic nuances which forms a cognitive "envelop" that conveys both the larger meaning and the cognitive subtleties associated with the specific form. In this light, Chomsky's assertion that utterances differ in "surface structure" and yet represent the same cognition in "deep structure" is misleading. Viewed from the perspective of syntactic nuance, the main concept of an utterance might be the same but the implications of the cognitive envelop might vary considerably. For a single utterance, the difference might
be insignificant. But what of a large number of utterances? Could two different speakers discuss the same topic, convey very similar cognitions, and yet, because of consistently different syntax, imply very different world views?

If it is found that syntactic differences do, in fact, represent real differences in cognition, then the implications for cognitive classification are considerable. For example, personality classification systems based on syntactic categories might prove to be more reliable than current taxonomic or diagnostic systems. Secondly, syntactic analysis might prove to be a better diagnostic procedure than current tests, or, at least a useful adjunct. Third, if syntax conveys a good deal of cognition, then instruction in alternate syntactic usage might prove useful as an adjunct to therapy.

**Language, and Psychopathology**

That language behavior might be a significant factor in cognition and psychopathological conditions is not a new idea. At least from the early part of this century (Southard, 1916) researchers have examined linguistic patterns in a wide variety of psychological or psychiatric conditions. For a review of some of the relevant historical literature refer to Appendix C.

**Cognition and Depression**

While the main tenet of this study is concerned with the analysis of the relationship of language to cognitive processes and how cognition affects behavior, the focus of
these concerns must be narrowed. For this reason, therefore, a particular mode of maladaptive behavior, depression, will be examined. Since depression is an example of behavior about which much is known, this paper will focus on the relationship between depression (as a cognitive state) and the specific linguistic behavior of syntax usage as a representation of the larger concern of linguistic behavior, cognition, and maladaptive behavior in general.

Depression has been chosen for this paper because of the seriousness and epidemic nature of this syndrome and for the fact that many researchers have offered a large number of theoretical positions that propose disordered cognitions as a major etiological factor in depression.

For a review of the major theories of depression and the extensive nature of the syndrome see Appendix D.

While listed as an affective disorder, depression as a diagnostic classification clearly indicates that behavioral and cognitive elements are involved. Depression is viewed as a multimodal phenomenon, involving or resulting from disturbance in affect, cognition, and overt behavior. Boyd and Levis (1980) have stated that manifestations of depression are seen at the emotional, cognitive, motivational, physical, and behavioral levels. A summary definition of depression might be that it is characterized by a predominant affective state of sadness or guilt and is accompanied by cognitive distortions relating to lessened self-esteem and competency; and as such it leads to a decrease in overt
reinforcing behavior and a person's general level of activity. While this definition is not exhaustive, it suggests the complexity of the syndrome and serves as a framework for our understanding of the psychological state of depression.

Cognitive Theory of Depression: Beck and Seligman

Although depression is classified as an affective disorder, it is clear that much of the subjective discomfort of depression results from the perceptions and beliefs of the individual. This distinguishes depression from simple sadness. While the emotional state identified as sadness seems to result from a perception of loss, depression has been identified as a continuing state of sadness with a concomitant distortion of cognition that maintains this sadness. This cognitive component in depression is the underlying factor of the psychopathological state, as defined by both Beck (1963) and Seligman (1974) as well as such other theorists as Frankl (1969), Bart (1974), Abraham (1911, cited by Akiskal & McKinney, 1975) and Bibring (1965) discussed in Appendix D. According to each of these theorists, some flaw or disorder in the cognitive process, (or the cognitive analog to use terms presented by Jaynes and discussed in Appendix A.) of the person, developed from whatever source and in whatever manner, maintains the emotional state of depression.

Presently, the most comprehensive system for explaining cognition and the psychopathological state of depression is that of Beck (1963). Beck identified specific deviations of
thought in depressed individuals which lead to distortions of cognition and behavior. Beck described four major components of depressive cognition. The first is low self regard. Depressed persons are prone to grossly distort their perceptions of their attributes, abilities and qualities in a negative manner. Beck found that achievements were minimized and failures were maximized. When comparing themselves to others, depressed individuals consistently regard themselves as inferior.

A second area of distortion is in ideas of deprivation. According to Beck, the depressed individuals believe themselves to be unloved, alone, or unwanted in spite of evidence to the contrary. This perceived deprivation applies to material possessions as well.

The third distorted area is self-blame or criticism. Depressed individuals will blame themselves or be highly critical of perceived shortcomings. This is distinguished from the general low self evaluation described earlier in that this criticism, while unrealistic, only applies to those attributes perceived as most important to the self image. For example, a person who values himself as a father would be intensely critical of himself in this area, while being less concerned about himself as an athlete or employee.

The fourth area of cognitive distortion described by Beck is the magnification of problems and responsibilities. Tasks are blown out of proportion and appear overwhelming to the individuals when, in fact, they are often insignificant,
even to the individuals themselves when not depressed.

Self commands are another significant area of distortion in depressed individuals. These self commands often far exceed any realistic or practical capabilities of the individual, but they are referred to by the individual as things that "should" or "must" be done. At this point, it is useful to recall the concepts concerning the development of cognition proposed by Vygotsky and Meichenbaum discussed earlier (see Appendix A.). Both of these theorists stressed the importance of self commands in the development of cognition and in the control of behavior.

Related to such self commands are frequent thoughts about an escape from problem situations or unrealistic expectations, as in daydreams or even suicidal ideation. However, these fantasies generally produce no lasting relief and, when indulged even for brief respites, produce greater feelings of distress as the individual perceives the time spent in this manner as wasted.

In addition to the four areas of distorted thematic content described above, Beck has classified the process of disordered thinking into what he calls types of error. The first type of error is called arbitrary interpretation. Here errors of thinking result when a conclusion is made about an event where there is no factual evidence to support such a conclusion. Characteristically, these interpretations involve a negative evaluation of the individual.

A second type of error is called selective abstraction. Here a detail is taken out of context and then the entire
event is interpreted on the basis of this detail. As in all of these types of error, the interpretation is made in the negative direction by the depressed individual. It is interesting to note that this process of selective abstraction is similar to a process that Jaynes called excerption or the selective attention to some attributes of the stimulus field to the exclusion of others.

**Magnification** and **minimization** are also common types of errors that occur in the cognition of depressed individuals according to Beck. In these processes the aversive consequences of an event are exaggerated far beyond the actual results. The pleasant aspects are ignored or minimized.

**Inexact labeling** is related to both overgeneralization and to the process of magnification. The depressed individual uses words with a greater negative connotation than is necessary to describe an event and then reacts to the magnified connotation.

Beck has also listed some characteristics of these cognitive distortions as they are perceived from the individual's point of view. These distortions are seen as automatic, involuntary and plausible. That is, they are perceived to occur automatically in a wide variety of situations, without recalled antecedents. They are perceived as not being under an individual's voluntary control and despite, their distorted, negative nature, these cognitions are believed by the individual to be realistic, plausible explanations and evaluations of the person's life situation.
Beck, Rush, Shaw, and Emery (1979) refined this cognitive model of depression and proposed three conceptual mechanisms to explain the psychological and cognitive processes of depression. The first of these is the concept of the cognitive triad. This is a specific belief system in which depressed individuals view all aspects of life and themselves in a negative manner. These individuals see themselves as defective and inadequate and, due to these assumed defects, view themselves as undesirable and worthless. Thus, they tend to underestimate their personal qualities and to criticize and to hold themselves responsible for all failures. Secondly, the individual categorizes current events and experiences to fit his negative expectations. In this manner they distort or exaggerate aversive events and ignore or deny positive ones. The third component of the cognitive triad is concerned with the depressed person's negative view of the future. In light of the first two beliefs, the individual anticipates continued deprivation and failure which, in turn, further fuels the depression.

The second set of cognitive mechanisms proposed by Beck et al. are schemas. These consist of relatively stable cognitive patterns through which current experiences are interpreted. These schemas are learned patterns which become overgeneralized, so that subsequent situations are interpreted in a similar erroneous manner. These schemas, according to Beck, are proposed to dominate depressive thinking to the extent that the individual becomes unresponsive to environmental changes.
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each model, there is room for a number of explanations as to just how the necessary negative cognitive set is formed. Beck is most clear in describing his model as one that explains the phenomenon of depression, while allowing for multiple explanations as to just how these cognitive processes are started. Within his model, many of the causes proposed by other theorists (Abraham, 1924; Frankl, 1969; Bart, 1974) can serve as starting points for the learned schemas and patterns that he suggests are the processes by which depression is developed. Beck addresses this issue by stating:

It should be emphasized that our explanation up to this point is based on analysis of the phenomena of depression. Our observational tools at this level of analysis do not provide data regarding the ultimate 'cause'. The patient's negative constructions of reality can be postulated to be the first link in the chain of symptoms (or phenomena) .... Our formulation of the role of predisposing maladaptive cognitive structures is based partly upon long-term clinical observations as well as logical speculation. It does not seem plausible that aberrant cognitive mechanisms are created de novo every time an individual experiences a depression. It appears more credible that he has some relatively enduring anomaly in his psychological system. Thus we need to make our longitudinal analysis in structural terms. A set of dysfunctional 'cognitive structures (Schemas)' formed at an earlier time becomes activated when the depression is precipitated (whether by psychological stress, biochemical imbalance, hypothalamic stimulation or some other agent). (pp. 19-20).

According to the view proposed by Beck, these cognitive structures or schemas compose an intervening variable in the process of depression, and for the sake of treatment the system is entered at this level of intervention.
However, from the viewpoint of examining the function of cognition itself, the model proposed by Beck deals with only part of the picture.

In order to properly examine Beck's cognitive theory, some additional framework for cognition is needed. Such a conceptual framework has been alluded to earlier but will now be more clearly specified. While the analysis of cognition can be undertaken at a number of levels,( Levanthal, 1984; Williams, Watts, MacLeod & Mathews, 1988; Sanford, 1985; Norman & Shallice, 1986; Oatley & Johnson-Laird, 1987) a model consisting of four levels will be presented here. These four levels are by no means the only conceptualizations possible nor are they strictly hierarchical in nature. Each level merges with the others and all have "loops" or referents in other levels.

The first level might be called the Meta or major functional level. At this level the primary utility of cognition as an explanatory variable is defined and studied. Examples of such functional definitions are the "analog" and "map" metaphoric models proposed by numerous authors. It is thought that the S-R and S-O-R models are appropriate for this level of analysis, whereby S-O-R models imply some functional utility for cognition and S-R models identify no such functional utility. This level of analysis allows for the study of concepts such as consciousness and behavioral mediation. Therefore, this level permits a further analysis of cognition as a useful variable in the explana-
tion of behavior. The utility of such a level of analysis is that it suggests the remaining levels and offers hypotheses for continuing study. For example, a "meta" model of cognition as a computer program suggests analysis at the remaining levels according to information theory, Boolean logic, decision theory, and game theory.

The second level I will term the Global or sub-functional level. At this level of analysis, what are commonly referred to as cognitive structures are studied. The range of such structures is large and includes such concepts as id, ego, superego, the self, Beck's schemas, Jaynes' analog I and metaphor me, and similar constructs. All of these constructs posit a function for cognition and propose structures and processes for the performance of that function.

The third level is the level of specific cognitive processes. These include the types of cognitions that occur in specific situations or within specific syndromes. Studied here is attribution theory, perception, memory, and many social phenomena, as well as the types of specific cognitive errors proposed by Beck to describe depression.

The fourth level is not, in fact, a level in the hierarchy, but is rather a focus for study of the events in all of the other levels. This level I will term the Para level and is concerned with the analysis of the media and processes of cognition itself. In information theory terms, this would be the analysis of the "carrier" rather than the "message". It is at this level that the study of syntactic properties in thought and language is most appro-
appropriately described, although, as mentioned earlier, syntax does carry semantic or "message" properties.

These four levels provide a conceptual overview with which to undertake the analysis of cognition. Viewed in light of these levels, Beck's theory deals primarily with levels two and three. He postulates a function for cognition at the meta level and then goes on to describe structures at the global level, his schemas. At the third level, Beck specifies types of cognitive distortions involved in depression and he suggests methods for the alteration of these types of distortion.

Beck does not address the fourth level, the properties or medium of thought itself. In effect, he makes use of the symbolic process without focusing on the act of symbolization or on the properties of such a symbolic process. For his level of intervention, such a focus on the symbolic process itself is unnecessary, but for a complete understanding of cognition such a focus is required. It is at this point that the threads of cognition in general, linguistic analysis, and the cognitive patterns of depression intersect. Summarizing briefly, an individual uses a map or analog of experience, termed cognition, to interpret his/her environment and to mediate his/her actions. While such symbolizations of an analog can occur in the three modes described by Bruner, the most extensive, intricate, and subtle form of symbols are those encoded in language. If there is a maladaptive distortion in the cognitive analog,
such a distortion should be visible in the encoded medium of thought, in this case, language. Thus, distortions in cognition should be reflected in linguistic usage and, conversely, distortions in linguistic usage will affect cognition.

Thus, condensing the terminology of a number of theorists, depression, according to Seligman and Beck, is the perception of self as helpless, past experience as painful and the prospects for the future as likely to result in more of the same. Translated into Jaynes' terminology, the "analog I" created by the individual is one where the behavioral options leading to pleasant outcomes are perceived as non-existent, all of the actions and outcomes that affect the "metaphor me" are seen as negative, and the analog I is seen as powerless to alter the situation for the better. The narratization process weaves a life story where the analog I is both the victim and the culprit and the conciliation process between both the analog I and the metaphor me interprets all incoming information in light of this negative cognitive set or schema.

The present investigation attempts to study the correlation of a measure of depression of known clinical utility with measures of linguistic analysis. If cognition is interrelated with language, then, it is plausible that just such a correlation will be found, mirroring this relationship.

Cognition and Syntax: Syntactic Language Computer Analysis III. (SLCA-III)
In an attempt to investigate language behavior and its relationship with cognition and the perceptual processes, and to provide a standard yet comprehensive format with an adequate theoretical foundation, Cummings and Renshaw (1971) developed what they called the Syntactic Language Computer Analysis (SLCA) program. A second version was developed in 1976 and the current revision SLCA III was introduced in 1978.

This latest version serves as the basic analytic tool of the present study. Incorporated into the theoretical background out of which this program was developed, are the conceptions of Whorf (1941, 1972), Vygotsky (1962), Skinner (1957), and Rapaport (1969), concerning the interrelationship of language, cognition, and perception. Cummings and Renshaw (1979) propose an axiomatic model of these relationships where cognition is thought to vary directly and isomorphically with language behavior.

Also used as a base for the development of SLCA-III is the information-extraction model of Gaito (1965), where it is proposed that information is drawn from the environment and forms the basis of cognition and perception. The standard grammatical parts of speech are interpreted in light of their relationship to types of environmental information. As mentioned earlier, Cummings and Renshaw state that language is composed, therefore, of: A) information units of perception (nouns), B) cognated relationships between these units (verbs), and C) qualifiers of the properties and
quantities of these units (adjectives) and relationships (adverbs).

The SLCA-III program categorizes language behavior and, by inference, cognition into eight classes or properties: A) Social perception, B) Sensation, C) Existence, D) Motion, E) Disposition, F) Time, G) Reflexive Density and H) Definitionality. Also tabulated are relative densities or proportions of information units (nouns), of relations (verbs), and qualifiers (adjectives and adverbs). These eight classes or qualities are further subdivided so that thirty-six variables are generated for each language sample. For a complete description of the SLCA variables and their dimensions see Appendix E. The eight classes defined by the SLCA-III program are clearly more than simple categories of parts of speech. They provide a theoretical underpinning for a comprehensive analysis of the function of cognition.

Cummings and Renshaw (1979) state, "These variables provide a basis for charting profiles of language users such that both molar and micro patterns may be identified as contributing to the understanding of the communication process."

Since the development of the second version of SLCA in 1976 a great deal of research has been done comparing language usage with such factors as age, sex, and educational level. In summarizing the studies that have been done using the SLCA program, Cummings and Renshaw noted that all eight categories were found to vary with age (Stich, 1978), Machiavellianism and power (Hazelton, 1977), physical distance
(Garner, 1977), field dependence (Wright, 1976), sex (Parkinson and Gorcyca, 1977), lying (Chapman, 1976), and ego involvement (Pletsch, 1976). The SLCA program has been used also in the diagnosis of communication disorders. Fields and Renshaw (1978) found that the categories of sensation, disposition, time, symmetry, and qualification were related to language delay. Jetty and Renshaw (1978) reported that social perception, sensation, and qualification were related with levels of hearing impairment. Edelman (1981) distinguished real vs simulated suicide notes using the SLCA program.

**Present Study: Effects of Cognition as Measured by Language (Syntax) in a Specific Psychological State (Depression)**

The preceding discussion has served to outline the many threads of thought that must be interwoven to provide a comprehensive analysis of the relation of linguistic usage, and cognition, and their relevance to the syndrome known as depression. From summarizing these viewpoints, equating their terminology, and integrating them, there emerges a theoretical synthesis.

Human cognition, consisting of three modes, as identified by Bruner (1964), results in a cognitive map or a world view or an analogical model of experience through a process of comparison and metaphor as described by Jaynes (1976). This model is built up or learned, subject to the principles of conditioning and learning, and serves as both
a summary of and a symbol for past experience, and as a guide for future action. Through the use of this analog, history can be symbolized, recalled and used as a predictor; alternate interpretations can be reached, and options analyzed prior to action. Using the information processing metaphor, this cognitive analog stores and encodes environmental and historical information, and contains the decision algorithms the organism uses to make judgements.

The symbolic mode of thinking exemplified most completely by language, allows cognition to reach its most complex, versatile and subtle form. Similarly, according to Vygotsky, Luria, and Jaynes, the unique attributes of human consciousness, namely self-awareness, arise from this linguistically based symbolic mode of thought. Relatedly, Jaynes describes two of what he considers to be the unique properties of human consciousness as the "analog I", and the "metaphor me". With these two cognitive-linguistic structures, Jaynes describes the process of narritization whereby the history and experiences of an individual are integrated into a consistent whole, and used as the basis for further action. Thus, commonalities concerning cognition and language are found among a number of theorists.

In looking at the diverse theories concerning depression, a number of commonalities are also found. First, phenomenologically, the experience of depression seems to center around the individual's negative perception of self and environment, and, usually, involves some form of dissatisfaction with life as it is experienced. Secondly, what-
ever the proposed etiology, distortions of perception and cognition constitute the bulk of the symptomatology in addition to depressed or flattened affect. Third, while the effects of depressed cognitions can be observed by others behaviorally in the form of lessened activity, lethargy, or expressions of despair, the pathology of depression is subjective and is defined by the cognitions, perceptions, and values of the afflicted individual. Translating this to the terminology of Jaynes, the subjective experience of depression is a function of the cognitive analog, specifically, distortions involving the "analog I" and the "metaphor me". Those aspects of the individual's cognitive map that deal with self-concept and the perception of the environment relative to the self are flawed and subject to misperception. That sadness is, of itself, not pathological is well documented. This is demonstrated by the classification of reactive depression as a normal response to traumatic events. It is only when the reaction is prolonged or occurs in the presence of no objectively perceived crisis that the condition is thought to be psychopathological.

The situational precursors of prolonged depression have long been speculated upon. The earlier discussion of the various theories of depression makes this clear. However, with the exception of the biogenic theories and, to some degree, the conditioning models, theories concerning the precursors of depression have in common a distortion of cognition, particularly where it concerns the perception of
the self. Even the biogenic theorists recognize such a distortion although they hypothesize that this cognitive distortion follows a chemical disturbance.

While a number of researchers are interested in the effects of cognition on depression, as discussed earlier, Beck has outlined most precisely the types of distortions likely to be present. Beck proposed a cognitive triad consisting of: A) a negative view of the self or what, in Jaynes' terminology, would be a negative "analog I", B) a negative view of the world as it affects the self, the "metaphor me" of Jaynes, and C) a negative view of the future where both the analog I and metaphor me are subject to aversive events with no foreseeable relief.

The work of Vygotsky, Luria, Whorf, Sapir, and the others cited earlier postulates an intimate relationship between cognition and language. In an extreme form, cognition is thought to depend almost entirely on language. While cognition in the iconic and enactive modes is possible, most self evaluations take the form of symbolic or linguistic thought.

If Beck's conceptions about the types of cognitions present in depression are valid and if syntactic use reflects cognition, then certain specific syntactic patterns should appear in the speech of depressed persons that can be distinguished from those of non-depressed persons. The SLCA-III program allows a comprehensive method of syntactic analysis. Thus, the hypotheses which this investigation will study propose to translate Beck's theory into the
specific syntactic variables measured by SLCA-III.

The main hypothesis is a general one, reflecting the fact that this is a first step in the study of the relationship of syntax to cognition in depression. Thus, it is predicted that depressed individuals will differ from non-depressed individuals in their use of syntax. Further, it is predicted that the specific nature of these differences, based on the types of cognitive distortions described by Beck et al. (1979), will be as follows:

1. Non-depressed persons will show a greater usage of qualifiers (adverbs and adjectives) than depressed persons suggesting a cognitive richness and variety with diverse descriptions and distinctions while depressed persons will show lesser richness and diversity.

2. Depressed persons will have a greater usage of personal pronouns which reflects the depressed person's preoccupation with the self.

3. Depressed persons will have a greater use of generalized other references. This hypothesis reflects the depressed person's greater cognitive vagueness and generalization.

4. Depressed persons will score higher in unsensed information than will non-depressed persons. This hypothesis reflects the depressed person's tendency to make vague statements which are less subject to objective verification. In other words, depressed persons will use more abstract
nouns, adjectives, and adverbs which cannot be readily verified to contradict their existing cognitive schemas.

5. Depressed persons will score higher in non-motion language as a result of an increase in verb forms containing variations of the verb "to be". This usage of the verb "to be" by depressed persons suggests a greater preoccupation with perceived self traits and states of being. In other words, depressed persons will use more constructions of the form "I am . . ." or "It is . . .". This reflects a tendency to perceive undesirable traits while at the same time showing a less action oriented point of view. While such a hypothesis is not explicit in Beck's theory, it is intimated in his theory and is based on the linguistic work of Korzybski (1933), and Bourland (1965) who developed a language he called E-prime, which consists of English without any of the verb forms of "to be". It was Bourland's assertion that such a language results in more precise and clearer thinking, with less of the sorts of over-generalizations and vague references that Beck hypothesizes are the source of much of the distorted cognitions leading to depression. Additionally, such a finding would be a replication of Andreasen and Pfohl (1976) who found that depressed persons used more "state of being" verbs than did their manic subjects.

6. Depressed persons will score higher in all categories of negated existence, suggesting an overall "negative" point of view corresponding to Beck's cognitive triad, while correspondingly non-depressed persons will score higher in
measures of positive existential density. This category of variables deals with an epistemological viewpoint of whether information is defined by affirmation or whether information is known by its negation (Fisher, 1985).

7. Depressed persons will score higher in asymmetric relational density which is associated with the passive voice and a more passive or "victim" like approach to life. However, this could vary from topic to topic as a depressed person might perceive personal responsibility for a failure that a non-depressed person might consider out of his/her control.

8. The overall level of activity as measured by the total word count (Perceptual-Cognitive Activity) will be lower for depressed subjects reflecting lowered cognitive activity in general.

All of the above hypotheses are derived from the types of linguistic and cognitive distortions that Beck et al. (1979) and to a lesser degree Seligman (1974) state are the cause of depression. They have been translated into a form that is operationalized in the 36 variables of the SLCA-III program and are, thus, capable of being measured and scored by that program. The details of the procedure, the types of subjects to be used, the instruments to be used, and the rationale for each will be presented in the next section.
METHOD

Subjects

Subjects were 64 female undergraduate volunteers drawn from undergraduate psychology courses. The mean age of all subjects used in the study was 20.25 years. For the non-depressed group the mean age was 20.4 with a range of 18 to 25 years whereas the depressed group had a mean age of 20.1 and a range of 18 to 24 years. Females only were used for this initial study for two reasons. First, the majority of reported cases of depression are female. Secondly, Cummings and Renshaw (1979) and Johnson (1980) have shown that language usage, as measured by the SLCA-III program, differs with age, sex, education, and socioeconomic level. Choosing the subjects from one sex and from a further restricted sample pool (college undergraduates) was an attempt to control for these variables.

Coder

To prepare the language samples obtained from the subjects for computer analysis by the SLCA-III program, one coder (a high school English honor student) was trained in the encoding procedures described in the SLCA-III manual (see Appendix F.). The obtained samples were first transcribed from tape into typewritten form on computer diskette. These diskettes were delivered to the coder. Following the rules in the manual, the samples were encoded
with symbols (+,-,++) placed before certain parts of speech, as per the SLCA manual. To ensure no bias in the coding the coder was not informed as to the nature of the study nor was the group membership of the samples identified in the raw text supplied to the coder. As a measure of reliability one of the 12 tapes (16 messages, 8.333% of the total messages) was independently coded and the results compared to those obtained by the coder. Of the 3261 words in those messages 1939 required some form of encoding. Of those 1939 words, 1923 were in agreement, a figure of 99.17%.

**Instruments**

**BDI** The Beck Depression Inventory (Beck, Ward, Mendelson, Mock, & Erbaugh, 1961; Beck, 1967, 1978) has been shown to be a valid and reliable measure of current depression when used according to specified conditions. (Bumberry, Oliver, & McClure, 1978; Sacco, 1981; Seitz, 1970). It consists of 21 items covering depressive symptoms and attitudes. Each item has four or five self-evaluative answers associated with it and the respondent chooses one. Each of the answers is weighted so that the inventory yields a total score of between 0 and 63, with lower scores indicating less depression. The full text of the Inventory is included in Appendix G.

Beck et al. (1961) reported a Spearman-Brown split-half correlation of .93 as one measure of its reliability. Additionally, Beck et al. did an interitem analysis and a
modified retest procedure as a measure of both validity and reliability. As a specific validation procedure, Beck et al. correlated the scores obtained on the inventory with a four class depth of depression rating using four experienced psychiatrists as raters. In two separate studies they found correlations of .65 and .67 between the inventory and the depth of depression. Seitz (1970) found that the BDI correlated .83 with the Zung Depression Scale (Zung, 1965) and .63 with the Miskimin Self Goal Other Discrepancy Scale (Miskimin, 1968). He also compared the BDI with the MMPI Depression Scale (Hathaway & McKinley, 1943) and found a correlation of .41. In addition, he also used a psychiatric rating and found a correlation of .19. Bumberry et al. (1978) found a correlation of .77 between the BDI and psychiatric rating using a university population.

For this study, inclusion into either the depressed or non-depressed group was based on BDI scores of greater than 16 and less than 4 respectively. The score indicating non-depression was chosen to make the differences between the groups wider. Beck et al. use scores below 10 as indicative of no depression. Bumberry et al. found this figure to include 77% of a university population. The figure of 16 or greater is termed by Beck and others as indicative of moderate depression and has been found by Bumberry et al. to include 7% of a university population.

SLCA-III The Syntactic Language Computer Analysis is discussed in some detail in Appendix E. It was obtained for
use in the study from Dr. H. Wayland Cummings, Dept. of Communications, University of Oklahoma, one of the developers of the program, and placed on the computer at the LSU Student Network Computer Center. Briefly, this computerized language analysis system is based on three linguistic dimensions: 1) informational units (nouns, pronouns, or other subject signs); 2) relational units (verbs or connectors); and 3) quantifier-qualifier units (adjectives and adverbs). Language samples are rated in terms of the relative frequency of each of these types of units. A probability view of language is derived which is based on eight qualities or categories of language usage which are: 1) social perception, 2) sensation, 3) existence, 4) motion, 5) definition 6) time, 7) reflexiveness and 8) conditionality. Also included are aggregate classes of the frequencies of total information units, total relational units and total qualifiers as well as a total word count referred to as Perceptual-Cognitive Activity (PCA). These classes are described in greater detail in Appendix E. From these eight classes and the aggregates, a total of 36 variables is generated. These variables are not nor were they meant to be independent of one another but are independent within each of the eight classes. How these variables are translated into hypotheses based on Beck's and others cognitive theories of depression is described at the end of the introduction section. The SLCA program itself consists of four parts: A) the Analyze program, B) the Numbers program, C) a
set of Dictionaries used by the Analyze Program, and D) a DMerge program to expand the dictionaries. The Analyze program reads the language samples after they have been properly encoded using rules included in appendix F. It then produces data for each message which is compiled by the Numbers program to provide a measure for each of the variables described. This output of scores served as the raw data for further statistical analysis.

Procedure An initial pool of over 250 subjects was recruited, drawn from large undergraduate psychology classes, with extra credit being awarded for participation as per university practice. An administration of the BDI was given in a large group setting with all subjects told that some subjects would be chosen for additional participation. At the time of their initial participation, all subjects were given a consent form (see Appendix H.) and a demographic information sheet (Appendix I.) asking for age, year in school, race, and an estimate of family income as well as telephone number, along with the BDI form. To insure confidentiality, all subjects were asked to only use their first name, last initial and last four digits of their student number to identify their BDI and demographic sheets. Upon completion of all forms subjects were asked to remain while the BDI was scored. Those whose scores met the inclusion criteria of either less than four or greater than 16 were asked to remain and were scheduled for an individual session of approximately 3/4 hour, usually later in the same day but in no case more than three days later.
From the large groups, 64 subjects met the inclusion criteria. At the second session the following procedure was used.

First, each subject was given a packet consisting of an instruction sheet and an individual sheet each containing one of each the three experimental stimuli along with a cassette tape recorder. After being given sufficient instruction in the use of the tape recorder to ensure that the subject was capable of correct operation, the subject was taken to a private room where she was left alone with the tape recorder and instructions. Each subject was given verbal instruction to the effect that this is a study of speech habits and that she would be asked to respond to the stimuli in the instruction packet by speaking into the tape recorder. Each subject was instructed not to erase or re-record once she had started speaking on each stimulus as these spontaneous corrections and changes are part of the study. Each subject was asked if there are any questions and told to be thinking about any dramatic life incidents such as a scary, exciting or joyous event or time in their lives. This served as a warm-up to decrease the likelihood of a speech block. Then the subjects were told to open the packet and begin. The examiner then left the room.

The face sheet given to all subjects stated,

"Enclosed in this packet you will find three envelopes each containing a separate item for you to respond to by speaking about the topic for approximately five minutes. The items are numbered in the order you are to respond to them. Open each item only in the correct sequence and only after
you have responded to the preceding item. For each item, read the item carefully, turn on the tape recorder, being certain that it is in the record mode and begin speaking. Begin each item by stating "Item one, etc." After speaking for approximately 5 minutes and when finished please leave a small pause on the tape then open the next envelope and repeat the procedure, stating "item two" and so on. Repeat the procedure for each item. After completing all three items bring the tape recorder and packet back to the examiner. Thank you for your cooperation.

Each subject was given the following three stimuli given in a counterbalanced order determined by a Latin Square procedure.

**Stimulus One  Positive Experience**

"This is a study of speaking and conversational habits. I would like you to speak for five minutes about any interesting or dramatic personal life experiences of a positive nature you may have had. Do not think too deeply about what you intend to say. This is not a study of public speaking ability. Say generally what first occurs to you. Remember to talk for approximately 5 minutes. (modified from Gotschalk, Winget & Gleser, 1969, p.5)

**Stimulus Two  Negative Experience**

"Thank You. Now I would like you to speak for five minutes about your most embarrassing or most negative experience."

**Stimulus Three  Opinion Item**

"Thank You. Now I would like you to speak for five minutes and give some of your thoughts as to why a free press is important in a democracy."

The instructions were modified so that the initial stimulus for each subject gave the general
information about the study of conversational habits. The text of all stimuli is in Appendix J. Upon completion of the sample periods each subject was informed of the nature of the study in general terms and requested not to discuss the study with other members of the class or friends involved in the study until the study was concluded. The only identifying information included with each sample was a subject number that was assigned at the time the initial BDI was scored. Each set of samples was given an encoded subject number with no identifying information classifying the subject according to group. Group assignment for the language samples was only matched after the samples had been encoded and scored using the SLCA-III procedures.

The language samples thus collected were transcribed onto diskette and encoded using the rules of the SLCA program (see Appendix F.). These rules call for the addition of symbols such as "+" or "-" to identify certain words and parts of speech. Encoding was done by a hired, independent rater trained in the procedure but unaware of either the full intent of the study or group membership of the samples. When all data was encoded, each language sample was individually run through the SLCA-III program at the LSU Computer Center, producing the frequency counts for the variables described in Appendix E. The resulting numbers were used as the basis for further statistical analysis. This resulted in a total of 192 coded messages from 64 subjects. Lastly, the three messages from each subject were merged to form an
aggregate message for each subject for use as an informal validation sample for the subsequent discriminant function analysis and for possible use in another study using differing analysis procedures. This aggregate message was also run through the SLCA-III program, yielding scores for the 36 variables.

**Statistical Analysis**  After the numbers portion of the SLCA-III program compiled the raw scores for the variables, each variable was subjected to a univariate Analysis of Variance (ANOVA), with GROUP classification (DEPRESSED vs. NON-DEPRESSED) and sample STIMULI (POSITIVE, NEGATIVE or OPINION) being treated as main effects in a repeated measures analysis. When significant differences for the main effect-STIMULUS were found, Duncan's Multiple Range Test was used to determine significant differences among the group means. Univariate analysis was chosen rather than multivariate procedures because of the interdependence and highly correlated nature of the variables. Finally, a forward stepwise multiple discriminant function analysis (Klecka, 1980) was done to determine if correct classification could be attained using the SLCA-III variables. The resulting classification function was informally validated on the aggregate messages. Results are presented in the next section.
RESULTS

For the main effect GROUP, 6 of the 36 SLCA variables were found to be significant and to distinguish Depressed from Non-Depressed subjects. These are:

Qualitative-Quantitative Density (total qualifiers). Non-Depressed persons showed a greater use of qualifiers in general, $F(1,62) = 6.955, p < .02$.

Non-sensed Information Units (abstract nouns). Depressed persons used more abstract nouns, $F(1,62) = 6.719, p < .02$.

Negative Existential Density (negated nouns). Depressed persons used more negated nouns, $F(1,62) = 5.238, p < .05$.

Positive Qualifiers (adjectives & adverbs). Non-Depressed persons used more non-negated adjectives and adverbs, $F(1,62) = 6.990, p < .02$.

Asymmetric Relational Units (intransitive verbs). Depressed persons used a greater frequency $F(1,62) = 4.485, p < .05$, of intransitive verbs which are associated with the passive voice.

Static Density (state of being verbs). Depressed persons used more, $F(1,62) = 4.701, p < .05$, of various forms of the verb "to be".

All of these findings were hypothesized. Several other effects were also hypothesized and were not found to be significant. These will be discussed in the next section.
A summary of all the ANOVA results for the main effect-GROUP is reported in Table 1. Table 2 contains means and standard deviations by group.

For the main effect STIMULUS, 29 of the 36 SLCA-III variables were found to differ significantly (see Table 1). Only the variables that did not show significant differences will be listed here. They are: Negative Existential Density (negated nouns), Positive Authority Perception (proper nouns), Positive Generalized Other references (indefinite pronouns such as "someone", "anyone"), Positive Audience Perception (second person pronouns), Undefined Information Units (unqualified nouns & pronouns), Asymmetric Relat. Units (intransitive verbs), and Assertion Density (use of the indicative mood).

For 16 of the variables showing a significant main effect for stimulus, the only significant difference among means was that the Opinion stimulus differed from the other two (Positive & Negative) which did not differ from one another. All of the other differences will not be presented in text. Table 3 shows the summary of all ANOVAS for the main effect-STIMULUS. Table 4 gives all means and standard deviations by stimulus and shows the results of the Duncan's Multiple Range Tests.

There were no significant interaction of GROUP x STIMULUS effects for any of the 36 variables.
Table 1

Summary of ANOVAS for Main Effect - GROUP

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<th>F</th>
<th>p</th>
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<td>.003</td>
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### Table 2

**Means and Standard Deviations by GROUP**

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<td>SD</td>
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* significant at p < .05 from ANOVA
### Table 3
**Summary of ANOVAS for Main Effect - STIMULUS**

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<th>Variable</th>
<th>df</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
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</tr>
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Table 4

Means and Standard Deviations by STIMULUS

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<td>.2602</td>
<td>.0432</td>
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<td>.0765 b</td>
<td>.0199</td>
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<td>Neg. Exist. Density</td>
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<td>Negated Qualifiers</td>
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<td>.0224</td>
<td>.0150</td>
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<td>Positive Authority</td>
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<td>.0009</td>
<td>.0024</td>
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<td>Negative Authority</td>
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<td>Pos. General. Other</td>
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<td>Neg. General. Other</td>
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<td>.0275</td>
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<td>Positive Self Percept.</td>
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<td>.1099</td>
<td>.0366</td>
<td>.0578 a</td>
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<td>Negative Self Percept.</td>
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<td>.0007</td>
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<td>.0012</td>
<td>.0032</td>
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<td>Neg. Audience Percept.</td>
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<td>.0123 b</td>
<td>.0200</td>
<td>.0225 b</td>
<td>.0295</td>
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<td>.1562 c</td>
<td>.0375</td>
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<td>Defined Inform. Units</td>
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<td>.0413</td>
<td>.3541 b</td>
<td>.0503</td>
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<tr>
<td>Undefined Inform. Units</td>
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<td>.0022</td>
<td>.0020</td>
<td>.0043</td>
<td>.0018</td>
<td>.0044</td>
</tr>
<tr>
<td>Defined Relat. Units</td>
<td>.0787 c</td>
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<td>.0916 c</td>
<td>.0307</td>
<td>.0581 c</td>
<td>.0302</td>
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<tr>
<td>Undefined Relat. Units</td>
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<td>.1707</td>
<td>.0355</td>
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<td>Symmetric Relat. Units</td>
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<td>.1184</td>
<td>.0319</td>
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<tr>
<td>Asymmetric Relat. Units</td>
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<td>Motion Density</td>
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<td>.0354</td>
<td>.1689 b</td>
<td>.0348</td>
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<td>.0430</td>
</tr>
<tr>
<td>Static Density</td>
<td>.0842 b</td>
<td>.0238</td>
<td>.0934</td>
<td>.0272</td>
<td>.0994 b</td>
<td>.0373</td>
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<tr>
<td>Past Time Density</td>
<td>.0996</td>
<td>.0371</td>
<td>.1104</td>
<td>.0430</td>
<td>.0165 a</td>
<td>.0273</td>
</tr>
<tr>
<td>Present Time Density</td>
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<td>.0455</td>
<td>.1391</td>
<td>.0465</td>
<td>.2374 a</td>
<td>.0416</td>
</tr>
<tr>
<td>Future Time Density</td>
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<td>.0131</td>
<td>.0128</td>
<td>.0134</td>
<td>.0300 a</td>
<td>.0184</td>
</tr>
<tr>
<td>Assertion Density</td>
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<td>.0375</td>
<td>.2461</td>
<td>.0258</td>
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<td>.0531</td>
</tr>
<tr>
<td>Conditional Density</td>
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<td>.0162</td>
<td>.0130</td>
<td>.0324 a</td>
<td>.0246</td>
</tr>
</tbody>
</table>

Note. * significant at p < .05 from ANOVA
Note. Means with "a" beside only significant difference at p < .05 from Duncan's Multiple Range Test
Note. Means with "b" beside differ only from one another but not from the third as above
Note. Means with "c" beside all differ from one another
The 6 SLCA-III variables for the POSITIVE and NEGATIVE stimuli which showed significant differences were entered as predictor variables into a forward stepwise discriminant function selection method using the minimum Wilk's Lambda to control the selection. The .05 level of $\chi^2$ was chosen to control the Wilk's Lambda with the minimum F-to-enter set at 1.00 and F-to-remove set at 0.0, a standard set of parameters. By this procedure three variables, all from the POSITIVE stimulus were chosen. The summary of the stepwise analysis is included in Table 5 with the classification functions in Table 6. These variables are: Static Density, Negative Existential Density, and Non-sensed Information Unit Density. The derived function correctly classified 71.875% of the cases. Given the 50% probability of correct classification by chance, this finding is significant, $\chi^2 (1, N = 64) = 12.3, p < 0.0005$. Table 7 shows this classification matrix. As an informal validation procedure, the derived classification function was run on the merged aggregate messages (the combined output for each subject from all three stimuli) and correctly classified 65.625% of the subjects, a figure also significant, $\chi^2 (1, N = 64) = 7.27, p < 0.01$.

Table 8 gives the classification matrix for these combined messages.
### Table 5

**Summary of Forward Stepwise Discriminant Function Analysis**

<table>
<thead>
<tr>
<th>Variable</th>
<th>F to enter</th>
<th>Wilk's LAMBDA</th>
<th>p</th>
<th>df</th>
</tr>
</thead>
<tbody>
<tr>
<td>Static Density</td>
<td>10.290</td>
<td>.853936</td>
<td>.002</td>
<td>(1,62)</td>
</tr>
<tr>
<td>Neg. Exist. Dens.</td>
<td>5.236</td>
<td>.799969</td>
<td>.025</td>
<td>(1,61)</td>
</tr>
<tr>
<td>Non-sensed Inform.</td>
<td>1.084</td>
<td>.789848</td>
<td>.301</td>
<td>(1,60)</td>
</tr>
</tbody>
</table>

### Table 6

**Classification Functions**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Non-Depressed</th>
<th>Depressed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Static Density</td>
<td>138.9463</td>
<td>171.0917</td>
</tr>
<tr>
<td>Neg. Exist. Density</td>
<td>80.1082</td>
<td>88.9728</td>
</tr>
<tr>
<td>Non-Sensed Inform.</td>
<td>45.8129</td>
<td>57.3084</td>
</tr>
<tr>
<td>Constant</td>
<td>-18.4589</td>
<td>-25.0562</td>
</tr>
</tbody>
</table>

### Table 7

**Classification Matrix**

<table>
<thead>
<tr>
<th>Group</th>
<th>N</th>
<th>Predicted Number of Cases</th>
<th>Percentage Correct</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Non-Depressed</td>
<td>Depressed</td>
</tr>
<tr>
<td>Non-Depressed</td>
<td>32</td>
<td>22</td>
<td>10</td>
</tr>
<tr>
<td>Depressed</td>
<td>32</td>
<td>8</td>
<td>24</td>
</tr>
<tr>
<td>Totals</td>
<td>64</td>
<td>30</td>
<td>34</td>
</tr>
</tbody>
</table>

*Note.* $X^2 (1, N = 64) = 12.30, p < .0005
Table 8

Classification Matrix - Aggregate Messages

<table>
<thead>
<tr>
<th>Group</th>
<th>N</th>
<th>Predicted Number of Cases</th>
<th>Percentage Correct</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Non-Depressed</td>
<td>Depressed</td>
</tr>
<tr>
<td>Non-Depressed</td>
<td>32</td>
<td>15</td>
<td>17</td>
</tr>
<tr>
<td>Depressed</td>
<td>32</td>
<td>5</td>
<td>27</td>
</tr>
<tr>
<td>Totals</td>
<td>64</td>
<td>20</td>
<td>44</td>
</tr>
</tbody>
</table>

Note. $\chi^2 (1, N = 64) = 7.27$, p. <.01
The first results to be discussed will be those dealing with the main effect STIMULUS. For 16 of the 29 variables that were found to differ significantly by stimulus, the result of the Duncan's tests showed that only the OPINION stimulus differed from the other two, which did not differ from one another. This suggests that the OPINION stimulus was qualitatively different from the other two. It is essentially an emotionally neutral, conceptual and abstract topic calling for clearly different types of thoughts and responses than either the POSITIVE or NEGATIVE stimuli which asked for personal, emotionally significant, past-based recollections and evaluations. It might even be assumed that most persons found it boring and were less interested in it because of all three stimuli it received the lowest total word count. For the other 13 significant differences, the results were what would be expected from the content of the stimuli, positive events called for positive types of variables, etc. While this finding addresses the discriminative ability of the SLCA-III program to distinguish among differing types of message input, it adds little to the discussion of differences between depressed and non-depressed subjects. Had there been any significant interactions of GROUP x STIMULUS where depressed persons responded one way to a stimulus and non-depressed another, further discussion of this effect would be warranted, tapping, as it
were, some difference in cognition or perception that varied by group and stimuli between depressed and non-depressed persons.

Cummings and Renshaw (1979) recognized the sensitivity of the program and the problems of interpretation when they said, "Earlier versions, though successful, tended to generate more data than researchers could interpret. One should have a strong theoretic rationale for the study of language in the communication setting." Because this study was exploratory in nature, the stimuli used were chosen to generate a language sample from each subject that was as wide as possible, yet manageable enough for coding and analysis. Additional research can more narrowly focus the stimuli along theoretical lines. A researcher may, for example, more completely test some of Beck's hypotheses, by developing stimuli which deal with a subject's description of him/herself, how he/she perceives his/her future, an opinion of the state of the world in general, an opinion of his/her relationships with others, and so forth. The list becomes endless. Some of these topic might possibly generate the interaction effects that would be most useful.

The primary focus of this study concerned the main effect GROUP and the hypothesized differences in cognition that were to be reflected and detectable by differences in language syntax. The general hypothesis, that differences would be found between depressed and non-depressed subjects, is supported. Six of the 36 SLCA-III variables were found to
differentiate depressed from non-depressed subjects. All six of these variables were among those hypothesized to be significant. Also, while the following result will not be discussed in detail because it is not part of the original design of the study and statistical conventions do not allow such an exclusion on a post hoc basis, when the OPINION stimulus was removed from the analysis, 12 of the 36 variables were found to differentiate depressed persons from non-depressed. However that finding can wait for a replication study.

The first specific hypothesis was that non-depressed persons would show greater use of qualifiers, suggesting greater richness and diversity of experience. This hypothesis was borne out with non-depressed persons using more qualifiers. This finding is in partial replication of Andreasen and Pfohl (1975) who found that depressives used fewer adjectives than manics did. Because they had no control group and their groups were of mixed sex and varied widely in age, the results cannot be compared directly but the finding is in the same direction.

The second specific hypothesis was that depressed persons would show greater use of personal pronouns. This hypothesis was not supported and it appears due to the nature of the stimuli. Asking subjects to describe a personal experience is quite likely to load for personal pronouns, while asking about an abstract concept might not load for enough. Perhaps this hypothesis could be more
adequately researched if a spontaneous sample of conversation were taken in an observed interaction as through a one-way mirror.

The third specific hypothesis was that depressed persons would show a greater use of generalized other (indefinite third person) pronouns suggestive of cognitive vagueness. This hypothesis was not supported in this study although it was a minor finding in the Andreasen and Pfohl study. Here again the specific nature of the stimuli, calling for specific personal events, might mitigate against the use of such indefinite pronouns. Andreasen and Pfohl generated their language samples in part from proverb interpretations and from what they termed "spontaneous free speech" taken in response to general questions such as "Tell me about your family" or "What are you like?" While such questions are likely to generate useful samples if investigated systematically, such was not the case in their study. They simply used the first 80 words of proverb interpretation and the first 320 words of speech. Further research might use a sample generated from spontaneous observed conversation to test this hypothesis of greater use of indefinite third person pronouns by depressed persons.

The fourth specific hypothesis was that depressed persons would show a greater usage of unsensed information (abstract nouns), types of vague non-sensory items that are part of Beck's hypothesized schemas which the depressed person would want to keep from direct
contradiction. Because the information is abstract and non-sensory it is less subject to objective verification. This hypothesis was supported. Depressed persons did use more of these abstract nouns than their counterparts. However, it was also thought within this hypothesis that non-sensed qualifiers would be higher for depressed persons for the same reason. The results did not support this hypothesis. The two groups did not differ on non-sensed qualifiers, perhaps because of the previous finding of non-depressed subjects using greater numbers of qualifiers generally.

The fifth specific hypothesis was that depressed persons would score higher in non-motion (state of being) verb usage, that is use of the verb "to be" and its forms such as "I am, It is, are, was," etc. The use of this verb is associated with states of being rather than action, traits rather than skills. Korzybski (1933) wrote extensively of the types of logical errors that ensue from the use of "to be" and his student and colleague Bourland (1965) proposed a language he called E-Prime which does not use any form of "to be". For example, the connotations between the statement "I failed." and "I am a failure." are significantly different, although the general meaning is thought to be the same. This hypothesis was supported by the data. Depressed persons did use more of these state of being verbs. This finding is also a partial replication of the Andreasen and Pfohl finding where depressed subjects used more state of being verbs than did manics.

The sixth specific hypothesis was that depressed sub-
jects would score higher in all areas of negative existence and conversely non-depressed subjects would score higher in measures of positive existence. This category of variables is a subtle and complex one and essentially deals with an epistemological point of view. Is information known by affirmation or by negation? A simple example of this is when someone responds to a question of health with "not bad". Here a positive response is worded negationally. A more complex and stilted reply that illustrates the point might be "My dysfunctions are not intolerable." Fisher (1985) discussed this use of negated epistemology as a form of defensive stance and he went so far as to relate various forms of negation to the classical defense mechanisms of denial, displacement, and repression. While such an extensive or radical interpretation is not proposed here, it is suggested that negation is related to a negative manner of relating to the world as proposed by Beck. Fisher argued that this negative epistemology should be visible in syntax when he said, "Because these formulations are in terms of syntax, the structure of a person's natural language is to some extent indicative of defensive dynamics, the negation of meaning may be accomplished by syntactic adjustments, and different kinds of surface displays of language may reflect negations which mark defensive propositions." (p. 191) This hypothesis was partially supported since depressed persons showed higher usage of negative existential density (negated nouns) and non-depressed subjects used a greater
number of positive existential qualifiers (adjective and adverbs). This relationship was found in only 2 of the 6 variables of this class. However, this relationship of negative existential density and positive qualifier density was also found by Edelman (1981) to distinguish real from simulated suicide notes.

The seventh specific hypothesis was that depressed persons would score higher in asymmetric verb usage. This is the use of intransitive verbs, essentially associated with the passive voice. It was hypothesized that depressed persons would use the passive voice more frequently suggesting a more "victim-like" orientation to the world. While this hypothesis is not explicitly stated in Beck's formulations, it can be inferred from his notion of the negative view of self and the world. Also this hypothesis is in line with Seligman's (1974) formulations of learned helplessness in depression. This hypothesis was supported by the data with depressed persons using a greater number of asymmetric constructions than did the non-depressed persons.

The eighth and last hypothesis was that Perceptual-Cognitive Activity (total word usage) would be lower for depressed subjects reflecting general psychomotor retardation and overall lowered activity level. This hypothesis was not supported. Perhaps the specific instructions to speak for 3-5 minutes on a topic overcame other factors and determined the total word output. This might be another variable that can be better tested in observed spontaneous conversations.
Overall, six of the eight specific hypotheses and the general hypothesis were supported by the results. These findings are encouraging and suggest the potential utility of future research. However, it should be remembered here that this study used females only. Replication and comparison with a male group is needed before generalization. Secondly, this study dealt with levels of depression found within a fairly well functioning group of subjects, college students. Further work with clinical populations is needed for more far-ranging generalization of results. However, some speculation is in order.

The finding that the discriminant function correctly classified almost 72% of the cases and then when run on the combined aggregate messages correctly classified almost 66% of the subjects suggests that some form of syntactic analysis might prove to be a useful adjunct to other forms of testing, particularly in situations where malingering, or other forms of dissembling are possible. Because of the complexity and time intensive nature of these procedures, syntactic analysis is not meant to replace instruments such as the Beck Inventory but might prove useful in complementing the types of information obtained. A possible future study might be to have non-depressed subjects speak "as if" they were depressed and compare the results with a depressed group. It would be interesting to see if someone seeking to fake depression would be able to consciously alter syntax without mistakes. A study by Chapman (1976) using the SLCA
program reportedly was able to determine deception during an analysis of Richard Nixon's speeches. A second possible use of syntactic analysis as an adjunct to traditional clinical assessment might be analysis of message samples generated from Thematic Apperception Test (TAT) cards (Morgan & Murray, 1935). While the TAT has been in use for fifty years, systems of scoring and interpretation are cumbersome and unreliable and therefore little used. A syntactic analysis might provide a more reliable alternate means of interpretation, especially since the SLCA-III program is being modified for use on personal computers (Cummings, 1991, personal communication).

Now that syntactic analysis has shown that differences between depressed and non-depressed subjects can be detected syntactically, further research can be done to refine the differences and compare the findings with the cognitive theories of Beck and others. This would entail more carefully crafting the stimuli that generate the message samples. For example, to further test Beck's conceptions stimuli asking subjects to assess their futures, themselves, their skills, human nature, how they perceive others to see them, their faults, the list is large but could be constructed to further explore the parameters of Beck's negative triad and varying schemas.

One of the tenets of this paper is that language usage reflects and is interwoven with cognition. The finding that syntax differs with the cognitive components attributed to depression suggests that syntax and language analysis might
provide a reliable and replicable way of cataloging and measuring any number of other cognitive states or processes.

Another interesting use of SLCA-III analysis might be as an adjunct outcome measure for therapeutic interventions, one that might prove less biased by halo effects and positive therapeutic experiences and good relationships, etc. Samples could be taken going in to the intervention and compared with the sample taken at the end of the intervention. In this same vein, syntactic analysis could be used as intermediate progress measures taken at points throughout the intervention to measure change. Of particular interest might be Beck's (Beck et al., 1979) cognitive interventions. Similarly, training in alternate linguistic usage more in line with "healthier" patterns might be undertaken to see if the relationship works in both directions and if improvement can be enhanced with syntactic training.

In other areas of psychopathology and developmental disability, syntactic analysis might also have some utility. Anecdotal evidence collected by this experimenter has found a number of cases where a referral to "rule out" mental retardation is made in cases where intellectual functioning as measured by standard intellectual tests is so low as to warrant the diagnosis but access to developmental, scholastic, and vocational records is so poor as to make accurate diagnosis according to the developmental criteria all but impossible. The anecdotal evidence suggests that the language patterns of those persons suffering from schizophrenia, etc,
are different from true developmentally disabled persons but SLCA-III analysis might be able to corroborate this impres-sion. In the same vein syntactic analysis of cases of head trauma or other neuropsychological dysfunction might prove useful as both a diagnostic and rehabilitative tool. Perhaps it could even be used in a manner similar to EEG's where an extensive sample could be taken from persons at risk such as is now done with athletes, etc. and subsequent to any injury or incident the sample could be compared with a post incident sample. Syntactic analysis might even have some utility in the study of memory dysfunctions related to alcoholism or Alzheimer's disease.

Ultimately syntactic analysis might provide the basis for more reliable and stable taxonomic systems than the current *Diagnostic and Statistical Manual of Mental Disorders* (DSM's) now in use, based on linguistic and cognitive information processing approaches.

For the time being the implication of this study is that depressed and non-depressed persons can be differentiated by syntactic analysis in what could prove to be a reliable and replicable method. Syntactic analysis by computer might prove the tool that can quantify and reliably measure any number of aspects of cognitive models in any number of areas, not just clinical applications. Cummings and Renshaw (1979) foreshaw just such use for this program when they said, "It is doubtful that an analysis of language behavior alone will reveal a one-for-one isomorphism with all mental and environmental activity; nevertheless, there seem
to be important perceptual-cognitive properties accessible through a 'psychogrammatical study' of language behavior. If a coherent set of language properties can be substantively and validly related to human experience we may be able to trace profiles of messages."(p.295) This study is one such attempt to validly relate an aspect of human experience, depression, with the coherent set of language properties contained in SLCA-III. The finding that syntax does differ in a state theorized to show differences of cognition allows for further exploration of any manner of theorized cognitive processes through the analysis of language and specifically the analysis of syntax.
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APPENDIX A.
COGNITIVE SCIENCE

This section will discuss in more detail, although again briefly, some of the current issues in the study of cognition. As volumes of books have been written on this subject, I cannot hope to do it justice here. My purpose here is to provide an outline or overview of some of the relevant issues as they suggest the train of thought in the present study.

While the study of elements of cognition is as old as the study of psychology itself and of course has its roots in the same philosophical underpinnings as that discipline; the blossoming discipline known as cognitive science is of fairly recent derivation and touches on or borrows ideas, methodology, and constructs from such diverse academic fields as: philosophy, linguistics, computer science especially artificial intelligence, psychology, information-processing, anthropology and sociology; with such mathematic areas as game theory, heuristics and stochastic processes thrown in. Sharkey (1986) defined the discipline of cognitive science as, "interdisciplinary, it uses the computational metaphor and its subject matter is the study of cognition/mind/thought/intelligence." Simon (1980) described it as, "the domain of inquiry that seeks to understand intelligent systems and the nature of intelligence." Miller, Polson and Kintsch (1986) pointed to
the eclectic and interdisciplinary nature of cognitive science when they said it may be viewed as, "the collection of several pairwise intersections among anthropology, computer science, linguistics, neuroscience, philosophy and psychology." Pylyshyn (1984) argued that "there may well exist a natural domain corresponding to what has been called 'cognition' which may well consist of a unifying set of principles."

Many of the areas studied in cognitive science would be familiar to members of the respective parent disciplines. Cognitive psychologists would be familiar with the study of memory and recall, perception, and pattern recognition. Linguists would recognize, syntactics and structures, discourse analysis and parsing systems. Other disciplines would find familiar conceptions as well. All of these areas are outside the scope of this paper and will not be addressed. However there is one central subject or issue that even is controversial among proponents of cognitive science and it is this issue, the concept of "representation" which is central to the thesis of this paper and has consequences for cognitive psychology and any and all cognitive theories of psychopathology.

The basic tenent of representational theories is that through certain processes (either unspecified or specified depending on the theorist) an organism constructs "representations" of the environment, reality, etc and it is these representations, along with decision rules etc that form the contents and processes of cognition. Such
representations are highly implied in the classic S-O-R conceptions of learning theory. Garfield (1990) stated, "The concept of representation and its allied concepts — belief, perception, etc. — lie at the heart of cognitive science. For common to all noneliminativists accounts of psychology, of the nature of mind, and of linguistic behavior is the thesis that humans and other cognitively characterizable organisms manipulate representations. Most of the interesting substantive debates get going when we ask just what those representations are and how one could build them out of blind matter" (p. xxiii).

Again, the topic of representation is much too large for complete analysis here. Below are presented some additional points of view regarding representation and cognition and one particular viewpoint, that of Jaynes (1976) will be discussed in some detail because of his contention that it is through linguistic processes that this representation is formed.

Bandler and Grinder (1975) argued that, through a process that they call modeling (not in the imitative sense as used by Bandura, but in the engineering sense), an individual builds up a symbolic representation of the environment with decision rules to interpret the incoming information. They state, "We create a map or model of the world which we use to generate our behavior. Our representation of the world determines to a large degree what our experience of the world will be, how we will perceive the
world and what choices we will see as available to us as we live in the world". (p. 7)

Jaynes (1976) concurred with this position. He also compares such an analogical representation with a map. He states that this map of cognition allows for the condensation and selective excerption of the essential features while at the same time it allows non-essential features to be ignored. As such, it provides for selective awareness and perception. The cognitive map, like its physical counterpart, allows for the anticipation of future consequences and the accurate remembrance of past travels. To complete the metaphor, an inadequate map will lead to mistakes as will a flawed cognitive model.

Mandler (1985) stated, "Representation in the widest sense of the term is the central issue in cognitive psychology. The concept of representation is intimately tied to and may be possibly identical with, the issue of useful theory. Representational systems are the theoretical constructs that are postulated as responsible for (that cause or generate) the observable thoughts, actions, etc. of the organism." (p. 11)

Minsky (1986) described this process, stating, "How do the signals that come to us give rise to our sense of "being in" the outside world? The answer is that this sense is a complicated illusion. We never actually make any direct contact with the outside world. Instead we work with models of the world that we build inside our brains." (p. 110)

Mahoney (1974) in looking at a a particular form of representa-
tional analysis, the information processing model, stated, "The information processing theorist takes a basic view of man as an active processor of experience rather than a passive or functionally vacuous composite of stimulus response linkages. The organism is seen responding not to a 'real world' but to his own mediated rendition of it. This mediation often takes the form of stimulus selection, distortion and transformation." (p.125)

Building on this definition of cognition, Jaynes described what he perceived to be six unique properties of human consciousness that are a direct result of the metaphorical origin of cognition. These are:

Spatialization. The illusion of an inner "mind space". In this process, spatial reference becomes the metaphor for a number of concepts, of which the most pronounced is the impression of an inner space. When we see with our "mind's eye" or "hear ourselves think", we do so in this illusory mind space. Also our understanding of time is based on the metaphor of space or distance.

Excerpton The process of attending to only limited elements of the environment at any given time.

The Analog I. A subset of the analogical system which involves the perception of self as an actor with specific properties. Jaynes states of this property,

A most important feature of this metaphor world is the metaphor we have of ourselves, the analog I, which can move about vicariously in our imagination, doing things that we are not actually doing. ... We imagine ourselves doing this or that and thus make decisions on the basis of imagined outcomes that would be impossible if we did not have
an imagined self behaving in an imagined world. (p. 63)

The metaphor Me, Another subset of the cognitive analog which involves the perception of the self as an object to which things happen;

Narratization. The process whereby life experiences are woven into a unified whole and given personal meaning; Jaynes describes this as, "seeing ourselves as the main figures in the stories of our lives." (p. 63)

Conciliation The process whereby new information is categorized and interpreted in patterns that are consistent with previous information. Jaynes states,

> What I am designating by conciliation is essentially doing in mind-space what narratization does in mind-time or spatialized time. It brings things together as conscious objects just as narratization brings things together as a story. And this fitting together into a consistency or probability is done according to rules built up in experience. (p. 65)

Thus, conscious thought is a process rather than a set of things, according to Jaynes. It operates by creating analogies, analog space, and an analog I which is capable of operating in that space. By using the features described above, cognition attributes meaning and order onto the environment and behavior. Nothing can exist in the thought analog that did not exist in behavior first, although as an analog its correspondence to the original act need not be perfect. Jaynes reiterated the importance of linguistic or symbolic representation by saying, "... consciousness is this invention of an analog world on the basis of language, paral-
ling the behavioral world even as the world of mathematics parallels the world of quantities of things..." (p.66)

The cognitive shemata of Beck and his specification of types of logical errors in the syndrome of depression are one example of a representational system and its subjective consequences for the individual.

REFERENCES

APPENDIX A.


APPENDIX B.
THE STUDY OF LANGUAGE

This section will provide some background on the topics of linguistics and some of the ways in which language has been studied including the division of language analysis into the areas of semantics, syntactics, and pragmatics, of which the primary focus of this study is syntactics and how they interrelate with cognitive schemas as postulated by Beck in depression. Shapiro (1979) in looking at the appropriateness of clinicians studying language stated, "Language is therefore ideal as a dimension for study in elaborating what is most characteristically human and has the virtue of a developmental sequence.... is a complex organization which involves motor control, cognitive structuring and social determinants in influences". (p12.).

The first question concerning linguistic analysis is just what differentiates a language from another system of signs or symbols and therefore what differentiates human language from communicative signals as might be used by other species.

Hockett (1960) in a comparative analysis of the communication systems of eight species listed 13 features that make up language. These included: 1) vocal auditory channel, 2) broadcast transmission and directional reception, 3) rapid fading, 4) interchangeability, 5) total feed-
back, 6) specialization, 7) semanticity, 8) arbitrariness, 9) discreteness, 10) displacement, 11) productivity, 12) traditional transmission, and 13) duality of patterning. Only human communication uses all 13. Of these 13, the features of semanticity, displacement, and productivity are the most intimately involved with the ability of language to reflect and define the complexity of human cognition.

**Semanticity** is the process whereby a word becomes a symbol for an object. This process is so complete that a thing and its name become virtually inseparable in cognition. **Displacement** is the ability of language to represent objects and events that are distant in both space and time. **Productivity** refers to the ability of language to represent, conceptualize, and manipulate an almost infinite number of sentences, resulting in concepts whose referents have no other form of existence except as linguistic reference, (i.e., "freedom", "love", "unicorn"). The above approach to the study of language is concerned with the attributes or features of language as a communicational system.

Morris (1964) subdivided the study of language into three broad areas: semantics, syntactics, and pragmatics. Semantics refers to the study of the meaning of words and the relationships of words as symbols to the referents they symbolize and represent. Syntactics refers to the study of the language and the classes of symbols which are used and their interrelationships with one another. Pragmatics refers to the relationship between the symbols of language or the symbolic process to the uses to which these symbols
are put. Pragmatics refers to the application of language and includes such topics as prosody (the melody of language pitch), irony, sarcasm, and para-linguistic features such as body language, gestures, tempo, facial expression, etc.

The area of semantics has been a very fertile one for research and is an extremely complex area of linguistic analysis. While the question of the relationship of words to their referents is an important one with broad and profound implications for the study of cognition, its sheer complexity precludes an adequate discussion in this paper. However, within the area of meaning are the concepts of denotation and connotation, referential and emotive meaning (Ogden & Richards, 1946), componential analysis, polar attributes (Deese, 1964), and lexical versus grammatical meaning. As one example of the complexity of semantic analysis, Deese (1970) has estimated that an array having fifty features would be necessary to define meaning. Further, he believes such an array would define the number of "thinkable concepts" as in excess of $2^{50}$ or over 1,000 trillion. In an effort to scale down this impossible number of dimensions for meaning, Osgood, Suci, and Tannenbaum (1957) developed the semantic differential. They had subjects rate their impressions of words along a limited number of polar scales. Then they analysed these impressions using a factor analysis from which they derived three factors that accounted for a large portion of the variance. These factors are an evaluative (good-bad) component, an activity (active-passive)
component and, a potency (weak-strong) component.

The areas of semantics and pragmatics will not be further discussed in this paper. This study deals with essentially syntactic elements of speech. However, these lines of demarcation between semantics, syntactics, and pragmatics are arbitrary and fluid with a great deal of crossover, as discussed in the body of the introduction of this paper. The above topics were provided to allow some background and points of reference to the present study.

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(Originally published, 1923)

APPENDIX C.

LANGUAGE AND PSYCHOPATHOLOGY

As discussed previously in several places, many theorists have postulated that language behavior is a significant factor in cognition and by extension, a factor in psychopathology. Further, as cognitive models become more complex and perhaps more precise, taxonomic systems based on cognitive or linguistic models might prove to be more reliable and useful than current categories of psychopathology. This viewpoint is not new however. In fact, researchers dating back to the turn of the century have studied and speculated upon the relationships between psychopathology, cognition, and linguistic and verbal behavior. The following section is not meant to be all inclusive but to point to areas of research previously examined in this area of linguistic behavior as it relates to so-called psychopathological conditions.

Vetter (1969), summarizing this area, cited the work of Southard (1916) who stated that standard grammatical categories may prove to be a more accurate and reliable method of diagnostic classification than existing categories. Busemann (1925, cited by Vetter, 1969) developed what he called the Action Quotient (AQ) which he attempted to correlate with ratings of emotional stability. White (1926, cited in Vetter, 1969) and Von Domarus (1925, cited in Vetter, 1969) did considerable examination of the language patterns of
Eisenson (1932) was the first to attempt to classify "linguistic profiles" for manic depressive illness and schizophrenia. He was interested in a number of factors such as rate of speech, content, flow of speech, pitch, and levels of abstraction. He stated, "A disorder in the use of speech of any type or degree reveals a disorder in personality." (p.166).

Newman and Mather (1938) attempted a highly sophisticated analysis of language behavior in manic-depressive illness and demonstrated clear distinctions between three syndromes: classical depression; states of dissatisfaction, self-pity and gloom; and manic syndromes. They used sixteen categories of speech elements including articulation, pitch range, tempo, syntactic techniques, and style level.

Some of the earlier work that focused on syntactic elements of speech looked at verb-adjective ratios (Balken & Masserman, 1940; Fairbanks, 1944; Mann, 1944; Lorenz & Cobb, 1953; Benton, Hartman & Sarason, 1955) and pronouns (Fairbanks, 1944; Mann, 1944; Goldman-Eisler, 1954; Conrad & Conrad, 1956).

Andreasen and Pfohl (1976) did a complex analysis of the speech of patients with affective disorders using elements of both syntax and content. Content analysis was done using the Type-Token Ratio, a measure of the richness or conventionality of vocabulary developed by Johnson (1944). Syntactic analysis was done by classifying words
into one of seven parts of speech with twenty-six subdivisions. Subjects were 31 inpatients classified as either manic (N = 16) or depressive (N = 15). Nine of the manic subjects and thirteen of the depressed subjects were female. Significant differences were found between the two groups. Depressed persons were classified as more vague but only in that they used more state of being rather than action verbs. Manics used more nouns in general, and, specifically, more concrete nouns. Depressives used more qualifiers and were therefore thought to be more tentative. Depressives also made more personal references. In the area of content analysis, manics expressed more concern with power and achievement, while depressives expressed more overstatement and generalization, a finding which would support at least one of Beck's hypotheses.

This study ranks as one of the most ambitious of the attempts to examine language behavior in the affective syndromes. However it is seriously flawed in a number of areas. First, there is no control group. Secondly, there was considerable diversity in the sample group in terms of age, educational level, and gender; all factors found by Cummings and Renshaw (1979) to effect linguistic usage.

These studies of language behavior and psychopathological conditions have all used both traditional grammatical variables and standard taxonomies of psychological conditions. However, some of the promise of using cognitive or cognitive-linguistic analysis is in discovering new ways of examining old issues.
Sanford (1942) expressed many of the concerns of what has become current psycholinguistics and specified what would become one of the critical issues of analysing language when he said:

If the investigation of the linguistic side of personality is going to amount to a great deal, the problem of choosing and defining significant variables must be met and solved. Grammatical categories are available but they are not psychologically conceived and may not be of maximal use in the psychological study of language. ... Researchers have shown that the grammatical categories are useful in the study of speech. But there is no evidence that they are the most useful categories or that a better way of classifying linguistic phenomena cannot be found. (p. 831).

Sanford's criticism is a valid one. But it must be remembered that the standard grammatical categories are themselves an artificial invention, designed for the classification of language usage in a more philosophical light, and then refined to deal with the stylistic concerns of literature. If these grammatical categories can be adapted to psycholinguistic investigation, so much the better. If not, they at least serve as a beginning point of examination.

The analysis of the content of speech as it relates to people suffering from various pathological conditions has long been an area of intense interest. However, the number of thematic classifications for language content seems to be as large as the number of etiological theories used to explain a given psychological disorder and little in the way of consensus has been reached in this area. Among the most well known and extensively researched are the Content
Analysis Scales developed by Gottschalk and Gleser (1969, 1964). What their work implies is that at some point a complete diagnostic battery should include 1.) some form of a content analysis or thematic study 2.) the syntactic analysis as proposed in this study and 3.) some profile of the paralinguistic features, as well. These three areas would provide a fairly complete profile of cognition as assessed by linguistic means. However, such a comprehensive diagnostic battery, while one of the ultimate goals of this researcher, is a number of years away and would require significant advances or standardization in the measurement of paralinguistic features; topics that are outside the scope of the present study.

REFERENCES

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APPENDIX D.

DEPRESSION: DESCRIPTION AND THEORIES

The history of the syndrome of depression is a long one. It has been discussed and recognized in all nations since ancient times. Since the time of Hippocrates and before, numerous explanations have been offered. The term, melancholy, is the result of one such explanation. In Greek melancholia means black bile, the bodily humour thought to be responsible for the affliction. Adolph Meyer in 1904 first suggested the use of the term depression.

Today the descriptions and terminology used to define depression are varied and ambiguous although the proportion of the problem is not. Beck, Rush, Shaw, and Emery (1979), quoting a National Institute of Health report (Secunda, Katz, Friedman & Schulyer; 1973), estimate that at least 12% of the adult population have had or will have experienced a depressive episode of sufficient magnitude to require treatment and that, during any year 15% of all adults suffer from significant depressive symptoms. In an earlier NIMH report, Williams, Friedman, and Secunda (1970) state that between four and eight million Americans are in need of professional care for their depressive illnesses. It must be emphasized that the costs of depression are not measured in terms of suffering or painful emotion alone. Williams, et al., further state that one of every two hundred persons
affected by a depressive illness will die by suicide. Solomon and Patch (1971) reported that for the year 1968 there were 21,372 suicides in the United States. Schneidman, Farberow and Litman (1970) stated that approximately 22,000 people commit suicide each year and that this estimate is likely to be low because of the difficulty in determining intent in many accidental deaths. Williams et al. further estimated that the financial consequences of depression, in terms of treatment costs and lost productivity are between 1.3 and 4.0 billion dollars annually.

Definitions of Depression

Depression is clearly a problem of epidemic proportions but what is depression? The problem of defining and categorizing depression is a complex one. Boyd and Levis (1980) stated "Currently used categories have classified this syndrome according to whether the eliciting stimulus is internal or external (endogenous vs. exogenous), the nature of the response pattern ( autonomous vs. reactive), the level of anxiety (agitated vs. retarded), the occurrence of mood swings ( unipolar vs bipolar), and the level of reality testing (psychotic vs. neurotic). "

The specification of the symptoms of depression is no easier. Levitt and Lubin (1975) concluded that almost every symptom known to psychiatry has been included in the depressive syndrome by some investigator. Akiskal and Mckinney (1975) stated, "The most common and most obvious symptoms of depression are what are commonly called depressive affects; grief, despair and guilt in varying degrees and combinations.
Not only are these affects painful in themselves, they are also often associated with an inability to function normally or with self-injurious and even self-destructive tendencies. This description focuses on the affective element of depression. Indeed, depression is listed in the Diagnostic and Statistical Manual of Mental Disorders of the American Psychiatric Association (DSM-III-R, 1986) as an affective disorder. However the complete diagnostic criteria for depression list a number of non-affective symptoms, among them:

a) Insomnia or sleeping too much. (b) Low energy level or chronic tiredness. (c) Feelings of inadequacy. (d) Decreased effectiveness or productivity at school, work or home. (e) Decreased attention, concentration or ability to think clearly. (f) Social withdrawal. (g) Loss of interest in or enjoyment of sex. (h) Restriction of involvement in pleasurable activities or guilt over past activities. (i) Feeling of slowing down. (j) Less talkative than usual. (k) Pessimistic attitude toward the future or brooding about past events. (l) Tearfulness or crying. (m) Recurrent thoughts of death or suicide. (p. 222)

These above criteria are in addition to the predominant affective state of sadness or guilt.

**Theories of Depression**

Just as the description of depression is diverse and varied, so are the theories that have been proposed to explain its causes. While the approaches suggested over the centuries have ranged from imbalanced bodily humours to loss of positive reinforcement, Akiskal and Mckinney (1975) have summarized 10 major contemporary viewpoints of depression.
They have classified these viewpoints into five major schools of thought.

The first is termed the psychoanalytic school, although this term suggests a more limited definition of models than is actually included. A more apt term might be mediational models. Listed here are the retroflexed anger model identified by Abraham (1924, 1911, cited by Akiskal & McKinney, 1975), the object loss model identified by Rado (1928), Spitz (1946) and Bowlby (1960), the loss of self esteem model proposed by Bibring (1965, cited by Akiskal & McKinney, 1975), and the negative cognitive set or cognitive theory of Beck (1979, 1964, 1963).

The second school of thought proposed by Akiskal and McKinney (1975) is identified as the behavioral approach. Included here are the learned helplessness model proposed by Seligman (1975) and the variants of the loss of reinforcement model as proposed by Ferster (1973), Lewinsohn (1974) and Lazarus (1974).

The third main school of thought is termed the biological approach. Included here is the biogenic amine or catecholamine model suggested by Schildkraut (1965). Also included under this approach are the conceptions of other researchers who suggest different neurophysiological processes as the cause of depression such as Coppen (1967) who views disturbances in the metabolism of potassium and sodium as a causal factor in depression and Rubin and Mandell (1966) who found an increased level of the cortical steroid,
cortisol, in the brains of depressed patients.

The fourth main school of thought is termed the socio-genic approach which includes only the sociogenic model proposed by Bart (1974, cited by Akiskal & McKinney, 1975). Here, depression is thought to involve a loss of self-esteem that accompanies a loss or confusion of approved societal roles.

The last school of thought identified by Akiskal and McKinney is the existential model exemplified by Frankl (1969). In this model, depression is thought to result from a person's perceived loss of meaning or purpose in life.

The five categories identified by Akiskal and McKinney provide only one way of conceptualizing the psychological state of depression. Boyd and Levis (1980) divided the theories of depression into two major categories; (a) a non-behavioral approach, that includes both the biological and psychoanalytic views, or (b) a behavioral model, which includes the cognitive model identified by Beck, the learned helplessness model identified by Seligman (1975) and the reinforcement models of Ferster (1973), Lewinsohn (1974), and Lazarus (1968).

Boyd and Levis further subdivide the behavioral models into (a) the stimulus-response non-motivational models including the work of Ferster, Lazarus, and Lewinsohn, (b) the stimulus-response motivational models which include the theory of Stampfl and Levis (1967) that depression is the result of both loss of positive affect and the arousal of anxiety, (c) the stimulus-stimulus non-motivational models, which includes Seligman's learned helplessness model.
and (d) the stimulus-stimulus motivational models, of which the best example is Beck's (1979) cognitive model.

The categorization system of Boyd and Levis (1980) reflects their general behavioral orientation. Thus, their taxonomic system represents only a differing way of conceptualizing the process or entity of depression. An equally valid method of categorization might be to divide the theories into those where cognition is implicated in some form, including here the psychoanalytic, existential, sociological and cognitive, those involving biological or physiological processes, and those involving classical or operant conditioning more directly.

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APPENDIX E.

DESCRIPTION OF SLCA-III VARIABLES

The following section describes in greater detail and explains the meaning of the classes and specific variables calculated by the SLCA-III program.

(A) social perception as assessed by measures of nouns and pronouns:

(a) inanimate perception - the relative frequency of subjects and objects of verbs having "thing" quality rather than referring to "person"

(b) audience perception - the relative frequency of subjects and objects of verbs that are second person pronouns, either positive or negated

(c) self-perception - the relative frequency of subjects and objects of verbs which are first person personal pronouns, either positive or negated

(d) generalized-other perception - the relative frequency of nouns and personal pronouns referring to unspecified persons or groups such as "someone, anyone", positive and negated

(e) authority-other perception - the relative frequency of proper nouns which refer to specific persons or groups, positive or negated

(B) measures of sensation assessed by measures of nouns, pronouns, and qualifiers:

(a) sensed information - the relative frequency of subjects and objects of verbs referring to persons, places or things that can be perceived by the senses (concrete)

(b) unsensed information - the relative frequency of subjects and objects of verbs that cannot
be sensed (abstract)

(c) sensed qualifiers - the relative frequency of adjectives, adverbs, and objects of prepositions which refer to qualities that can be perceived through the senses

(d) unsensed qualifiers - the relative frequency of modifiers that cannot be sensed

(C) measures of existence (affirmation or negation):

(a) negative information - the relative frequency of subjects or objects of verbs which have a negation or a prefix such as "un" or "dys"

(b) positive information - the relative frequency of subjects and objects of verbs that have no negation

(c) negative qualification - the relative frequency of qualifiers associated with the words they modify by use of "no" or "not"

(d) positive qualification - the relative frequency of qualifiers not associated with "no" or "not"

(e) negative relation - the relative frequency of verbs having "not" or certain negating prefixes in the verb phrase

(f) positive relation - the relative frequency of verbs which do not have negation in the verb phrase

(D) measures of motion (state of being)

(a) non-motion language - the relative frequency of verbs or verb phrases which are in the form of "to be"

(b) motion language - the relative frequency of all other verbs or verb phrases

(E) measures of disposition

(a) disposition language - the relative frequency of verbs that are in the subjunctive mood or
in the form of a question

(b) assertion language - the relative frequency of verbs in the indicative mood

(F) measures of time

(a) past time - the relative frequency of simple past tense verbs or verb phrases

(b) present time - the relative frequency of simple present tense verbs or verb phrases

(c) future time - the relative frequency of simple future tense verbs or verb phrases

(G) measures of reflexiveness

(a) symmetric relation - the relative frequency of verbs or verb phrases that have an object associated with them (transitive verbs)

(b) asymmetric relation - the relative frequency of verbs or verb phrases that do not have an object (intransitive verbs)

(H) measures of definitionality

(a) qualified information - the relative frequency of information units with one or more qualifiers

(b) unqualified information - the relative frequency of information units without qualifiers

(c) qualified relation - the relative frequency of relations (verbs) with one or more qualifiers

(d) unqualified relation - the relative frequency of verbs or verb phrases without qualifiers

The first class, social perception, refers to the primary focus of the individual's thoughts, whether to self, other persons, things, authority figures, etc.

The second class, sensation, deals with the nature of
the cognitions. Are they tangible and concrete or are they abstract and ephemeral?

The third category deals with existence and can be thought of as the "point of reference" or attitude concerning the nature of information. Thus, this category is concerned with whether the individual perceives the world by way of positive affirmation or whether the existence of things is affirmed by negation.

The fourth class is termed motion, but, more precisely, it is concerned with the state of being or the state of function of relations (verbs). The cognitive nuances that are encoded in either the form "I am courageous" vs. "I act courageously" might be discovered to have significant implications for the study of cognition.

The fifth category is termed disposition and is a measure of the speculative or confident nature of the language used. Conversely, it is also a measure of potentiality or possibility used in language. The subjunctive mood is used to express contingent or hypothetical propositions and is indicated by such words as "may" or "might". Cummings and Renshaw suggest that this category relates to the user's perception of what is unreal or what is fact. It might further assess the level of confidence of the user.

The sixth category is concerned with time and is of considerable importance because of the place that references to past and future times have in many theories of disordered behavior. The seventh category is termed reflexiveness and
it essentially involves measures of intransitive vs. transitive verbs. The use of intransitive verbs is likely to yield measures of the use of the passive voice which is often associated with a victim orientation. Finally, the eighth category is termed definitionality and may also be seen as a measure of confidence or certainty in communication. This category measures the degree to which information units and relations are modified or qualified.
APPENDIX F.
SLCA MANUAL
GUIDE TO SLCA III

INTRODUCTION

SLCA III consists of four parts:
1. the ANALYZE program
2. the NUMBERS program
3. a set of dictionaries used by ANALYZE
4. the DMERGE program used to maintain the dictionaries

ANALYZE reads in the SLCA dictionaries and textual data (messages). By dictionary lookup and positional analysis it produces data for input to the NUMBERS program.

NUMBERS reads the "augmented data" produced by ANALYZE. For each message a one-page report is printed giving the message id, the perceptual-cognitive activity (PCA) and the thirty-five densities NUMBERS has calculated.

Optionally, NUMBERS punches the reported information for each message. This requires six cards per message.

DMERGE can create new dictionaries from old ones. The format of dictionaries will be discussed later.

USING THE ANALYZE PROGRAM

INPUT DATA FOR ANALYZE

The input data for ANALYZE consists of one or more "messages." The first card of each message is used for identification. Begin punching the message text on the next card. Skip one or more blank spaces between each word. You may punch data out to col 80 if you wish. It is best, however to punch stuff out to about col 65 leaving 73-80 for sequence numbers. It saves a lot of trouble if you don't split words across card boundaries. (See $MARGIN option.) At the end of each message punch a slash (/). This may or may not be on a new card.

GENERAL RULES FOR CODING MESSAGES

1. Do not punch hyphens (except in verbs; see next rule), apostrophes, plus signs (except for nouns and pronouns), colons or quotes within messages.
2. Code each verb with a hyphen (-) at the first of the word (e.g. -ARE). Connect the words making up a verb phrase with hyphens.

+I WANT-TO-TAKE A +VACATION.
An exception to this: if a Non-Action verb occurs
within the verb phrase then break the phrase at that point. For instance:

+I WILL-BE -STAYING AT THE +RITZ.

3. Tag all nouns and pronouns with a plus (+) at the front of each word (e.g. +GIFT, +I). Tag a specific person or group with two plus signs (++), like:

++REGINALD OF THE ++ASPCA -IS HERE.

4. If necessary, relocate prepositional phrases so that they occur in the sentence after and as close as possible to the noun or verb which is being modified by the preposition. For instance:

given: Up the hill he ran quickly.
code: +HE -RAN QUICKLY UP THE +HILL.

5. Code numbers (two, say) in numeric form (2) unless it is being used as a subject or object. In those cases, spell out the number (e.g. +ONE WILL-BE SUFFICIENT).

6. If a word has a negative prefix remove it and code the word "NOT" in front of the word. For example:

for "unlimited" code NOT LIMITED

for "illegal" code NOT LEGAL

7. Break down contractions:

for "won't" code NOT -WILL
for "you're" code +YOU -ARE

8. NOTE: ANALYZE considers a word to be negated if and only if it is immediately preceded by either NO or NOT.

OUTPUT FROM ANALYZE

<table>
<thead>
<tr>
<th>NO.</th>
<th>TAGS</th>
<th>WORD</th>
<th>FUNC</th>
<th>TYPE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.01</td>
<td>A B C D R S T</td>
<td>++JACK</td>
<td>IU</td>
<td></td>
</tr>
<tr>
<td>1.02</td>
<td>A U S</td>
<td>AND</td>
<td>OTH</td>
<td></td>
</tr>
<tr>
<td>1.03</td>
<td>A U S</td>
<td>++JILL</td>
<td>IU</td>
<td></td>
</tr>
<tr>
<td>1.04</td>
<td>P D NT ND AC</td>
<td>-WENT</td>
<td>RL</td>
<td></td>
</tr>
<tr>
<td>1.05</td>
<td></td>
<td>UP</td>
<td>PREP</td>
<td></td>
</tr>
<tr>
<td>1.06</td>
<td></td>
<td>THE</td>
<td>OTH</td>
<td></td>
</tr>
<tr>
<td>1.07</td>
<td>+ R N</td>
<td>+HILL</td>
<td>PEND</td>
<td>QQ</td>
</tr>
<tr>
<td>1.08</td>
<td>R D TR ND AC</td>
<td>TO-FETCH</td>
<td>RL</td>
<td></td>
</tr>
<tr>
<td>1.09</td>
<td></td>
<td>A</td>
<td>OTH</td>
<td></td>
</tr>
<tr>
<td>1.10</td>
<td>I D N</td>
<td>+PAIL</td>
<td>IU</td>
<td></td>
</tr>
<tr>
<td>1.11</td>
<td></td>
<td>OF</td>
<td>PREP</td>
<td></td>
</tr>
</tbody>
</table>
This is a number generated in the following way: the part left of the decimal point is the clause number within the input text. The part to the right is the number of the word within the clause. Thus each word input to ANALYZE will get a unique number.

The TAGS are subdivided into seven "positions." These are called A, B, C, D, R, S and T. Positions A, B, C and D can have a one character value. Positions R, S and T can have a two character value. None of the three TYPES use all seven positions. Only words of type IU, QQ or RL get TAGs at all.

Just the word again, unchanged from the way it was typed in.

Used by ANALYZE in positional analysis. There are four different values for this:
1. OTH means the word was found in the OTH dict.
2. NEG means the word is either NO or NOT.
3. PREP means the word was in the PREP dict. and also that ANALYZE was able to find an object for it.
4. PEND the object of a PREP. PENDs automatically are TYPE QQ.

1. IU - Information Unit. Nouns, pronouns.
2. QQ - Qualitative-Quantitative word. Adverbs, adjectives, objects of prepositions.
3. RL - Relational word. Verbs, verb phrases.

With the exception of PEND, any word that gets assigned a FUNC is not assigned a TYPE. The following Tables will be helpful in figuring out what the TAGS for a word mean. There is a different Table for each of the three TYPES.

<table>
<thead>
<tr>
<th>POSITION script</th>
<th>TAGS for IU TYPE</th>
<th>dictionary</th>
</tr>
</thead>
<tbody>
<tr>
<td>A (1)</td>
<td>&quot;A&quot; Authority other</td>
<td>-</td>
</tr>
<tr>
<td>(2)</td>
<td>&quot;G&quot; General other</td>
<td>(GO)</td>
</tr>
<tr>
<td>(3)</td>
<td>&quot;S&quot; Self</td>
<td>(SELF)</td>
</tr>
<tr>
<td>(4)</td>
<td>&quot;T&quot; Audience</td>
<td>(AUD)</td>
</tr>
<tr>
<td>(5)</td>
<td>&quot;I&quot; Inanimate</td>
<td>-</td>
</tr>
<tr>
<td>B (1)</td>
<td>&quot;+&quot; positive (IU)</td>
<td>-</td>
</tr>
<tr>
<td>(2)</td>
<td>&quot;-&quot; negated (IU)</td>
<td>-</td>
</tr>
<tr>
<td>C (1)</td>
<td>&quot;D&quot; Defined (IU)</td>
<td>-</td>
</tr>
</tbody>
</table>

Table 1
Figure 1 is some sample output from ANALYZE. Let's go through some of it.

Notice that for ++JACK the TAG in position A is "A". In position B there is a "C". The TAG in position C is "U" and in position D the TAG is "S". Using Table 1 it can be seen that ++JACK was classified Authority-other, positive, Undefined and Sensory.

AND didn't get any TAGS because it wasn't found to be of type IU, QQ or RL.

-WENT has TAGS "P + D NT ND AC". This translates to: Past tense, positive, Defined, iNTransitive, iNDicative and ACtion (see Table 3).

Table 2
TAGS for QQ TYPE

<table>
<thead>
<tr>
<th>POSI- sub-</th>
<th>value</th>
<th>class</th>
<th>dictionary</th>
</tr>
</thead>
<tbody>
<tr>
<td>TION script</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B (1)</td>
<td>&quot;+&quot;</td>
<td>positive (QQ)</td>
<td>-</td>
</tr>
<tr>
<td>(2)</td>
<td>&quot;-&quot;</td>
<td>negated (QQ)</td>
<td>-</td>
</tr>
<tr>
<td>C (1)</td>
<td>&quot;I&quot;</td>
<td>qualifier of IU</td>
<td>-</td>
</tr>
<tr>
<td>(2)</td>
<td>&quot;R&quot;</td>
<td>qualifier of RL</td>
<td>-</td>
</tr>
<tr>
<td>D (1)</td>
<td>&quot;S&quot;</td>
<td>Sensory (QQ)</td>
<td>(SENSE)</td>
</tr>
<tr>
<td>(2)</td>
<td>&quot;N&quot;</td>
<td>Non-sensory (QQ)</td>
<td>-</td>
</tr>
<tr>
<td>R,S,T</td>
<td>-unused-</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 3
TAGS for RL TYPE

<table>
<thead>
<tr>
<th>POSI- sub-</th>
<th>value</th>
<th>class</th>
<th>dictionary</th>
</tr>
</thead>
<tbody>
<tr>
<td>TION script</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A (1)</td>
<td>&quot;P&quot;</td>
<td>Past tense</td>
<td>(PASTC)</td>
</tr>
<tr>
<td>(2)</td>
<td>&quot;R&quot;</td>
<td>Present tense</td>
<td>-</td>
</tr>
<tr>
<td>(3)</td>
<td>&quot;F&quot;</td>
<td>Future tense</td>
<td>(FUTRC)</td>
</tr>
<tr>
<td>B (1)</td>
<td>&quot;+&quot;</td>
<td>positive (RL)</td>
<td>-</td>
</tr>
<tr>
<td>(2)</td>
<td>&quot;-&quot;</td>
<td>negated (RL)</td>
<td>-</td>
</tr>
<tr>
<td>C (1)</td>
<td>&quot;D&quot;</td>
<td>defined (RL)</td>
<td>-</td>
</tr>
<tr>
<td>(2)</td>
<td>&quot;U&quot;</td>
<td>undefined (RL)</td>
<td>-</td>
</tr>
<tr>
<td>D</td>
<td>-unused-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>R (1)</td>
<td>&quot;TR&quot;</td>
<td>Transitive</td>
<td>-</td>
</tr>
<tr>
<td>(2)</td>
<td>&quot;NT&quot;</td>
<td>iNTransitive</td>
<td>-</td>
</tr>
<tr>
<td>S (1)</td>
<td>&quot;SU&quot;</td>
<td>Subjunctive</td>
<td>-</td>
</tr>
<tr>
<td>(2)</td>
<td>&quot;ND&quot;</td>
<td>iNDicative</td>
<td>-</td>
</tr>
<tr>
<td>T (1)</td>
<td>&quot;AC&quot;</td>
<td>Action</td>
<td>-</td>
</tr>
<tr>
<td>(2)</td>
<td>&quot;NA&quot;</td>
<td>Non-Action</td>
<td>-</td>
</tr>
</tbody>
</table>
+HILL has been classified positive, modifier of an "RL" (this came about because +HILL was the object of a preposition which occurred after an "RL" word), and Non-sensory.

+HILL was classified Non-sensory. +HILL should have been classified Sensory. Evidently HILL wasn't present in the dictionary of sensory words (SENSE). We will probably want to add HILL to SENSE. This does not mean we have to run ANALYZE again, however. If the PUN option was enabled then ANALYZE produced a data set containing all that info in Figure 1. This data is fed to the NUMBERS program. Before we hand over this data to NUMBERS we can use a text editor to fix mistakes like the one just noted. Let us assume that $PUN=1 and ANALYZE has written the augmented data into a data set called "phase2.data." Figure 2 below is an example of how one could fix the error using QED:

```plaintext
qed phase2.data old nonum
QED
verify
find '1.07'
  1.07 + R N  +HILL  PEND QQ
change /N/S/
  1.07 + R S  +HILL  PEND QQ
save
SAVED
```

Figure 2: Fixing a mistake made by ANALYZE

Now when the NUMBERS program reads phase2.data it will take +HILL as being Sensory. Once again we'd like to stress that there is nothing sacred about the decisions made by ANALYZE and that no frequency counts are maintained by ANALYZE. The NUMBERS program accumulates frequencies of all the different TAG combinations that occur. These are held in three multi-dimensional arrays:

1. $IU(5,2,2,2)$
2. $QQ(2,2,2)$
3. $RL(3,2,2,2,2,2)$

Look again at Table 2. The TAGs we decided on for +HILL are "+ R S". These have the associated subscripts 1,2,1. What this means is that the NUMBERS program increments the array element $QQ(1,2,1)$ by 1 when it processes the card changed in Figure 2.

### List of Options for Analyze Program

- **$PUN=1** Requests ANALYZE to output the augmented data needed by ACCUM. This will be written to file PUNCH.
- **$PUN=0** (default) Suppress output of augmented data.
- **$CHECKD=1** (default) Requests ANALYZE to print the "header card" from each of the eight dictionaries. This sometimes helps in detecting errors in the
**SPECIFYING OPTIONS FOR ANALYZE PROGRAM**

Options for all three programs in SLCA III (ANALYZE, NUMBERS and DMERGE) are handled in the same general way. That is, the selected options are passed as a string of characters to the executing program by the operating system. The string itself consists of one or more assignment statements separated by commas. The order of the assignments within the string is unimportant. Some examples:

```
// EXEC PGM=ANALYZE,PARM='PUN = 1, CHECKD = 0'
```

Or, you might let the options default:

```
// EXEC PGM=ANALYZE
```

**FILE USAGE IN ANALYZE PROGRAM**

The ANALYZE program reads text messages from file SYSIN. It writes a report to file SYSPRINT and punches augmented data to file PUNCH. It reads in the dictionaries from file INPUTD.

**USING THE NUMBERS PROGRAM**

**HOW NUMBERS INTERPRETS THE AUGMENTED DATA**

ANALYZE punches out the augmented data in the following format:

1. Message id, cols 1-80
2. A bunch of "data lines," one for each word and mark of punctuation in the original message.
3. End of message indicator, (a slash in col 1).

Items 1. through 3. are produced for each message in the original data.
NUMBERS handles each data line as follows:

col. 1  ANALYZE outputs a card with a slash (/) in column 1 to signal the end of each message to NUMBERS. NUMBERS checks each card for this slash and upon finding it, begins summing up the accumulated frequencies and prints a one page report. Optionally, NUMBERS punches output for the message at this point. The next message id is read.

cols 56-57  If these are blank, NUMBERS ignores the card completely. If these columns contain letters other than 'IU', 'QQ' or 'RL' then a warning is issued and the card is ignored.

cols 14-29  The TAG info in these columns is translated into subscripts used for incrementing the correct element of the appropriate frequency accumulator array.

The ANALYZE program produces (and the NUMBERS program expects) data arranged according to the above format. When you make changes in the data produced by ANALYZE, you must be careful not to change the position of the TYPE or TAG info. If you move something out of place, NUMBERS will let you know.

LIST OF OPTIONS FOR NUMBERS PROGRAM

$PUN=1  Requests NUMBERS to punch the message id card, the PCA and the thirty-five densities.
$PUN=0  (default) Suppress PUN option.
$LC=66  Number of lines per page for the printed output.
         (default)

PASSING OPTIONS TO NUMBERS PROGRAM

This is done in exactly the same way as for the ANALYZE program. That is, a string of one or more assignment statements separated by commas and enclosed in apostrophes is passed to the program by the system. Like:

    // EXEC PGM=NUMBERS,PARM='$PUN = 1'

or, you can omit the parm string and get the default options:

    // EXEC PGM=NUMBERS

FILE USAGE IN NUMBERS PROGRAM

The NUMBERS program reads the augmented data from file SYSIN. It writes error and warning messages to file MESS.
Reports are printed on file SYSPRINT. Card output is written to file PUNCH. A "DD Statement" or "TSO FILE ALLOC" will have to be provided for each of these files at run time.

DICTIONARIES IN SLCA III

FORMATTING OF SLCA DICTIONARIES

In general, a dictionary is arranged as follows:

- **HEADER card**
  - When ANALYZE reads in a header card it compares the first eight characters of the header against an internal label to see if it is really the dictionary it wanted. Columns 9-80 of the header are disregarded and may be used for further identification.

- **WORD COUNT**
  - An integer right justified to column 10 of the next card.

- **WORDS**
  - The words are enclosed in single quotes and are separated from each other by one or more blanks. This is to be suitable for PL/I "list directed" input, and in practice is usually created by PL/I list directed output.

The ANALYZE program expects eight of these dictionaries, end to end and in the following order:

OTH, GO, SELF, AUD, PREP, PASTC, FUTRC, SENSE.

CONTENTS OF DICTIONARIES

There are eight SLCA dictionaries:

1. OTH - words that are to be excluded from analysis (UH, MAYBE, etc.).
2. GO - the General-Other dictionary contains words that refer to other (non-specific) people (+THEY, +EVERYONE, etc.).
3. SELF - words that refer back to the speaker (+I, +WE, etc.).
4. AUD - audience. References to the person being spoken to (+YOU, etc.).
5. PREP - Prepositions (INTO, OVER, BEYOND, etc.). Note that if ANALYZE can't find an object for the preposition it TYPEs the preposition as QQ.
6. PASTC - Past tense verbs. If a verb or verb phrase in the input data contains something from PASTC as a substring that verb gets tagged past tense.
7. FUTRC - Future tense verbs. Same as PASTC but the tense is future.
8. SENSE - Sensory words. Nouns or verbs stored with no plus in front. Don't include words from any of the other dictionaries in this one.
USING THE DMERGE PROGRAM

DMERGE is the dictionary maintenance program for SLCA III. With it, one can create new dictionaries. DMERGE always needs one old dictionary (read through file DICT). DMERGE also reads input from file SYSIN. This might be another SLCA dictionary. DMERGE uses a work file (filename: TOUT) and writes the new dictionary to file NDIC. "DD Statements" (or "TSO FILE ALLOC"s if you are running foreground) must be supplied for each of the files mentioned.

LIST OF OPTIONS FOR DMERGE PROGRAM:

$MERGE=0             Add or Delete. Input:
                        (default)
  1. An old dictionary through file DICT.
  2. A set of cards each with a blank space or a "D" in the first column and one word enclosed in single quotes.

If col 1 was blank the word on the card will appear in the new dictionary. If col 1 was a "D" the word will not be copied to the new dictionary.

$MERGE=1             Add All. As with $MERGE=0 you feed in an old dictionary through file DICT. But here, the input is the new word to be added to the dictionary. This includes the header card and word count and everything as described in the dictionary format section. A word will appear in the new dictionary if it appears in either one of the input dictionaries.

$MERGE=2             Delete all. Input is same as for $MERGE=1 (i.e. two old dictionaries, one to file DICT and one to file SYSIN). A word will appear in the new dictionary if it appears in the file DICT dictionary and does not appear in the file SYSIN dictionary.

$MESS=1             (default)
                    Requests DMERGE to issue a warning message whenever you try to add a word that is already in the file or delete a word not in the file. It is a good idea to let these messages be printed when you have chosen $MERGE=0.

$MESS=0             Suppress messages described for $MESS=1. You may want $MESS=0 for $MERGE=1 or 2.

$SIZEW=nn
$NUMWDS=mm

These options help control the amount of memory required by DMERGE. The dictionary read in through file DICT is not stored in memory in its entirety. However, all the stuff read in from file SYSIN (no matter which merge option you pick) IS. The value for $NUMWDS had better be greater than or equal to the number
of words in the SYSIN file. $SIZEW had better be set to a value greater than or equal to the number of characters in any of the words in EITHER of the two input files.

The default values are: $SIZEW=40, $NUMWDS=1800.

SPECIFYING OPTIONS FOR DMERGE

As with the ANALYZE and NUMBERS programs, options are passed as a character string to DMERGE by the operating system. The string consists of one or more "assignment statements" separated by commas and enclosed in single quotes.

Example:
// EXEC PGM=DMERGE,PARM=' $MERGE =  1 ,  $MESS =  1 '

Or, omit the string and settle for the defaults:

// EXEC PGM=DMERGE
PLEASE NOTE

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University Microfilms International
APPENDIX H.

CONSENT FORM

DEPARTMENT OF PSYCHOLOGY
LOUISIANA STATE UNIVERSITY
BATON ROUGE, LA. 70803-5501
(504) 388-8745

Consent Form

This study is a comparison of speech patterns with elements of cognition and thought. You will be asked to respond to specified stimuli by speaking into a tape recorder. The speech will be analyzed by computer and comparisons will be made according to some of the information on the forms you will be filling out.

Your participation in this study is voluntary and you may withdraw at any time. All responses will be anonymous and at no time will any record of your full name be kept except on this consent form which will not be kept with the data samples. While your first name and last four digits of your student number will be used in the first part of the study, final samples will be compared using only an unrelated subject number and the name and student # information will be destroyed.

There is one other request, that you not discuss the study or the stimuli with friends or others who might be participating in the study until the data collection is complete and they have given their samples of speech.

Should you choose to participate in this study, please sign below.

__________ I agree to participate in this study and not discuss it with others who will be participating until their participation is completed.

_____________________________    __________
Signature                      Date
APPENDIX I.

DEMOGRAPHIC FORM

First Name: ____________________________ Last Initial: _________

Telephone: ________________ Last 4 Nos. of Soc. Sec. _________

Age: __________ Year in School ____________________________

Race: __________ Is English your Native Language? _________

Estimate of Yearly Total Family Income: (Parents)
(check one only, please)

____  $ 13,000 or under

____  $ 13,000 to $21,000

____  $ 21,000 to $30,000

____  $ 30,000 to $40,000

____  $ 40,000 to $60,000

____  $ 60,000 and over
APPENDIX J.

STIMULI

This section contains all of the various stimuli used and how they were worded for the different orders of presentation.

Stimulus One
Positive
This is a study of speaking and conversational habits. When you are ready I would like you to speak for approximately five minutes about any interesting or dramatic personal life experiences of a positive nature you may have had. When you are ready you may begin.

Stimulus One
Negative
This is a study of speaking and conversational habits. When you are ready I would like for you to speak for approximately five minutes about your most embarrassing or most negative personal life experiences. When you are ready you may begin.

Stimulus One
Opinion
This is a study of speaking and conversational habits. When you are ready I would like you to speak for approximately five minutes, giving your thoughts as to why a free press is important in a democracy. When you are ready you may begin.
Stimulus Two

Positive
This time I would like you to speak for approximately five minutes about any interesting or dramatic personal life experiences of a positive nature you may have had. When you are ready you may begin.

Stimulus Two

Negative
This time I would like you to speak for approximately five minutes about your most embarrassing or most negative personal life experiences. When you are ready you may begin.

Stimulus Two

Opinion
This time I would like you to speak for approximately five minutes giving some of your thoughts as to why a free press is important in a democracy. When you are ready you may begin.

Stimulus Three

Positive
This time I would like you to speak for approximately five minutes about any interesting or dramatic personal life experiences of a positive nature you may have had. When you have completed this item, you are finished and may return to
the experimenter. Thank you for your participation. When you are ready you may begin.

Stimulus Three

Negative

This time I would like you to speak for approximately five minutes about your most embarrassing or most negative personal life experiences. When you have completed this item, you are finished and may return to the experimenter. Thank you for your participation. When you are ready you may begin.

Stimulus Three

Opinion

This time I would like for you to speak for approximately five minutes, giving your thoughts as to why a free press is important in a democracy. When you have completed this item, you are finished and may return to the experimenter. Thank you for your participation. When you are ready you may begin.
APPENDIX K.

INSTRUCTIONS

This section contains the instruction set given to all subjects.

Instructions

Inside this envelope are three smaller envelopes each containing one stimulus for you to respond to. The envelopes are numbered one, two and three. Please open them only in the correct order and open the second only after you have responded to the first, and open the third only after you have responded to the second.

For each item I would like you to speak for approximately 3 to 5 minutes, giving your thoughts or telling about the topic. This is not a study of speech making or public speaking so please do not stop the tape or re-record if you make mistakes, just keep going.

Before you begin speaking on each item please identify the item according to the stimulus number and the one word underneath. For example you might say "Stimulus One, Opinion". Do this at the start of each item. This will help me transcribe the items. When you are ready you may open the first item and begin.
VITA

Daniel M. Christy was born in Quincy, IL. on February 28, 1951 and was raised in Pekin, IL. He obtained a Bachelor of Science degree from Purdue University in West Lafayette, IN., majoring in Psychology, in August, 1972. He obtained a Master of Arts degree in Clinical Psychology from Bradley University in Peoria, IL. in December of 1974. Subsequently he was employed in the position of Senior Therapist of the Partial Care Program of the Stonehedge Poly-Drug Unit of the Peoria Area Mental Health Center before undertaking his doctoral studies. His clinical internship was done at the Napa State Hospital in Napa, CA. and completed in the Fall of 1981. The Doctor of Philosophy degree in Clinical Psychology was awarded in August of 1991. Upon completion of that degree, Dr. Christy was employed in the Department of Psychology at the East Louisiana State Hospital in Jackson, LA.
Candidate: Daniel Merton Christy

Major Field: Psychology

Title of Dissertation: A Syntactic Language Computer Analysis of Depressed Versus Non-Depressed Females

Approved:

[Signature]
Major Professor and Chairman

[Signature]
Dean of the Graduate School

EXAMINING COMMITTEE:

[Signatures]

Date of Examination:

May 13, 1991