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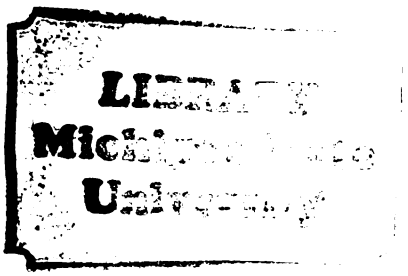

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QUALITATIVE DIFFERENCES IN THE WORD DEFINITION RESPONSES OF APHASIC AND NONAPHASIC ADULTS

By

Silvia Ann Graves

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ABSTRACT

Previous studies support the contention that aphasic individuals show a loss of the ability to abstract and an increased tendency toward concreteness in verbal and non-verbal behavior. The purpose of this study was to investigate the aphasic individual's verbalization of word meaning in terms of a concrete-abstract dimension through a qualitative analysis of their verbatim responses to a word definition task.

The sample consisted of 20 nonaphasic subjects between the ages of 45 and 70, and 20 aphasic subjects between the ages of 45 and 83 who passed the criterion tests of word recognition and the PICA. Both subject groups were equated on the variables of age, education, and sex. The subjects were required to orally define 20 noun words on high and low frequency levels. Using a qualitative analysis system, their audiotape recorded definition responses were evaluated on a five-point

classification system: Synonym, Explanation, Use and Description, Inferior, and Error types. The MANOCOVA and t-test techniques were employed to test the significance of the differences between mean scores for the two groups.

The analysis led to the conclusion that the aphasic, like the nonaphasic subjects, used both concrete and abstract definition categories but used them in varying degrees. Whereas the aphasic individuals tend to use more concrete (Use and Description and Inferior-type) and Error definitions, the nonaphasic individuals used more of the abstract definitions (Synonym and Explanation). This suggests that the aphasic subjects may not have complete impairment in abstraction; rather the aphasic subject can be impaired along a concrete-abstract continuum of language. Although the frequency of word occurrence (high or low) did not affect the rate of error response for the two groups, it did affect the type of definition response given. For all subjects, age had no effect on type of definition response; however, the higher the level of education, the more likely were abstract definitions offered.

On the basis of the current study, it is likely that the speech-language pathologist may find a continuum model rather than the categorical model of the abstract-concrete dimension of verbal language the most appropriate framework for evaluating aphasic individual's verbal ability.

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CHAPTER I

BACKGROUND AND STATEMENT OF THE PROBLEM

Introduction

Word definition responses, i.e., the ability to use words to represent meaning (Litowitz, 1977, 1981), have been of interest to many aphasiologists because of their assumed importance to language functioning (Bayles & Boone, 1982; Davis, Myers, Adamovitch, & Yorkston, 1981; Goldman-Eisler, 1964; Muma, 1975) and to human communication (Chapey, 1981; Krauss, 1972; Lesser, 1978; Ulatowski, Macaluso-Haynes, & North, 1981).

The concept of "knowing" a word may appear obvious, yet there are complex behaviors involved; and knowledge of even simple words is a cumulative process that results from gradual development (Litowitz, 1981). For the adult, knowing a word implies a conscious or unconscious understanding of the critical attributes included in a dictionary definition such as the part of speech, how it can be combined in a sentence (selectional features), and which words have similar meanings (synonyms) and opposite meanings (antonyms). Therefore, to define a word verbally involves memory, speech behavior, motivation, a knowledge of sentence structure, and the ability to select and organize words in a

meaningful way (Harrington & Erhmann, 1954). Further, it is this verbal information which is sought and examined in the definitional sections of most vocabulary tests.

The importance of word definition performance becomes apparent when we consider that word definitions imply that a mental representation of the word is the basis for all responses to a given word. For example, in the development of word meaning, the individual learns to represent the world of objects internally (Jackson, 1978; Lenneberg, 1967). He/She cannot place the objects inside of his/her brain, so he/she deals with real objects through mental representations. It is implicit in this process that the individual develops a mental substitute for the real object. Correspondingly, once the individual creates mental substitutions for objects, he/she begins to use words or phrases in his/her language to verbalize what she/he means by the object. Thus, the mental representation or content of ideas (i.e., concept) formed in the individual's mind contains the information to be expressed linguistically about the object in order to make possible the sharing of experience necessary to the existence of every social group (Litowitz, 1977, 1981).

One view of the representational system underlying an object's meaning is that the mental representation can take either an abstract or a concrete conceptual form (Bruner, Goodnow, & Austin, 1956). That is, the input (which is often a word) is translated into a conceptual form containing

either abstract elements and their relations or concrete elements and their perceptual attributes (Nelson, 1974, 1975). In this sense, concepts (represented by words or phrases when making a word definition) can be described as either concrete or abstract according to the kind of conceptualization formed in response to the stimulus word. A characteristically concrete definition response, then, expresses the meaning of the referent in terms of an observable context-dependent relation (e.g., donkey--"it has four legs"). A characteristically abstract word definition response expresses the meaning of the referent in terms of a generic class or category (e.g., donkey--"an animal") (Anglin, 1970, 1977).

Studies of word meaning as an index of concept formation among normal subjects have employed a form of analysis related directly to word definition performance (Feifel, 1949; Feifel & Lorge, 1950; Green, 1931; Storck & Looft, 1973). These studies involving normal children and adults typically have required subjects to give definitions which were scored according to their definition levels (that is, level of conceptualization). They found a developmental progression in conceptualization from concrete and action-oriented definitions in early childhood to more abstract formalizations in later adolescence and adulthood. It is noteworthy that although it has been long asserted that aphasic individuals demonstrate difficulty associating words with their respective meanings (Doehring & Swisher,

1972; Gardner & Denes, 1973; Hanson, 1976; Myers & Linebaugh, 1981; Muma & McNeil, 1981; Osgood & Miron, 1963; Schuell, Jenkins, & Landis, 1961), this kind of investigation has not been systematically carried out in the aphasic population.

The use of word meaning as an index of concept formation among adults with language problems has been studied but primarily in the context of word association tasks (Grossman, 1981; Goldfarb & Halpern, 1981; Milberg & Blumstein, 1981; Kelter, 1976). These authors analyzed the free speech responses of their subjects and concluded that a "conceptual" deficit of some sort plagues the aphasic individual's ability to refer with a word.

Studies employing word association tasks relative to word definition response performance have also examined conceptualization in aphasia by relying on lexical judgments (Biasschi, Denes, & Semenza, 1976; Whitehouse, Zurif, & Caramazza, 1978; Zurif, Caramazza, Myerson, & Galvin, 1974). In order to test the defining properties of words in aphasia, these authors asked aphasic subjects to judge which two of three items best go together. Zurif et al. (1974), in particular, concluded that aphasic individuals barely make the supraordinate category differentiation, thus supposing a common abstract conceptual relation; but, rather, they perform better on the thematic category in the sense of forming context-dependent or concrete relations. Others who have regarded aphasia as a shift in the level of

conceptualization include Bouman and Grunbaum (1925), Lubinski et al. (1980), and Milton, Wertz, Katz, and Prutting (1981).

The research studies cited thus far on testing for word meaning impairment in aphasia suggest that there are characteristic patterns of difficulty in the word definition response performance of aphasic individuals. Aside from word meaning, investigators have attempted to determine whether other aspects of words produce inherently difficult situations for the aphasic individual. The parameters explored have included (1) the frequency of word occurrence in English usage (Bricker, Schuell, & Jenkins, 1964; William & Canter, 1981; Filby, Edwards, & Seacat, 1963; Goodglass, Hyde, & Blumstein, 1969; Goldfarb & Halpern, 1981; Howes, 1964, 1967; and Siegel, 1959); (2) part of speech (Eisenson, 1954; Siegel, 1959; Weisenberg & McBride, 1951; Wepman, 1951): (3) word length (Bricker et al., 1964; Filby et al., 1963; Goldstein, 1948; Jenkins, Miminez-Palon, Shaw, & Sefer, 1975; Siegel, 1951; Wepman, 1951; Wepman & Jones, 1961); and (4) abstract versus concrete nouns (Brown, 1956; Goldfarb & Halpern, 1981; Spreen, 1968). Concrete noun words refer to those words whose reference to objects, to material, to sources of sensation is relatively direct. Abstract nouns refer to those words whose reference to objects, to material, to sources of sensation is relatively indirect (Gorman, 1961).

The patterns of difficulty with word tasks have been explained in terms of a broad theoretical framework, concerning the entire problem of aphasia (Chapey, 1977, 1981; Eisenson, 1954, 1971; Goldstein, 1942, 1948; Head, 1915; Kreindler, Gheorgita, & Voineseu, 1971; Schuell, 1974; Wepman, 1951, 1972). These theories indicate that the inability of an aphasic individual to produce a number and variety of responses is due to a fundamental problem of shifting from the concrete to the abstract conceptual perspective in performing verbal and nonverbal tasks.

Goldstein (1948) stated that normally a person

> . . . combines both (the concrete and abstract) attitudes and is capable of shifting from one to the other at will according to the demands of the situation. Some tasks can be performed only by virtue of the abstract attitude. For others, the concrete attitude is sufficient.

But he maintained that the aphasic individual's nonverbal and verbal behavior is concrete and she/he is unable to make the shift to the abstract attitude.

More recently, Chapey (1977) stressed the fact that aphasic individuals often retain highly concrete verbal responses even when less concrete and more abstract responses are not retained. In a later analysis, Chapey (1981) explained that the inability to generate a number of semantic responses (of which word definition is one aspect), to change direction of one's responses, or to use words flexibly to express a variety of relationships is a central component of the aphasic complex. Thus, the views

of Chapey and Goldstein seem to be typical of Werner's (1965) proposal that the aphasic individual regresses from a more abstract, verbal conceptual level to a level that is concrete, general, and more tied to perceptual attributes. The term regression as used by Werner refers to the structural re-emergence of developmentally lower levels of functioning when the more advanced and more recently developed levels of functioning are disorganized. Aphasia is thus seen as a regression in cognitive processes. That is, it is conceived as a reversal of those patterns of conceptualization which are encountered in the normal course of development.

Statement of the Problem

A common theoretical claim is that aphasia, in general, is not simply an impairment in language but also a reduction in verbal behavior which manifests itself in a more concrete manner of thinking (Goldstein, 1942, 1948). While many sources (Chapey, 1977, 1981; Lubinski et al., 1980; Osgood, 1953; Osgood & Miron, 1963; Siegel, 1959; Werner, 1965) have accepted and corroborated Goldstein's contribution concerning abstract and concrete behavior, other investigators have taken issue with his views, procedures, and results. One such author, Brown (1955), criticized Goldstein's failure to obtain normal control data in his work and his tendency to generalize from extensive studies of individual subjects. Another issue is the methodology

used in later studies (Brown, 1955; Lubinski et al., 1980; Siegel, 1959)in examining abstract behavior in aphasia. For instance, the Goldstein-Scheerer test (1941) used by Brown (1955) is nonquantitative and requires a rating of concreteness by the experimenter. Furthermore, in Brown's study, an adequate control group was absent. The Kendler reversal-nonreversal paradigm used by Lubinski et al. (1980) is a nonverbal, pictorial task of common objects necessitating a pointing response by the subject. The word stimuli task by Siegel requires an utterance by the subject to each stimulus word as the card upon which it is typed is presented. Therefore, because of the inconsistency in the methodology of these studies, the results of these studies appear inconclusive. Furthermore, other authors (Brown, 1955; Eisenson, 1954; Wepman, 1951) indicate that the loss of ability to abstract was not a general characteristic of the aphasic individuals under their observation.

Although research studies have suggested that definitions can reflect two different levels of conceptualization (i.e., the abstract and the concrete) little attention seems to have been given to the complexity of the response required in the word definition response performance of aphasic individuals. For example, the research studies cited to this point have used, in the main, either a matching task, a picture recognition task, or a multiple choice word list in which the mere selection of the response was

considered most important. Selecting a correct definition from a number of possible definition alternatives may be a far much less complex task than that which requires spontaneous verbal definition. While a word recognition task involves motivation, perception, and memory, the selection and organization of words into a meaningful sequence is not required by the subject. All that is required of the subjects is to recognize the word and make a choice limited to recognized possibilities.

It would appear, then, that the question of whether the abstract solutions to language tasks are no longer available to an aphasic individual is deserving of more systematic study. Therefore, the present study attempts to investigate, qualitatively, the use of language in the ability of aphasic individuals to engage in abstract conceptualization as inferred from their performance on a word definition task. The word definition task permits us to rate the performance of a subject according to all the variety of different responses given to all words and is therefore sensitive to whether a response is abstract, concrete, or even somewhat peripherally relevant. The assessment of an individual's performance in this way, may have potential diagnostic value of clinical and theoretical importance. For example, the traditional, standardized aphasia tests of vocabulary afford primarily a measurement of the number of words used infrequently in conversation. One may, however, measure other

aspects of vocabulary such as the subject's (1) ability to form concepts and (2) conceptual level of meaning formed with familiar words. These variables are neglected by the usual standardized aphasia test of vocabulary which requires only that one meaning be given for each word and does not differentiate among the different shades, quality, and range of possible meanings.

A qualitative analysis of word definition responses by aphasic individuals to familiar words may thus compliment the traditional aphasia test of vocabulary in two ways: (1) it requires a degrees of flexibility since the subject must shift from the meaning of one word to another one. Chapey (1971) has stressed the importance of flexibility for more articulated use of language; and (2) it may be more indicative of an easier solution by simple associative processes when the mechanisms involved in the more difficult conceptual organization underlying word meaning are no longer avaliable. Thus, a qualitative analysis of word definition responses may be used as an index of measurement in the amount of change from the pre-impaired level of conceptual ability in word meanings.

Purpose of the Study. The purpose of the present study is to investigate the quality of aphasic individuals' verbalizations of word meaning in terms of a concrete-abstract dimension. Using a qualitative analysis of the definition responses to selected noun stimuli by equated

groups of aphasic and nonaphasic subjects, this study attempts to answer the following questions:

1. Are there qualitative differences in the verbal definitions of selected nouns between aphasic and nonaphasic groups?
2. What types of word definitions are observed within the aphasic group and within the nonaphasic group?
3. Are there differences between aphasic and nonaphasic groups in their word definition responses to high- and low-frequency nouns?

CHAPTER II

BACKGROUND AND LITERATURE REVIEW

There is common agreement in the literature that aphasia refers to known focal damage to a cortical area of the brain which typically involves the extensive central zone in the left hemisphere (Lesser, 1978). Although it is widely agreed that language disturbance can result from cortical insult, there is less global agreement on the nature of aphasia and exactly what language deficits are to be included. However, there appears to be a growing awareness that the general language disturbance can be viewed along an abstract-concrete dimension (Chapey, 1977; Goldstein, 1942, 1948). In this sense, aphasic individuals are said to be able to respond only to the immediate sense impression of an object and are unable to produce verbal responses conceptually from their experience of a word in terms of general information. This means, then, that the aphasic individual's language disturbance is at the abstract level. If this is the case, then it is reasonable to assume that an abstract impairment of language could be reflected in any aspect of the aphasic individual's language usage, including the making of a word definition.

The first section of this chapter presents the theories of aphasia that seem to support a concrete-abstract

dimension in aphasia. The second section summarizes empirical studies related to the use of word definition responses in terms of the abstract-concrete dimension by normal children and adults as well as by aphasic individuals.

Related Theories of Aphasia which Suggest an Abstractness-Concreteness Dimension

Propositional theory. The propositional theory is associated with Hughling Jackson (1948, 1978) who considered the physical basis of a spoken word as a sensorimotor and an audio-articulatory nervous arrangement. Jackson pointed out that the utterance of any number of words would not constitute speech, for human beings do not think or speak in words alone but in words or signs referring to one another in a particular manner. These necessary relationships inherent in meaningful language he termed "propositions." He maintained that a proposition implied a relationship of two images, internal (symbolic) in the sense that each of them is related to all other images organized in individuals and external (object) in the sense that it is also related to things in the environment. The two propositions taken together imply an internal and external relationship; i.e., words are not only related to one another, but also to the situation in which they are used. In other words, propositional language consists of words relating to one another in a particular symbolic way wherein the words assume a syntactic relationship and, in doing so, modify the meaning of each other (Head, 1915,

1926). Thus, the unit of speech is not the individual word but, rather, the proposition formed by the interaction of all the words used (Weisenberg & McBride, 1935).

It appears, then, that propositional speech is concerned with the expression of the sign (word) and object. Inherent within this interpretation is the realization that propositional speech represents abstract language because Jackson contrasted "superior, intellectual speech" and automatic speech (such as emotional utterances, direct associational naming, highly frequent utterances) in which propositionality or rationality is minimal. Among those who share Jackson's propositional theory are Head (1915, 1926), Schuell (1950), Goldstein (1963), and Osgood and Miron (1963).

With particular reference to aphasia, Hughlings Jackson (1926) considered aphasia a loss of voluntary actions with conservation of the more automatic. He indicated that aphasic individuals had not lost language but that they had lost the ability to use it voluntarily as a means of expressing relationships between sign (word) and object previously organized by his/her nervous sytem and those currently being registered from the environment. Jackson maintained that the language disturbance was part of a general impairment of the volitional ability to propositionalize on expresed relationships such as in the making of a word definition. For example, the making of a word definition (like any complete language act) consists of

central processes and a response. The stimulus or input is registered and is related to "other images or associations organized in us" (Brown, 1956, 1958). The model of response may be graphic, oral, or gestural. The content of response is attributable both to characteristics of the stimulus and to the interpreting and mediating central processes. Consequently, if Jackson's propositional theory holds, it seems plausible that in defining a word an individual may assume either a concrete or abstract manner of thinking in his/her attempt to propositionalize language.

In summary, Hughlings Jackson envisioned aphasia as a propositional thought disorder which may or may not involve concrete language. The aphasic individual is impaired in the ability to synthesize verbal propositions, that is, to express numerous and varied word relationships (Chapey, 1977). The impairment, in turn, may reflect an inability to abstract (Duffy, 1981).

Abstract-concrete theory. Goldstein (1942) stated that the human organism was guided by conceptualization of categories, classes, and general meanings. Goldstein further believed that human action was guided by what we "think" about what we see, hear, taste, smell, and touch. He observed that the ability to react to things in a conceptual manner necessitated the use of an abstract attitude. In this manner Goldstein differentiates between an attitude

necessary for the formulation of abstract concepts and sensory or concrete impressions of individual objects.

An abstract attitude is utilized to express relationships between objects and events in the world. Understandably, the expressed relationships never represent objects themselves but rather the concepts which the mind has formed of the objects as a result of that autonomous activity by which the mind creates language. In contrast, in the concrete attitude, the individual is said to be stimulus-bound, i.e., capable of responding only to the immediate sense impression of an object or situation with an inability to go beyond that impression to a larger category of associated ideas or to shift to another impression.

To support his theory, Goldstein (1948) used a nonverbal sorting task as a reflection of conceptual thinking or abstract thought and found that the aphasic individual's difficulty in abstraction was due to a failure to shift to new principles of sorting, by rigid adherence to grouping by physical cues like color and size and also by an inability to classify objects by nonphysical concepts such as function. While defining a word represents a verbal task as a reflection of conceptual thinking or abstract thought, later research (Brown, 1955) shows that there are, indeed, similar mechanisms of thought in verbal and nonverbal conceptual tasks. In particular, Brown (1955) provided support for Goldstein's (1948) finding in

that he also observed that the aphasic individual demonstrated difficulty in abstraction not only in nonverbal but also in verbal behavior. He concluded that both the aphasic individual's nonverbal and verbal behavior is concrete, whereas the normal person's behavior is either concrete or abstract, as determined by the requirements of the stimulus situation.

According to Goldstein and Scheerer (1941), the behavior exhibited by impaired abstract attitude is not a specific linguistic disorder separate from the individual who has it but a change in more basic orientation to language. Along these lines, Goldstein (1948) indicated that the behavior exhibited by impaired abstract attitude represented an inability to find meaning and to find words as names for a variety of objects. This means that impairment in abstract language may judiciously be reflected in propositional language. For instance, if one cannot abstract, one cannot symbolize or incorporate symbols into a number of different contexts and relationships. Impairment in abstract attitude may further inhibit the selection of choice and the ability to shift from the concrete to the abstract.

It would appear, then, that the impairment in abstract attitude in aphasic adults may not be a loss of words but, rather, a loss of the use of words as symbols in certain generalized or more varied, conceptual situations with retention of the ability to emit the same sym-

bol as a specific, concrete response to immediate "here and now" conditioning stimuli. Thus, the aphasic individual may be able to name objects in a highly structured context when the object is present because he has associated the name and the object but may be unable to describe it, to discuss its use, or to identify the generic character of the word. In other words, the aphasic individual cannot use words in the categorical sense but only in relationship to one particular referent.

Goldstein also attributed impairment or loss of the abstract attitude in aphasia to a total personality change which is brought about by the cerebral insult. As a result of the impairment of the abstract attitude in aphasia, Goldstein stated the individual will have a problem of integrating inner experiences and in separation of ego from the outer world. Therefore, the ability to think symbolically, without specific stimulus relationships, and to consider things which are only possibilities rather than actualities will be disturbed.

Goldstein (1948) further postulated that impairment of the abstract attitude is manifested along a continuum of deficiencies ranging from complete absence of communication by any means to a slightly abnormal, uneven, sporadic impairment. Further, the disability, aside from a change in total personality, may result in a change in volitional activity, such as that involved in conversation, in formulating code rules, in structure, and in dealing

with previous experience in building concepts. In contrast, however, Eisenson (1954) and Wepman (1951) felt that this impairment of the abstract attitude was due not to a total personality change but rather to the aphasic individual's disinclination to assume the abstract attitude. Wepman and Eisenson felt that the concrete behavior of the aphasic individual was, therefore, amenable to change.

In summary, Goldstein maintained that the abstract component of language in the aphasia symptom complex is impaired. Consequently, the impairment in abstract attitude will, in turn, damage the variety, quantity, and relevance of the aphasic individual's communication or his/her abstract verbal abilities.

Divergent semantic theory. Chapey's (1977) concept of aphasia involves the linkage of thinking and memory to verbal production. In essence, the divergent semantic theory postulates that the critical component of verbal behavior involves a relationship to higher cognitive processes: thinking and memory. Thinking, according to Chapey, is the act or process of reasoning or of conceiving ideas; memory is the power, act, or process of remembering.

Divergent semantic or word production, therefore, involves the generation of logical alternatives from given information where emphasis is upon variety, quantity, and relevance of output from the same source. It is concerned with the generation of logical possibilities, with the

ready flow of ideas and with the readiness to change the direction of one's responses. It involves providing ideas in situations where a proliferation of ideas occurs as a series of discrete lexical responses to a particular stimulus such as in defining a word. Such behavior necessitates the use of a broad search of memory storage and the production of multiple or divergent responses to a single stimulus. Divergent semantic behavior, then, is directed toward new responses--new in the sense that the thinker was not aware of the response before he began the particular line of thought (Gowan, Demos, & Torrance, 1967).

According to Chapey, aphasia is a divergent semantic impairment which involves a decrease in the aphasic individual's ability to generate logical semantic alternatives where emphasis is on variety, quantity, and relevance of output from the same source. The client's ability to be fluent or to produce a number of relevant ideas with words in response to given information is lowered. Thus, when a person with aphasia is asked to respond to a divergent task (such as "Can you list many different uses for a pen?"), the individual will demonstrate an impairment in ability to produce a number and variety of semantic responses. Therefore, divergent impairment in a spontaneous language context may be reflected by an inability to retrieve a variety of words and concepts.

In summary, Chapey (1977, 1981) envisioned aphasia as a deficiency in divergent thinking which is required for the production of spontaneous language. The aphasic individual's inability to generate a number and variety of semantic responses (of which word definition is one aspect) may be attributed to an impairment in abstract attitude.

Unidimensional theory. Hildred Schuell (1964) popularized the concept of aphasia as a unified disorder or unidimensional phenomenon instead of resorting to all sorts of overlapping categories within the disorder.

Schuell's theory of unidimensionality of aphasic disturbance is grounded in test and clinical data obtained from a factor analysis of the Minnesota battery of aphasia tests of 157 aphasic patients. Schuell identified five factors which could account for the pattern of aphasic behavior. However, factor one--language behavior--was the most significant factor of the five in that it accounted for 41% of the test variance. This factor, Schuell proposed, represented a general dimension of language behavior that crosses all language modalities since 45 of the 69 tests from every section in the test battery were heavily dependent on just Factor One. Furthermore, the tests which loaded on Factor One involved kinds of integrations which could not be attributed to organization of motor responses or to events in outgoing pathways. Rather,

they involved utilization of a broad ability which was dependent upon higher level organizations. Consequently, it was this factor which provided evidence of aphasia as a general, rather than a modality specific, reduction of language which cuts across various language modalities such as comprehension of spoken language, speech, reading, and writing on which the various perceptual, sensorimotor, or motor deficits may or may not be superimposed.

Correspondingly, Schuell's concept of the cause of this general language breakdown reflected a broad and dynamic view of the language process and appears to encompass far more than a language mechanism which can only generate highly learned semantic responses. She hypothesized that an individual is aphasic because of brain damage or a lesion in his/her brain which interferes with processing of verbal messages, that is, the analysis and integration of verbal messages. All aphasic individuals, Schuell said, show some impairment of vocabulary and of verbal retention span, with a proportionate amount of difficulty in formulating and responding to messages at some level of complexity. It is apparent that a concrete as well as an abstract language component can be inferred from the unidimensional model. Specifically, the aphasic individual's inability to retrieve and use language, to communicate a variety of ideas may be highly suggestive of a reduction in linguistic abstraction.

Thought process theory. Wepman (1972, 1976) took "a new look" at aphasia treatment and advocated a "nonlanguage, content-centered discussion therapy" for aphasic individuals. Wepman noted that aphasic individuals often substitute words which are associated with the actual words that they are trying to produce and that the remainder of the communication effort often relates to the approximated rather than to the intended word. Wepman, therefore, seemed to suggest that limitations in abstract thought process may be the basis for aphasic language impairment. Wepman viewed thought processing as the ability " . . . to symbolize both verbally and nonverbally at both the levels of concrete and abstract operations; to retain and recall past associations to presenting stimuli . . . " (p. 131). In his earlier work (1951), he indicated that the major aspect of thinking disorders in aphasia was the individual's inability to form abstract concepts. As a result, Wepman urged that remediation activities of language should not be on names (words) or other specific language activities. Rather, emphasis should be placed on content and ideas. Furthermore, because the aphasic individual displays a paucity of ideas, concreteness, and limited associations, Wepman advocated the stimulation of the aphasic subject's thought process by indirectly encouraging him/her to talk about things of interest to him/her. To this extent, Wepman's thought-centered theory represents a reflection of

a proclaimed low level of abstract thinking or inability to abstract in aphasia.

Regression theory. Roman Jakobson's (1968) concept of aphasia involves the assertion that aphasia represents a regression of language to a stage of language development, a kind of development in reverse. According to Whitehouse, Caramazza, and Zurif (1978), a clear statement of this relation between stages of language and thought and language breakdown appeared in Jakobson's Child Language, Aphasia, and Language Universals (1968). The thesis of Jakobson's theory is that the pattern of language dissolution in aphasics is similar, but in reverse order, to the pattern of language acquisition in children. Those aspects of language competence acquired last or, more precisely, those that are most dependent on other linguistic developments,. are likely to be the first disrupted consequent to brain damage, whereas those aspects of language competence that are acquired earliest and are thus "independent" of later developments are likely to be most resistent to the effects of brain damage (p. 145).

Acceptance of this regression hypothesis implies that language knowledge consists of a hierarchical or layered sequence of mental structures: at the "bottom" are the first acquired and more primitive; at the "top" the last acquired and those currently in use. This view of a transitional or hierarchical relationship in language behavior

(i.e., the microgenesis of language) permits a number of brain-behavior interpretations. For instance, Wepman (1951), commenting on the regressive linguistic phenomenon, indicated that "cortical impairment reduces man to a more primitive level of thought, from the abstract to the concrete" (p. 191). Wepman and Jones (1961) proposed that the varieties of aphasia could be scaled so as to correspond to the stages of development of speech in a child; that is, the major aphasic syndromes could be regarded as steps in a scale of regression. Rochford and William (1962, 1965) tested whether aphasic individuals' misnamings could be related to the age at which children learned the words. They found a close parallel between the number of correct responses given by the aphasic adults to the word and the age at which children had learned the names. It seems that the names first learned in childhood are the names last lost in aphasia. Rochford and William reported that the similarities between the performances of children and aphasic adults are so close that it almost seems possible to speak of a "naming age" in aphasia.

According to this model, the major principle of aphasia therapy is that recovery proceeds in distinct developmental steps. This process should ideally demonstrate the developmental steps of word finding found in microgenetic experiments with normals. That is, therapy should start with the use of letter combinations as cues, followed by a stage where the semantic sphere emerges without being

able to advance toward verbalization, and, finally, the semantic sphere emerges to a more general categorical stage of the correct word. Regarding therapy in aphasia, Werner (1965) stated that

> . . . whereas paraphasic performance emerges through microgenetic derailment, re-educational guidance toward healthy language seems to be consistent with developmental stages observable under normal conditions of microgenesis (p. 354).

Summary of related theories. The theories of aphasia--including Jackson's propositional theory, Goldstein's abstract-concrete theory, Chapey's semantic theory, Schuell's unidimensional theory, Wepman's thought-process theory, and Jakobson's regression theory--have indicated that there are characteristic patterns of difficulty in the language of aphasic individuals. Further, these theories reveal that aphasic individuals demonstrate specific impairment of vocabulary performance as part of the aphasia symptom complex. More importantly, these theories not only provide strong support for the existence of a vocabulary deficit among aphasic individuals but also provide strong support for aphasia as a specific impairment of abstract-verbal language. An outgrowth of these theories is the contention that aphasic individuals typically retain specific, concrete responses even when the responses that act as symbols for abstractions are not retained. The present study affords an opportunity to test the abstract-concrete

dimension of verbal language with reference to word definitions.

Studies related to the abstractness-concreteness dimension in word definitions of normal and aphasic individuals are reviewed in the succeeding sections.

Related Studies on Abstract-Concrete Dimension of Word Definitions

Word definition performance in normal children. A number of studies have explored some of the possible forms verbal definitions might take in the normally intact brain. For the most part, such studies have incorporated the notion of qualitative definitional forms. For example, Anglin (1970) states that "it is a commonplace saying that the mind of a child is relatively 'concrete' and the mind of an adult 'abstract'" (p. 10). The words concrete and abstract are sometimes used in the sense of subordinate and superordinate. In this sense a relatively concrete mind would speak with subordinate categories, e.g., "apple," and an abstract mind with superordinate categories, e.g., "fruit."

With respect to children, qualitative studies have included the work of Chambers (1904) who tested 2,922 children and young people ranging in age from five to 27 years. He asked them to define and tell what they meant by selected words; and the results showed that the definitions could be classified under four headings: (1) no

answer, signifying absence of content; (2) wholly wrong answers; (3) vaguely right answers, i.e., having one or more correct features; and (4) correct answers. He summarized his findings by indicating that in the early years of life, there is an accurate knowledge of only those things which are most immediate and familiar. He also drew attention to the fact that a correct definition in the early years is "a mere outline, a framework of bare essentials which in later years is filled with various details" (p. 37).

Kirkpatrick (1938) also indicated growth in the character of the definitions attached to words. As a result of studying the word definitions of children in primary grades through college, he concluded that

> Descriptions which are so common in the high school and college papers are rarely or never given by children in the primary grades. The same is true of definitions by synonyms and inclusions under large terms. The younger children always define by mention of specific incident, e.g., "a chair is to sit on," "baby stands up in a chair," "a bee goes around a piazza and makes a noise." What anything can do, or what can be done to it, or with it, is of most importance in early knowledge of all things; hence we find the definitions of children expressing action and use more than anything else (p. 17).

Marx (1928) carried out a qualitative study of the first 50 words of the Stanford-Binet (Binet, 1915) vocabulary on a fairly large group of children and adults and reported that the highest quality types of definitions in relation to chronological age were those of the synonym and

genus variety. Lowest on the scale were those definitions using illustration, use, and repetition as responses. This work confirms the earlier work by Dolch (1927).

Green (1931) also qualitatively analyzed the responses of 718 school children and 110 adults in 50 vocabulary words (45 of which later became the Form L Vocabulary Test of the 1937 Revised Stanford-Binet). She worked out a method of weighting scores for each word in accordance with the relation between the quality of response and the developmental level of the subject. She found that children ages six and seven were characterized by "use" definitions and that young children perceived words as concrete ideas. She, therefore, concluded that the power of generalization was not yet fully developed sufficiently to make it possible for them to define orange as a "fruit" but, rather, as "you eat it." Even though this work used a somewhat different classification from Marx (1928), Green's (1931) results followed the same trend of Marx.

Feifel and Lorge (1950) gave the Binet vocabulary to 900 children aged 6-14 and analyzed their responses by means of a five-fold classification system. They found that younger children most often employed the use, description, illustration, demonstration, inferior-explanation, and repetition types of responses, whereas older children most often used the synonym and explanation types of

response. Younger children defined words more concretely, and older children more abstractly.

Storck and Looft (1973) reported similar findings on word definition performance. This study replicated the research of Feifel and Lorge's (1950) into the adult and aged portions of the life span. They observed a developmental trend in the character of word definitions that was similar to the findings of Feifel and Lorge. The developmental trend was one of progression from concrete and action-oriented definitions in early childhood to more abstract and conceptual formalizations in later childhood and adolescence; apparently little change occurred in the structuring of word definitions throughout the vast remainder of the life span. Thus, their findings indicated, as in earlier studies, that definitional performance parallels development in intellectual processes are outlined by qualitative theories of cognition such as that of Piaget (1926, 1929, 1970).

Implied in the foregoing findings is that words and quality of the definition in a well-developed language could be arranged in a hierarchy of ascending levels of increasing generality, with those serving "as labels for concrete particular things at the lowest level and those having reference to the most universal and abstract of concepts at the highest" (Watt, 1944, p. 53).

This finding seems to provide a basis for Gerstein's (1949) theory that concrete or descriptive definitions of

words represent the lowest level of intelligence. Hence, definitions by functional attributes are replaced by abstract responses as the child gets older.

Additional evidence for the development of more abstract conceptualization of words may be found in more recently reported research. Palermo and Molfese (1972), for example, reported that their results may be interpreted as an indication of the relation between semantic development and general conceptual development of children. They stated that there are, indeed, "indications of moving from the ability to conceptualize in terms of concrete operations to more abstract levels at about 11 or 12 years of age" (p. 424). Al-Issa (1969), Gerstein (1949), Gray and Holmes (1938), Reichard, Schneider, and Rapapport (1949), and Wolman and Barker (1965)also examined this possibility and found that concrete and functional definitions of words give way to abstract definitions at about 10 to 12 years of age.

Word definition performance in normal adults. Regarding level of word definitions in normal, older-aged adults, research has included the work of Fox (1947) who found no significant change in the qualitative responses of the 70 year old group as contrasted with the 40 year old group of subjects. Similarly, Feifel (1949)--using groups aged 15-29, 30-49, and 50-79--found no evidence of a decline in the quality of responses with increased age comparable to

the rise in quality in children. He concluded that "on the whole no clear differences appear to exist between the younger and older normals in their choice of types of responses." This finding confirmed an earlier study by Green (1931) in which she administered 50 words (45 of which became the 1937 Terman vocabulary) to a group of 110 adults ranging in age from 19 to 84. She discovered that there was no great change in vocabulary score after the early twenties.

Storck and Looft (1973) reported similar findings on vocabulary or word definition performance. They replicated an earlier study by Feifel and Lorge (1950) in which the latter involved 6-14 year olds by extending the age range to 66+. Like Feifel and Lorge (1950), Storck and Looft (1973) found a developmental progression, with age, occurring in the quality of word definitions as well as in the range of vocabulary. Specifically, they found that synonyms increased in frequency through childhood and were the predominant form of response throughout adulthood; that use and description forms were rare, but were somewhat more common in the youngest subjects; that explanations were slightly more frequent in the adult years; that demonstration and illustration forms were rare and indicated no age trend; and that error rate decreased through the childhood and adolescent years.

Swaard (1945) matched a population of 45 university professors aged 60 to 80 against a control group of 45

younger professors and instructors aged 25 to 35. He concluded that in word knowledge on general vocabulary, the older aged are uniformly superior to the younger aged.

David (1960) investigated vocabulary ability and the difficulty of the associates to be learned. He divided his elderly subjects (over 60 years of age) and his younger subjects (19 to 35 years) into three groups based upon their WAIS vocabulary scores (high, medium, and low). Then he classified his paired associates into two groups: hard and easy. David found that the more difficulty of the two groups of paired associates made for a larger decrement in performance with age than did the easier group of associates. The subjects who had higher vocabulary abilities performed better than those who had lower vocabulary abilities. However, the magnitude of the difference between performance was similar for the older and the younger groups, i.e., the role of vocabulary level was the same.

Thorndike and Gallup (1947) administered an untimed, multiple-choice vocabulary test made up of items taken from an intelligence scale to a sample of American adult voting public. They reported that age differences for the test were almost nonexistent and that it was not until the "over sixty" age group that any substantial drop in vocabulary score was observed.

The experiemental evidence above seems to substantiate the contention that vocabulary performance follows a

progressive developmental trend not only in the vocabulary range but in the character of the definition as well from childhood to adulthood and declines little, if at all, with increasing age in normal individuals. Furthermore, analysis of the qualitative studies indicates that there are many possible methods of approach used in defining a word, some of which are easy, others comparatively difficult. Thus, the character and quality of the word definition given by an individual can throw light on the conceptual level or mode of thinking of the individual.

Word definition performance in aphasic individuals. Unlike the study of word definitions in normal individuals, only a few research attempts have been made to systematically study word meaning from a qualitative perspective in aphasia. One such investigation was the study of connotative meaning and use among aphasic individuals as it relates to denotative meaning (Gardner and Denes, 1973). Their purpose was to determine the aphasic individual's sensitivity to the connotative or expressive meaning of abstract and concrete words. They administered a modified version of the semantic differential to 12 aphasic subjects and found that a subject's performance on the test of connotative comprehension correlated highly with his/her performance on tests of denotative comprehension. They also concluded that the aphasic subject's comprehension of abstract nouns was as well preserved as his/her comprehension of

concrete nouns. This finding seems to contradict the general belief about the effects of abstract and concrete stimuli on aphasic individuals' performances (Goodglass, Hyde, & Blumstein, 1967; Gardner, 1973; Halpern, 1965; Oldfield & Wingfield, 1965; Rochford & William, 1965). In general these studies have advanced the hypothesis that the lower (i.e., concrete words) the level of word abstraction, the better the aphasic individual performed on it.

Okado and Sachio (1980) investigated the relationship between anomic aphasic symptoms and word meaning. They analyzed the spoken expressions of aphasic subjects and found that repetitious speech usually occurs in word definition response performance in aphasia and that some of the subjects repeated phrases again and again without paying any attention to what was said to them. This finding, they concluded, revealed that such word meaning disturbances in adults represented an impairment in cognitive-intellectual ability. In word definition performance, this kind of impairment will generally reflect an increase in Error type responses in the aphasic individual.

Gil (1980) also looked at word definition response performance in 41 aphasic subjects. His results revealed that the restriction of the semantic field in the course of aphasia is greater for the connections that require a prevous transfer of meaning (in the case of connotative meaning) than it is for the semantic relations that preserve the word's proper (denotative) meaning.

Wilcox, Davis, and Leonard (1978) examined the ability of 18 aphasic and normal individuals to comprehend utterances when correct interpretation required integrations of extra-linguistic cues in a natural setting. They used videotaped situations in which the correct interpretation of an utterance was not the denotative interpretation but was the meaning conveyed by the request in a particular context (connotative). The aphasic individual's performance with connotative meaning was superior to his/her performance on denotative meaning as determined from a battery of auditory comprehension tests. They concluded that standardized tests of auditory language comprehension, therefore, offer a measure of aphasic breakdown in linguistic processing but do not adequately reflect aphasic individuals' preceptive abilities in natural communicative settings. This finding suggested that the aphasic individual performed better in response to a contextual-dependent conveyed (concrete) stimulus than a denotative conveyed (cognitive) stimulus. In contrast, Ammon, Moerman, and Guleac (1977), in a study dealing with the question of whether in aphasia connotative meaning is disturbed, found that aphasic subjects have a disturbed perception of connotative meaning. They tested 26 German-speaking aphasic subjects, 23 Dutch aphasic subjects, and 19 French-speaking aphasic subjects, ages 45-48 and age-matched controls. The method used consisted of matching words to meaningless figures. It was proven that aphasic subjects

from different countries have a disturbed perception of connotative meaning.

In a study of word meaning by Woll, Cohen, and Kelter (1979), four groups (20 patients in each) with the following syndromes were tested and compared: Broca aphasics, Wernicke aphasics, brain-damaged nonaphasics, and chronic schizophrenics. The task was to select two out of three pictures that referred to the same object in two series. In one series, two of the three pictures showed parts of the objects. In the second series the objects appeared with typical situation backgrounds. In each series the third picture had a conspicuous physical or semantic feature in common with one of the other two pictures. Aphasic and nonaphasic brain-damaged patients performed equally well when identifying objects from common situation backgrounds. However, when the pictures showed parts of objects, both of the aphasic groups performed significantly worse than the brain-damaged nonaphasics. Schizophrenics did not differ significantly from any of the other three groups. It was concluded that aphasic subjects possess only limited components of concepts in making choices or interpretations.

Whitehouse, Caramazza, and Zurif (1978) found dissimilar results. They explored the word retrieval or naming difficulties of Broca aphasics and anomic aphasics in relation to a recently developed model of the normal mental lexicon that stresses (a) the importance of integrating

perceptual and functional information in the act of naming and (b) the inherent vagueness of conceptual categories based on such information. Ten 50-65 year old subjects were shown line drawings of various food containers varying in physical features such as height and weight. They were required to select a name for the object from a multiple-choice list (cup, bowl, glass). The Broca aphasics showed relatively normal naming profiles. In contrast, the posterior patients were unable to integrate perceptual and functional information and were insensitive to the fuzzy boundries between conceptual categories. These authors concluded that the results for the posterior patients reflect an impairment in the underlying conceptual organization rather than retrieval difficulties.

Another study of auditory comprehension and word meaning was that of Pizzamaglio and Appificiafuoco (1971). They constructed a 30 item multiple-choice test designed to evaluate the ability of aphasic subjects to understand the meaning of words in clusters of semantically similar alternates. Four-picture clusters containing pictures such as "hand," "foot," "leg," and "finger" were presented visually and subejcts were asked to point to the picture having the highest degree of "associative overlapping." Aphasic subjects made significantly lower scores than nonaphasic subjects; however, neither Broca and Wernicke aphasics nor Broca and amnesic subjects who were matched for severity of

overall comprehension impairment performed differently on the test.

A set of investigations has examined the word meaning performance of aphasic individuals in a related task of word association response. One such study is that of Goldfarb and Halpern (1981). They presented a word association test to a group of 32 aphasic adults and 32 normal adults similar in age, sex, and education. They found that for the aphasic subjects, the percentage of categorical or paradigmatic word association responses increased as the level of word abstraction decreased. They concluded that this finding appeared to be an exclusively aphasic response, because no clear pattern of abstraction level preference emerged in the responses of the normal control group.

Semenza, Denes, Luchese, and Bisacchi (1980) investigated conceptual structures in aphasia using a nonverbal test given to 14 Broca and Wersicke's aphasics and seven control subjects. They found that the understanding of categorical or class and thematic or contextual relationships was selectively impaired in aphasic individuals. Broca's aphasic subjects showed difficulty in evaluating thematic relationships and did not differ from normal controls as far as class relationships were concerned. The opposite occurred in Wernicke's aphasic subjects whose defect seemed to be selectively restricted to class relationships.

Zurif, Carmazza, Foldi, and Gardner (1979) looked at eight aphasic and four normal subjects on a word recognition task. On only one trial, some words were instances on the superordinate category (thus presupposing a common abstract conceptual feature) and words could be linked thematically in the sense of forming context-dependent relations. Their results showed that the verbal memory limitations in aphasic individuals, as indicated by their response either in terms of superordinate categories or in terms of concrete, thematic relations, are only in part limited to constraints on the abstract-concrete conceptual features.

With respect to aphasic individuals, given the foregoing research studies of word definition response performance in aphasia, it is impossible to explicate the absolute nature of the conceptual change, if any, in the quality of their response. However, a number of the studies cited did yield experimental evidence to support the contention that aphasic individuals display difficulty in their ability to communicate, to form concepts, and to reason symbolically with words. When we inquire about what it is that makes the use of verbal language, as manifested in a word definition, in aphasia more difficult in some situations than in others, it is wise to consider a whole set of influences (Lesser, 1978), some of which go beyond the realm of the word's definition. The next section addresses one such influence, frequency of word occurrence,

which is expected to affect the aphasic individual's use of language.

Stimulus Variable Affecting Word Definition Performance in Aphasic Adults

Frequency of word occurrence. Word frequency is the frequency of occurrence of a word in the English language estimated on the basis of the Thorndike-Lorge word count. "Man" and "hat" are examples of frequently used words. Research findings vary in the reported difficulty of aphasic individuals in their use and understanding of words of low and high levels of frequency. For instance, Filby, Edwards, and Seacat (1964) reported that aphasic subjects demonstrated equal difficulty on words of frequent and infrequent occurrence. In contrast, Siegel (1959) found that when his 31 subjects were asked to respond to word stimuli, their errors increased as word frequency level decreased. Similarly, Gardner (1973, 1974), in testing for the influence of word frequency on recognition of certain objects in 11 aphasic subjects, found that word frequency is a variable in aphasic individual's language performance.

Other studies have also revealed that word frequency does not create a differential effect in aphasic individuals' language performance. Marshall and Brown (1971) particularly examined the effects of word frequency upon verbal retention of aphasic adults. They constructed an experimental task of picturable nouns based on high,

moderate, and low frequency levels of occurrence from the Thorndike-Lorge (1964) word list. Their results revealed that degree of word frequency did not differentially affect aphasic subjects' vocabulary performances. Based on this finding, they concluded, like Schuell (1964), that aphasia reflects a unidimensional degree of impairment rather than a processing deficit on a particular semantic level.

Lohman and Prescott (1978) and Klatt (1978) also examined the effects of word frequency on word performance of aphasic individuals and, like Marshall and Brown and others, they found that word frequency did not create a differential effect in aphasic individuals' vocabulary performance. Lohman and Prescott particularly stressed that word frequency was not a variable in the performance of aphasic adults when word frequency, size, shape, color, and array of stimuli on the Revised Token Test (Vignolo & Derenzi, 1962) were equated.

Klatt (1978) looked at word frequency as a variable in the definition of anomia. Eighteen adult mild-aphasic individuals were required to read list of words that were controlled with respect to length, frequency of occurrence, and part of speech. Results showed that part of speech category had a significant influence on readability, whereas word frequency did not.

Frequency of word occurrence in English has also been verified in the context of word association response

performance of aphasic subjects. For example, Goldfarb and Halpern (1981) examined 32 aphasic subjects' performance on a word association task and found that frequent words resulted in more paradigmatic (class) responses than did infrequent words. This result occurred, according to Goldfarb and Halpern, because frequent words, which are learned earlier in life, are closer to the automatic level of speech (e.g., naming days of the week, naming months of the year, using profanities, etc.) and are more preserved in aphasia.

The experimental studies cited above have examined frequency of word occurrence as a contributing variable in the ease of langauge use by aphasic individuals. In general, these studies found inconclusive results relative to the effect of frequency of word occurrence on aphasic individuals' language performances. Thus, there appears a need for further research on frequency of word occurrence as a variable of study in aphasia (Gardner, 1974; Lohman & Prescott, 1978; Siegel, 1959).

Summary of Related Literature. The frequency of a word has been shown to vary in its effect upon aphasic individuals' language performances. Such data, according to Duffy (1981), are largely the result of basic clinical and experimental research. Furthermore, Holland (1975) and Tikofsky (1971) have suggested that such data are invalu-

able because one of the strategies in designing aphasia treatment is to follow "leads" provided by research.

The relationship between the production of a definitional response and language was explained in this review and related to a hierarchical or developmental progression from concrete to abstract language. Presumably, the making of a word definition by an invidual provides a measure of that subject's ability to verbalize what he means by the words tested (Moran, 1953; Cottrell, 1980). When the quality of the verbalization is examined, it can be found that everyday concepts vary along a continuum ranging from concrete to abstract. At the concrete end of the continuum lie those concepts that are defined in terms of their physical characteristics, like a particular kind of flower or make of car. Concepts that lie toward the abstract end of the concrete-abstract continuum are thought to be characteristic of idiosyncratic or mental representations. Therefore, the definitional test provides support relative to an interesting speculation: the concrete level of functioning of aphasic individuals should be reflected in definitions of a lower conceptual level than definitions given by nornal subjects.

The retrieval or expression of a word definition, then, reflects the use of words as conceptual instruments, i.e., "the ability to communicate, to form concepts, or to reason symbolically with words" (Moran, 1953). In this respect, definition of a word appears to be an intrinsic dimension of language which can be impaired in aphasia.

CHAPTER III

METHODS

The general goal of this study was to investigate qualitative differences in the verbal definitions of selected nouns offered by aphasic and nonaphasic adults. The chapter describes the procedures that were used to achieve this purpose.

Operational Definition of Terms

In order to assure a common frame of reference, the following terms are defined as they will be used throughout this study.

Aphasia refers to a language impairment due to brain injury.

Language refers to the symbolization or codification of concepts used to express ideas about the world (objects, events, and relationships) which is governed by the use of an arbitrary system of signals agreed upon by a community of language users (Bloom & Lahey, 1978).

Word definition response refers to the ability to select and organize words in a meaningful way. It involves memory, motor behavior, perception, motivation, and a knowledge of sentence structure (Harrington and Ehrmann, 1954).

Abstract word definitions refer to concepts in terms of categories or classes that are generalizations of what one means about the word (Botwinick, 1967). The choice definition is a synonym or substitute term for the stimulus word, e.g., "car--auto" (Papania, 1954).

Concrete word definitions refer to concepts in terms of Use and Description, Inferior Explanation, Repetition, and Demonstration responses that do not incorporate what one means by the object into a broader context of that which can be expressed linguistically. The concepts formed are not much more than literal recognition responses to the specific object (Botwinick, 1967; Papania, 1954).

Word frequency refers to the number of times a word occurs in a sample of a fixed size (Howes & Geschwind, 1964).

Attitude refers to a disposition to evaluate certain objects, actions, and situations in certain ways (Bruner, Goodnow, & Austin, 1956); attitude is a way of conceiving an object and is the mental counterpart of an object (Faris, 1931).

Concept refers to all the knowledge an individual possesses about a category of events or objects denoted by that word (Anglin, 1970; Litowitz, 1981); the association between a common response (often verbal) and a word; the cluster of different meanings and associations surrounding common words and ideas (Osgood, 1953).

Subjects and Subject Selection Criteria

General criteria. The subjects of two groups of male and female adults (20 subjects per group): a group of aphasic and a group of nonaphasic individuals.

There were no restrictions on race, occupation, or socio-economic status. All subjects had to be at least 45 years of age to participate in the study, and the subjects had to have at least a seventh grade education. Nonaphasic subjects, however, were matched as closely as possible to the aphasic subjects on the basis of age, sex, and education. The distributions of aphasic and nonaphasic subjects with respect to age, sex, and education are summarized in Table 1. All aphasic and nonaphasic individuals included in the study had spoken English as their native language since the third grade.

Aphasic subjects slection: group I. In addition to the above criteria, aphasic subjects were required to meet other criteria. At the time of the study, each subject (1) was or had been hospitalized for a cerebral vascular accident, (2) was in at least the third post-traumatic month, and (3) had to have been diagnosed by a neurologist as having suffered left hemisphere brain damage with right hemiplegia.

To ensure that each aphasic subject was functioning at a minimal level of language skills, selected subtests of the Porch Index of Communicative Ability (PICA) (Porch,

Table 1

Distribution of Sex, Age, and Education of the Aphasic and Nonaphasic Group

Group	n	Sex[a]	Mean Age (Years)	Age Range (Years)	Mean Years Educ.	Range of Educ.
Aphasic	20	F (10)	64.6	45-83	13.4	7-21
		M (10)				
Non-aphasic	20	M (10) F (10)	62.6	45-70	13.4	7-21

NOTE: 21 years = Ph.D., 18 years = Master's degree, 16 years = Bachelor's degree, 12 years = high school diploma, 7-11 years = actual number of years of school attendance prior to high school graduation.

[a]Numbers in parentheses indicated the number of subjects for each gender.

1973, 1967) were administered. Subjects were expected to achieve a response score of seven or higher on each subtest. In addition, aphasic subjects, like nonaphasic subjects, were presented with and expected to recognize a picture of each of the stimulus words of the experimental task used in this study (see section on criterion task, p. 50).

Nonaphasic subject selection: group II. Nonaphasic subjects were included in the present study if (1) they had no history of neurological disease and (2) they had sufficient hearing to participate in informal conversation.

Procedures for Subject Selection

The aphasic subjects were selected from several hospital and speech and hearing facilities, whereas the nonaphasics were slected through the Tri-County Office on Aging (Region 6). In both cases, with the assistance of each facility's research review committee and/or designee, the investigator initially reviewed suggested records to locate possible aphasic and nonaphasic subjects who met the criteria for this study(see Appendices A and B).

A list of names, addresses, and telephone numbers of potential subjects were obtained from the various participating facilities. To avoid invasion of the subjects' privacy, a standard form (see Appendix C) was sent to each subject's home address requesting his/her permission for participation in the study. In some cases, however, potential subjects were telephoned to request participation in the study.

Biographical data (Appendix D) and an informed consent contract (see Appendix E) were obtained from all potential subjects at the time of the initial contact. If the aphasic individual's medical history, visual and auditory acuity, language background, age, and education were in accord with the subject selection criteria, arrangements were made to administer the criterion tasks. Testing continued until 20 aphasic and 20 nonaphasic individuals met subject selection criteria.

Description and Administration of Criterion Tasks

The two criterion tasks which were used to determine the individual's eligibility to participate in the experimental task are described below.

The Porch Index of Communicative Ability (PICA). The PICA (Porch, 1973) is a 180-item test containing 18 subtests which elicits verbal and nonverbal responses. Emphasis is placed on tasks requiring speech, verbal comprehension, reading, and writing. It is considered a valid and reliable measure of aphasic impairment (Duffy, Watt, & Duffy, 1981). However, for the purpose of this study, only the first 12 subtests of the PICA were used (see Appendix F). These included the four verbal and eight gestural subtests. The last six subtests are graphic and were omitted as part of the PICA testing battery because they were not considered germaine to the purpose of this study.

The PICA was administered by a speech pathologist trained in its administration. The procedures used for testing and scoring the PICA were those established by Porch (1973). The PICA employs a 16-point multidimensional scoring system in which subjects' responses are scored for accuracy, responsiveness, completeness, promptness, and efficiency. This system has the feature of being highly standardized and applicable to all the I-XII subtests within the PICA.

The Word Recognition Screening Task. The Word Recognition Screening Task sampled the subject's ability to visually recognize and auditorially comprehend the test stimuli by pointing to them. If the individual did not recognize a picture of every stimulus word, she/he was excluded from the investigation. No cues were given.

The procedures used for the Word Recognition Screening Task included presentation of clear and unambiguous pictures from the Peabody Picture Development Kits (Dunn, 1968). A picture of each of the 20 stimuli was presented to the subject, accompanied by the following verbal instructions:

> Can you see all of the pictures on the table (gesture)? I am going to ask you to identify each of these pictures. Point to _____ (etc.).

There was no limitation on the number of times the instructions could be given. Subjects were required to indicate the correct picture in a series of pictures given for each word. Correct identification of all 20 stimulus items constituted successful completion of the Word Recognition Screening Task.

Description of Experimental Task

The experimental task required the subjects to provide a verbal definition of 20 words familiar in every day experience. The experimental task measures the ability of the subject to verbalize what she/he means by the

word and also the conceptual level of his/her verbalization (Moran, 1953).

Selection of stimulus words. The stimulus words consisted of 20 nouns as shown in Table 2. The aphasia literature (Bayles & Boone, 1982; Williams & Canter, 1981; Marshall, 1976; Santo Pietro, & Rigrodsky, 1982) suggests that 20 stimulus words can adequately elicit a reliable and sufficiently large number of definitional or verbal responses for statistical analysis.

Considering the claim that certain aspects of words influence the differential performance of aphasic individuals on a spontaneous language task (Chapey, 1977; Gorman, 1961; Santo Pietro & Rigrodsky, 1982; Spreen, 1968; Wiggins, 1971), the stimuli were selected according to three operationally defined word parameters: (1) grammatical class, (2) level of word abstraction, and (3) frequency of word occurrence.

The stimulus words were chosen using Gorman's (1961) list of single nouns which had been scaled according to their part of speech (noun), level of word abstraction (concrete), and according to their frequency levels (high or low).

With respect to part of speech, nouns may refer to persons, places, or things that can be seen, heard, felt, smelled, or tasted, or to more abstract concepts that

Table 2

The 20 Stimulus Words Classified According to Level of Abstraction and Frequency of Occurrence in the English Language

Experimental Word List		
Level of Abstractness	Index of Occurrence	Stimulus Word
concrete	A	plate
	A	telephone
	A	airplane
	A	lamp
	A	cap
	A	map
	A	knife
	A	scale
	A	clock
	A	bell
concrete	7	overalls
	9	ambulance
	8	necklace
	9	valentine
	7	microscope
	9	revolver
	14	bulb
	14	volcano
	12	bacon
	12	vase
		plate
		telephone

NOTE: Numbers in parentheses indicate the frequency of the word's occurrence: an index of 7-17 indicates a frequency of 7-17 times per one million words; an index of "A" indicates a frequency of 50-100 times per one million words (Thorndike & Lorge, 1944).

[a]Gorman, 1961.

cannot be experienced by the senses. With respect to level of abstraction, any noun that refers to objects, materials, or persons should receive a concrete rating; any noun that refers to a concept that cannot be experienced by the senses should receive abstract rating (Gorman, 1961). The word chair can be experienced by the senses and, therefore, is rated as concrete; the word independence cannot be experienced by the senses and, therefore, is rated abstract. However, for the purpose of the present study, only concrete or picturable nouns were included in the experimental word list. This constraint was necessary to reduce the possible confounding effect of lack of stimulus recognition on participants' performances.

Regarding grammatical class and ease of production, Halpern (1965a, 1965b) and Buckley and Noll (1981) are among those who have noted that aphasic individuals process nouns more easily than words in other grammatical classes, e.g., adjectives and verbs.

Finally, with respect to frequency, the occurrence of the stimulus words in the English languge was checked against the Thorndike-Lorge (1944) word list. The levels of the frequency factor were operationally defined by Gorman (1961) and used in this study as follows: low--all nouns having Thorndike-Lorge indices 7-17 occurring between 7 and 17 times per one million words in the English

language; high--all nouns having Thorndike-Lorge index "A" occurring between 50 and 100 times per one million words in the English language (Gorman, 1961).

The stimuli comprising the experimental word list, then, were chosen by selecting 10 concrete nouns at each of two levels of the frequency factor--low and high; thus, there were two treatment combinations: concrete-low (CL) and concrete-high (CH). The experimental word list used in this study can be found in Table 2 on page 53.

Procedures for Administering the Experimental Task

Testing procedures. Each subject was interviewed individually. Prior to the experimental task, all of the subjects received the two pretests, the Porch Index of Communicative Ability (PICA) (Porch, 1973) and the Word Recognition Screening Task (Schuell & Jenkins, 1961), to determine his/her eligibility for participation in the study.

Aphasic subjects received the criterion tasks prior to and on a different day of the experimental task. Typically, the experimental task was given on the day following the administration of the criterion tasks. All subjects (aphasic and nonaphasic) received the experimental task in a single sitting. All subjects were tested by the investigator, a certified speech-language pathologist, using the same equipment and materials. Each subject was tested individually. Aphasic subjects were tested at home or in the various participating hospitals or clinics.

Nonaphasic subjects were tested in a quiet room within the Tri-County Office on Aging or in their homes.

During the testing procedure, the subject and examiner were seated side-by-side. A Windsor tape recorder (model number 2244) was placed on the table, and an audio recording was made of all responses. In addition, subjects' responses were simultaneously noted by the examiner on prepared test forms (see Appendix G). When feasible, distracting visual and auditory stimuli were removed from the testing site.

In obtaining a definitional response, the verbal directions to the Experimental Task were as follows:

> Listen; and when I say a word, you tell me what it means. Are you ready? Apple. What is an apple? (etc.)

Each of the 20 task words presented in Table 2 was given singly in a random order. There was no limit on the number of times the instructions could be given. However, if the examiner sensed that the subject, after receiving the instructions, was not fully aware of the nature and requirements of the task, the examiner still repeated the instructions and added, "Guess even if you are not sure." Thus, the actual presentation of the Experimental Task did not begin until the subjects had demonstrated that they were aware of what was expected of them and that they were ready to begin. Each response ended immediately following the subject's last utterance; that is, when the subject was no longer speaking.

Once the subject demonstrated awareness of what was expected, she/he was given 20 seconds to imitate the response orally or in writing to each stimulus word. After this period, the experimenter made the transition to another stimulus word by saying, "All right, let us try something else."

Scoring of responses. The subject's audiotape-recorded definition responses were later replayed and evaluated by the investigator and one independent observer who had no prior knowledge of the subject's background or group status. Each definition response was assigned to one of five categories as devised by Green (1931) and subsequently applied by Feifel (1949) to a qualitative analysis of "abnormals" with the Terman Vocabulary List and Storck and Looft (1973) in their qualitative analysis of "normals" with the Stanford-Binet (Form L-M) Vocabulary Subtest.

The qualitative classification system provided for five categories of definition "quality" as illustrated in Table 3. The first category is that of Synonym. The second category of quality of definition provides for those definitions which give a somewhat lengthy, but essentially accurate, explanation of what the given word symbolizes. The third category provides for definitions that either describe the function of or describe the physical attributes of that for which the word stands. These two types of definitions are lumped together in the Use and Descrip-

Table 3

Qualitative Classification System of Definition Responses

Quality Levels of Word Definitions	Examples
Synonym Category I	
Synonym:	Join = connect Orange = a fruit
Explanation Category II	
Explanation:	Priceless = It's worth a lot of money. Skill = being able to do something well.
Use, Description, and Use and Description Category III[a]	
Use:	Orange = You eat it.
Description:	Orange = It's round.
Use and Description:	Bicycle = It has wheels and a handle bar.
Illustration, Inferior Explanation, Repetition, and Demonstration Category IV[b]	
Illustration:	Priceless = a gem
Demonstration:	Eyelash = subject pointed to lash
Inferior Explanation:	Scotch = hot
Repetition:	Puddle = puddle of water
Error Category	
Wrong Definition:	Orange = a vegetable
Misinterpretation	Regard = protects something
Omits:	when the word is left out
Clang Association:	Roar = raw; skill = skillet
Repetition Without Explanation:	Puddle = puddle
Incorrect Demonstration:	Eyelash= points to eyebrow

a and b Use and Description have been combined in the final scoring as have Demonstration and Repetition in keeping with Feifel's (1949) and Storck and Looft's (1973) methods.

tion category. The fourth category provides for essentially Inferior definitions. These may consist of simple Illustrations, Demonstrations, Inferior Explantions, and Repetitions of the stimulus word. The fifth category is that of Error. This may consist of Wrong Definitions, Repetition Without Explanation, Misinterpretations, Omits, Clang Associations, and Inferior Explanations. Table 3 presents a list of the categories and sample responses in each.

All word meanings to stimulus words recognized by standard dictionaries were acceptable and scored 1, 2, 3, 4, 5 according to the category to which each belonged. A tally was made of as many categories given for each word by each subject. Each subject was then represented in the data by the number of definitions she/he produced and by the distribution of these responses over the categories (see Appendix H).

One other judge independently classified each verbatim word definition into one or as many of the five qualitative categories. Any disagreements in categorization were subsequently resolved by discussion among the raters.

Statistical Analysis

The Statistical Package for the Social Sciences (SPSS) was employed on the CDC Cyber 750 computer at the Michigan State University Computer Center. The frequency of responses from all subjects for each of the five definitional

categories (Synonym, Use and Description, Inferior-type, Explanation, and Error) in each group was tallied across categories. Then the means and standard deviations for each of the five qualitative categories for each of the two groups were computed and used for further statistical analyses.

The multivariate analysis of covariance (MANCOVA) was used to control for the effects of age and education on the mean scores for each of the two groups on each of the five categories of word definition. It was further used to investigate overall between-group differences on the five word noun definition categories. In order to identify the definition response variables responsible for the between-group differences that occurred, the univariate ANOVA statistical tests were applied.

Follow-up analyses included the discriminant analysis and the Tukey t-test for pairwise multiple comparison of means. The discriminant analysis was used to find the linear combination of the five original dependent variables that "best" separated the two groups by maximizing the between-group variance. The canonical variates, derived from the discriminant analysis, represented the relative contribution of each of the five dependent variables to the separation of the two groups (Bray & Maxwell, 1982).

The multiple pairwise contrasts were used to test for significant within-group effects on each of the five definitional categories.

In order to investigate how the aphasic and nonaphasic groups' error rates increased as a function of word frequency, a series of MANCOVA was used (Nie, Hall, & Jenkins, 1972). Specifically, each subject's definition responses were recorded over the five definitional response categories for each of the two frequency subclassifications, high and low. Consequently, one to five repeated observations were obtained for the high- and low-frequency stimulus words separately.

In all the analyses, .05 alpha level was regarded as the minimal criterion for statistical significance. The results follow in Chapter IV.

CHAPTER IV

RESULTS

The general goal of the research was to document if and how aphasic and nonaphasic adults differ qualitatively in their definition responses to selected noun words. To accomplish this objective, the three major research questions posed were:

1. Are there qualitative differences in the verbal definitions of selected nouns between aphasic and nonaphasic adults?
2. What type of definitions are observed in the aphasic group and within the nonaphasic group?
3. Are there differences between aphasic and nonaphasic groups in their word definition responses to high- and low-frequency nouns?

The raw scores obtained for each of the five definitional categories (Synonym, Explanation, Use and Description, Inferior Explanation, and Error) were averaged and their means and standard deviations computed. A range of statistical procedures, which included multivariate analysis of variance and covariance and multiple comparison t-tests, were then applied to answer three research questions.

Table 4

Means and Standard Deviations of Definition Responses for the Aphasic and Nonaphasic Groups on Each of Five Defini- Response Categories Pooled across High- and Low-Frequency Words

	Aphasic Group N = 20		Nonaphasic Group N = 20	
Category	$\bar{X}$	SD	$\bar{X}$	SD
Synonym	3.70	2.89	9.50	4.41
Explanation	3.40	4.34	5.80	4.56
Use and Description	9.55	5.30	5.25	4.67
Inferior Type[a]	2.85	3.34	.85	1.41
Error[b]	1.20	2.36	.05	.22

NOTE: Values listed in this table are observed combined means for low- and high-frequency words.

[a]Inferior Type = Inferior Explanation, Repetition, Demonstration, and Illustration

[b]Error = Wrong Definition, Repetition Without Explanation, Misinterpretation, Incorrect Demonstration, Omits, Clang Association

Table 4 presents the means and standard deviations for the five qualitative response categories for each group. The data show that for the 20 aphasic subjects, mean scores ranged from 1.20 on the Error category to 9.55 on the Use and Description category. For the 20 nonaphasic subjects, mean scores ranged from .05 on the Error category to 9.50 on the Synonym category. The data reveal that the Use and

Description types of responses were given more often than any other type of definition by the aphasic subjects. On the other hand, nonaphasic subjects gave Synonym and Explanation types of responses most often.

A comparison of the mean scores for the two groups revealed that mean scores for the aphasic group were lower than those of the nonaphasic group on just two definition categories, Synonym and Explanation. On the remaining categories, Use and Description, Inferior-type, and Error, the mean scores for the aphasic group were higher than those of the nonaphasic group.

Overall, it appears that the major distribution of definition response scores for the aphasic subjects is in the concrete category (Use and Description), whereas the major distribution of definition response scores for the nonaphasic group is in the abstract category (Synonym).

Statistical Treatment of the Data

Adjusted scores for the aphasic and nonaphasic groups. In order to reveal whether observed differences presented in Table 4 with regard to the types of qualitative definitions given by the aphasic and nonaphasic subjects were statistically significant, the data were subjected to the multivariate analysis of covariance (MANCOVA). The MANCOVA was used since observed variation in the word definition performance of the aphasic and nonaphasic groups could have been confounded by known subject differences in age and

education. Table 1 (see Chapter III, p. 48) reveals that both groups differed in the range of chronological ages and years of formal education. The age range was 45-83 for the aphasic subject and 45 to 70 for the nonaphasic subjects. The range of education level was 7 to 21 years for both the aphasic and nonaphasic subjects. Age and education have been shown to affect the definition response performance of children (Cottrell et al., 1980; Papania, 1954) and adults (Feifel, 1949; Storck & Looft, 1973). Therefore, the statistical tests applied involved the use of age and education adjusted scores.

The method used to determine the extent to which the difference between word definition response performance for the two groups could be attributed to age and education involved the construction of regression equation for each variable and the prediction of a set of scores for each subject based on their correlation with age and education. These predicted scores were then subtracted from the raw scores, and the resulting group differences (i.e., the adjusted scores) on each category were used as the basis for data analysis of the aphasic and nonaphasic definition response performance in the present study (Nie et al., 1972).

Differences in education, but not for age, were observed; but when the MANCOVA was repeated with education adjusted scores, differences between the aphasic and nonaphasic groups' definition responses were essentially

identical to those obtained with the original raw scores. Therefore, the variables of age and education could not account for or explain all differences found between or within the aphasic and nonaphasic groups.

The succeeding sections describe the outcome of the specific statistical procedures that were applied to the data using adjusted scores to answer each of the three main research questions.

Aphasic and Nonaphasic Between-Group Differences

Question one addressed group differences on the five definition response categories (Synonym, Explanation, Use and Description, Inferior-type, and Error), which have been used as an index of the abstract-concrete conceptual levels of definitions evoked by a verbal stimulus.

The definitions given by each subject were scored for one of five quality levels described earlier: Synonym, Use and Description, Explanation, Inferior-type, or Error (see means and standard deviations for each group in Table 4).

The research question posed was:

> Are there qualitative differences in the verbal definitions of selected nouns between aphasic and nonaphasic adults?

The overall analysis, MANCOVA, was statistically significant: $F(5,36) = 8.97$; $p < .01$, indicating significant differences between mean scores for the aphasic and nonaphasic groups (see Table 5). To locate the definition

Table 5

Significance of Difference on Definition Response Scores on a Word Stimuli Task Between Nonaphasic and Aphasic Groups

Test	Source of Variance	Adjusted[a] F-ratio	p
Multivariate Analysis of Covariance	Group Membership	8.97	.001
Univariates	Definitional Levels		
	--Synonym	34.48	.01
	--Explanation	3.52	--
	--Use and Description	13.88	.01
	--Inferior Type[b]	7.06	.05
	--Error[c]	5.99	.05

[a]Multivariate analysis of covariance was used to control for the effects of education and age

[b]Inferior Type = Inferior Explanation, Repetition, Demonstration, and Illustration

[c]Error = Wrong Definition, Repetition Without Explanation, Misinterpretation, Incorrect Demonstration, Omits, Clang Association

response variables responsible for the significant overall effect, examination of the univariate F-ratio was necessary.

Table 5 presents the results of the MANCOVA that was applied to test for significant differences between subject groups' means on each response category. The data represent the combined results for high- and low-frequency words. As can be seen from Table 5, the univariate F-ratios, which were used as follow-up tests to explain group differences, revealed statistically significant

group effects for all categories of responses except the category Explanation.

The application of the discriminant analysis as a follow-up to the MANCOVA provided further assistance in the interpretation of the significant means' results. The discriminant analysis characterized the relative contribution of each of the five dependent variables to the significant differences between group means. Given discriminant function coefficient weights, discriminant scores were computed for each subject to reveal the extent and direction of differences reflected by the statistical test (Bray and Maxwell, 1979). The different order in which the different conceptual levels of word definitions entered the discriminant analysis are found in Table 6. It shows that the Synonym definition responses (-.84) exhibited the greatest relationship with the canonical variables (discriminant scores); therefore, Synonym definition responses were ranked as the "best" discriminator between the aphasic and nonaphasic groups and, therefore, accounted for the largest percent of score variance (36.1) between groups. The correlation between the original dependent and canonical variables and their corresponding percentage variance were ranked from high to low in the order of Use and Description, Inferior-type, Error, and Explanation (see Table 6).

Table 6

Correlation Between Dependent and Canonical Variables and Percent of Variance Listed in Order Specifying the Relative Variable Contribution to Group Separation

Variable	Correlation Between Dependent and Canonical Variables	Percent Variance
Synonym	- .84994	36.1
Use and Description	.52425	22.2
Inferior Type[a]	.37396	15.9
Error[b]	.34446	14.6
Explanation	- .26419	11.2

Note: Minus values indicate that the difference is in favor of nonaphasic group.

[a]Inferior Type = Inferior Explanation, Repetition, Demonstration, Illustration, Definition Responses.

[b]Error Type = Wrong Definition, Repetition Without Explanation, Misinterpretation, Incorrect Demonstration, Omits, Clang Association Definition Responses.

Aphasic and Nonaphasic Within-Group Differences

The second research question involved word definition responses given by each subject group without considering how the definition responses compared across the two subject groups. Specifically, the research question posed was:

> What types of word definitions are observed within the aphasic group and within the nonaphasic group?

Obtained differences between mean scores for each of the five definition categories served as the basis for analysis of within-group differences. Mean scores for each of the two subject groups were evaluated separately using the Tukey t-test for pair-wise multiple comparison of means.

The experiment-wise error rate associated with multiple pair-wise comparisons was controlled by using the analysis of variance prior to the Tukey t-test for significance of means (Bray & Maxwell, 1979). Each subsequent t-test that reached the specified alpha level of .05 was, therefore, considered reliably significant.

The t-test results, summarized in Table 7, reveal significant within-group differences among the definition categories for the aphasic and nonaphasic groups. These differences are discussed in the succeeding section.

Analysis of the mean scores for the aphasic group. In the aphasic group the reader will recall that Use and Description definitions were most frequently produced; Synonym, Explanation, Inferior-type, and Error followed in that order (Table 4). As can be seen in Table 7, application of the t-test revealed that there are significant differences ($p < .05$) between the mean frequencies of production of Use and Description and every other type. It is noteworthy that the frequencies with which Explanation and Synonym type definitions were produced did not differ.

Table 7

Mean Differences Between Word Definition Scores by Aphasic and Nonaphasic Subjects Pooled Across High- and Low-Frequency Words

	Aphasic, N=20		Nonaphasic, N=20	
Contrasts	Difference	t	Difference	t
Synonym with:				
Explanation	.30	.25	3.70	2.61**
Use and Description	-5.85	-4.87**	4.25	2.96**
Inferior-type	.85	.70	8.65	8.36**
Error	2.50	2.08*	9.45	9.57**
Explanation with:				
Use and Description	-6.15	5.12**	.55	.38
Inferior-type	.55	.49	4.95	4.64**
Error	2.20	1.83*	5.75	5.63**
Use and Description with:				
Inferior-type	6.71	5.58**	4.40	4.03**
Error	8.35	6.96**	5.20	4.97**
Inferior-type with:				
Error	1.65	1.38	.80	2.51**

NOTE: For 95 degrees of freedom, t-values required for significance are: 5% level of confidence, 1.65; 1% level of confidence, 2.33.
*significant at .05 level of confidence
**significant at .01 level of confidence

Yet both were produced significantly less frequently than the Use and Description type responses, as were the frequencies with which the remaining two categories were produced.

Analysis of the mean scores for the nonaphasic group. In the nonaphasic group, the reader will recall that synonym definitions were most frequently produced: Explanation,

Use and Description, Inferior-type, and Error followed in that order (Table 4). As can be observed in Table 7, application of the t-test revealed significant differences ($p < .05$) between the mean frequencies of each definition type and every other type with one exception: the frequencies with which Explanation and Use and Description were produced did not differ significantly from each other.

Noun Stimulus Differences

The third and final research question of this study focused on rate of error and the conceptual level of word definitions by aphasic and nonaphasic groups on words of low and high levels of frequency.

Specifically, the following research question was posed:

> Are there differences between aphasic and nonaphasic groups in their verbal definition responses to high- and low-frequency nouns?

The means computed separately for the definition responses on words of low- and high-frequency levels are presented in Table 8. A test of the differences for the overall mean scores for the two frequency levels was made using a two factor analysis of variance as found in Table 9. The overall mean score on Use and Description responses to high-frequency words (9.35) was significantly higher than the mean score of low-frequency words (5.45), revealing that Use and Description response tends to increase on words of high-frequency. On the other hand, for Synonym responses,

Table 8

Mean Values for Each of the Five Quality Levels of Word Definitions Given by the Aphasic and Nonaphasic Groups on Words of Low and High Levels of Frequency

	CATEGORIES														
	Synonym			Explanation			Use and Description			Inferior-type[a]			Error[b]		
Group	Low	High	Total	Low	High	Total	Low	High	Total	Low	High	Total	Low	High	Total
Aphasic (n = 20)	2.75	.95	3.70	1.55	1.85	3.40	4.05	5.50	9.55	1.35	1.50	2.85	.65	.55	1.20
Nonaphasic (n = 20)	6.00	3.50	9.50	2.55	3.25	5.80	1.40	3.85	5.25	.50	.35	.85	.05	0.0	.05
TOTALS	8.75	4.45	13.20	4.10	5.10	9.20	5.45	9.35	14.80	1.85	1.85	3.70	.70	.55	1.25

NOTE: Use and Description have been combined in keeping with Feifel and Lorge's (1949) and Storck and Looft's (1973) method.

[a]Inferior-type: Demonstration, Inferior Explanation, Illustration, and Explanation.

[b]Error = Wrong Definition, Repetition Without Explanation, Misinterpretation, Incorrect Demonstration, Omits, Clang Association.

Table 9

A Comparison of Word Definition Responses of Aphasic and Nonaphasic Groups on Words of Low and High Levels of Frequency

		df	MS	F	P
Synonym	Between Groups	1	168.20	47.40	.001***
	Between Treatments	1	26.45	26.05	.001***
	Two-Way Interaction Group X Treatment	1	2.45	.69	.409
Explanation	Between Groups	1	28.80	5.67	.069
	Between Treatments	1	5.00	.98	.324
	Two-Way Interaction Group X Treatment	1	.80	.15	.693
Use and Description	Between Groups	1	92.45	16.37	.001***
	Between Treatments	1	76.05	13.46	.001***
	Two-Way Interaction Group X Treatment	1	5.00	.86	.350
Inferior- (Demonstration, Illustration, Repetition, Inferior Explanation)	Between Groups	1	20.00	11.96	.001***
	Between Treatments	1	.00	.00	.999
	Two-Way Interaction Group X Treatment	1	.27	.27	.605
Error (Wrong Definition, Clang Association, Omits, Incorrect Demonstration, Misinterpretation, Repetition Without Explanation)	Between Groups	1	6.61	9.23	.01**
	Between Treatments	1	.11	.15	.693
	Two-Way Interaction Group X Treatment	1	.01	.01	.895

NOTE: A separate two-factor analysis of variance with repeated measures on one factor was performed for each of the five definition categories.

**significant at .01 level

***significant at .05 level

a reverse effect for frequency was found. The mean score on Synonym response of low-frequency words (8.75) was compared with the mean synonym of high-frequency words (4.45), revealing that synonym responses tend to increase on low-frequency words.

For the remaining categories, Explanation, Inferior, and Error type, the main effect of frequency proved to be nonsignificant at the 5% level, indicating that no differences existed between words of high- and low-frequency levels in relation to these categories. Overall, then, it seems that the frequency variable did interact with the type of definitional response given but not with group membership. For both the aphasic and nonaphasic groups, there was no systematic tendency for the subjects to give definitions in a particular category in respect to low- and high-frequency words.

In order to reveal whether there was a statistical interaction between treatment (high and low-frequency) and group membership (aphasic and nonaphasic) the two-factor analysis of variance with repeated measures on one factor was separately applied to each definitional category. The results of the two-factor analysis of variance are summarized in Table 9. It is apparent from Table 9 that interaction between levels of frequency of occurrence and the two groups for all five definition categories was not significant at the .05 level. This apparent lack of interaction between frequency of occurrence and the

two groups for the five definition categories is more clearly seen in Figures 1-5 which show the distribution of responses to high- and low-frequency words for each definitional category. Thus, the low-and high-frequency levels of words do not create a differential effect for the rate of error response by the two groups.

A significant difference between low- and high-frequency words, however, was found for just two of the five categories. Specifically, the effect of frequency for Synonym and for Use and Description was significant ($p < .001$), as indicated in Table 9.

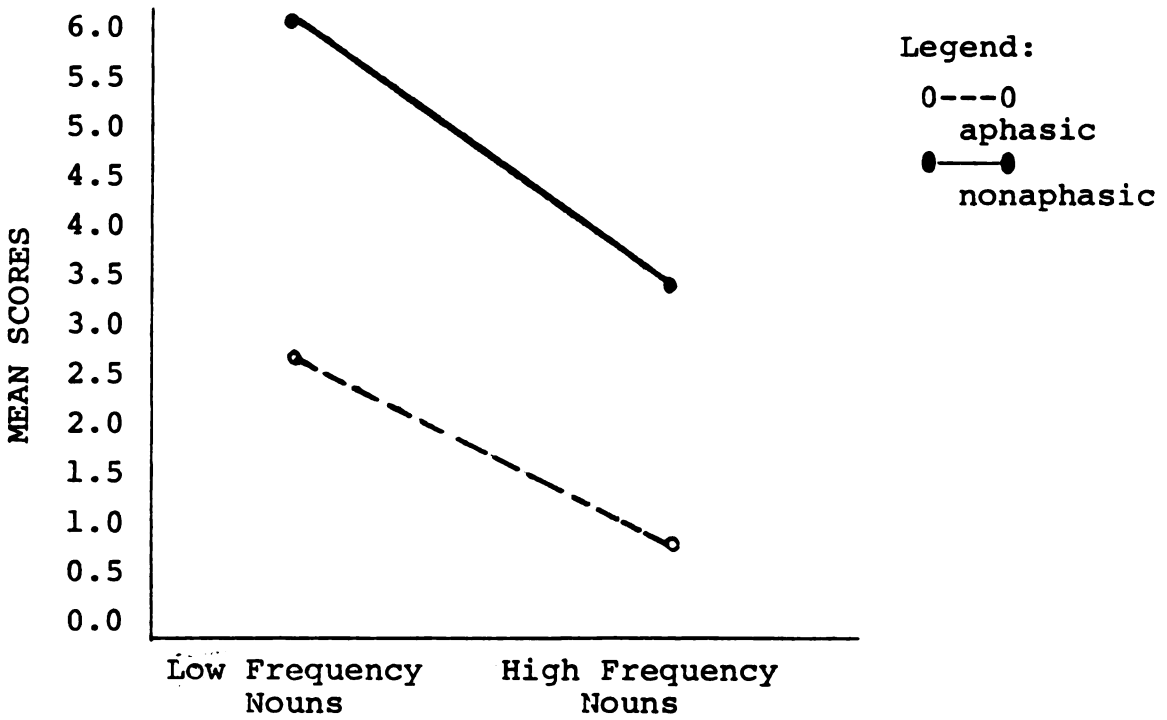

Figure 1. Distribution of Synonym Definition Response Scores for the Aphasic and Nonaphasic Groups.

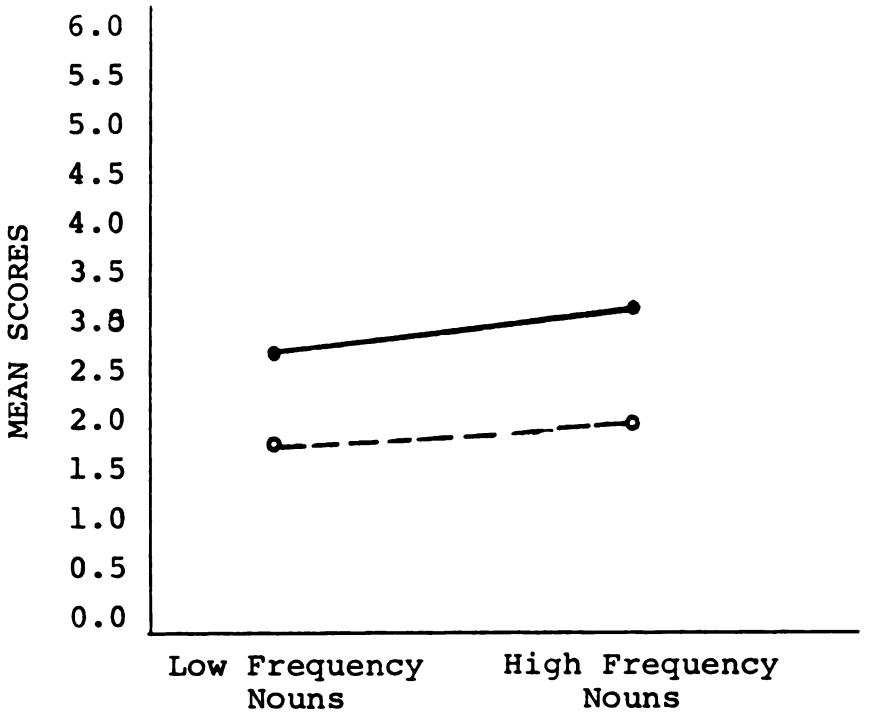

Figure 2. Distribution of Explanation Definition Response Scores for the Aphasic and Nonaphasic Groups.

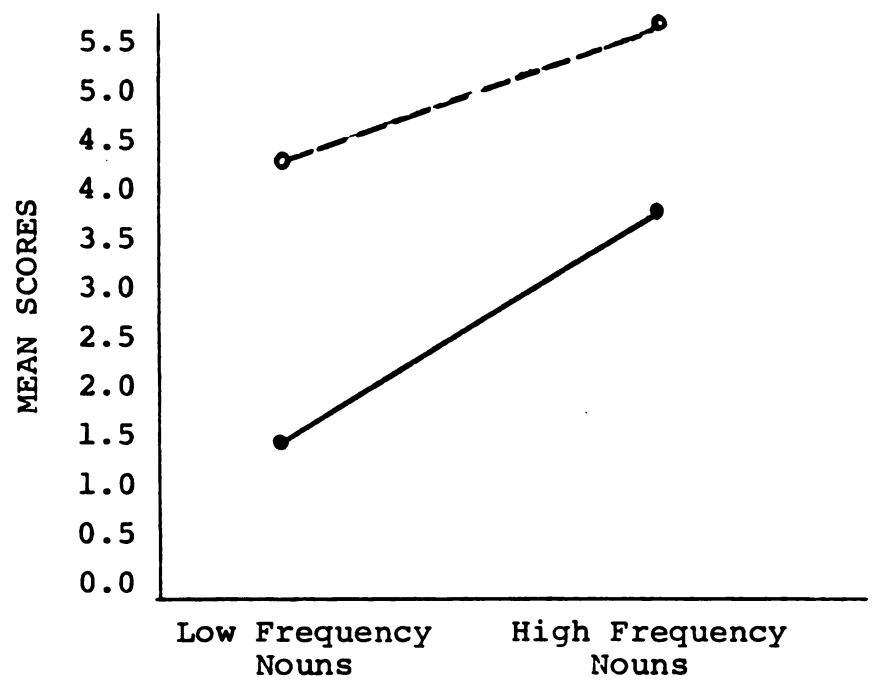

Figure 3. Distribution of Use and Description Definition Response Scores for the Aphasic and Nonaphasic Groups.

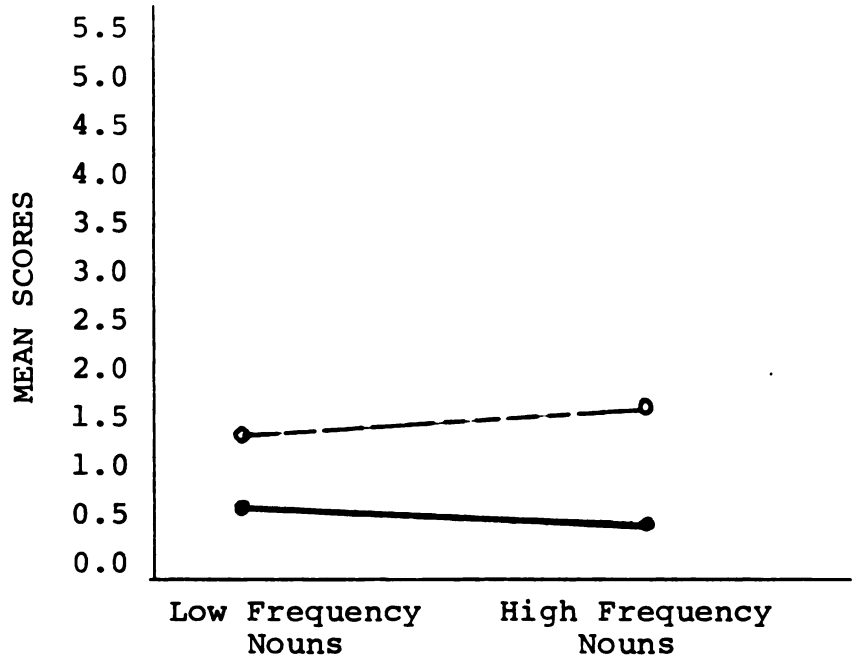

Figure 4. Distribution of Demonstration, Illustration, Repetition, Inferior, Explanation Definition Response Scores for the Aphasic and Nonaphasic Groups.

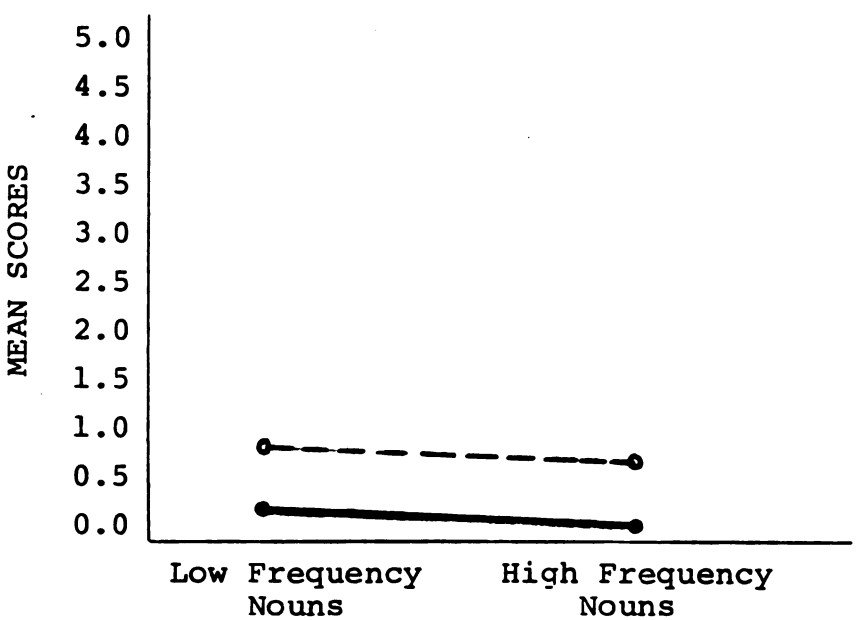

Figure 5. Distribution of Error Definition Response Scores for the Aphasic and Nonaphasic Groups.

Supplementary Analysis

Several additional findings merit description. It appears that there is some linear relationship between the variable of education and type of word definition responses given (see Table 10). As can be seen from Table 10, there

Table 10

Significance of the Relationship Between Word Definition Response Performance, Age, and Education for Aphasic and Nonaphasic Groups

Covariate	Definitional Level	r	t-value	p
Education	Synonym	.37	2.43	.05
	Explanation	.45	3.07	.01
	Use and Description	-.53	-3.94	.001
	Inferior Type[a]	-.14	- .889	--
	Error	-.18	-1.14	--
Age	Synonym	-.10	- .655	--
	Explanation	-.07	- .538	--
	Use and Description	.21	1.55	--
	Inferior Type[a]	-.11	- .651	--
	Error[b]	.01	.084	--

NOTE: Values listed in this table were computed before scores were corrected for age and education.

[a]Inferior Type = Demonstration, Repetition, Illustration, and Inferior Explanation.

[b]Error = Wrong Definition, Clang Association, Omits, Incorrect Demonstration, Misinterpretation, Repetition Without Explanation.

is a moderate relationship between Education and Use and Description performance ($r = -.53$, p .001), albeit a negative one. The two remaining significant variables, Synonym ($r = .37$) and Explanation ($r = .45$), are similarly related at the .05 and .01 levels, respectively. In particular, there was a significant and definite trend in both the non-aphasic and aphasic groups for the proportion of Synonym and Explanation type definitions to increase and of Use and Description type definitions to decrease as one moved up through the educational levels, i.e., from eighth grade to college graduate and above. Inferior-type and Error definition responses were not found to be linearly-related to education within the present study.

Regarding age, none of the five conceptual levels of word definition was found to be significant.

CHAPTER V

DISCUSSION

Previous studies dealing with aphasia tend to claim that the language deficit in aphasic individuals includes a loss of the ability to abstract and an increased tendency toward concreteness in verbal and nonverbal behavior (Goldstein, 1942, 1948; Chapey, 1977, 1981). The purpose of this study was to investigate, qualitatively, aphasic individuals' definitional level (i.e., conceptualization) to a word definition task relative to a concrete-abstract dimension of word meaning. To achieve this objective, we used a five-fold classification system of word definitions: Synonyms, Explanation, Use and Description, Inferior, and Error-type.

A major finding of this study was that whereas aphasic and nonaphasic subjects used both abstract and concrete levels of conceptualization in their word definitions, the aphasic subjects used more of the concrete definitions (Use and Description, Demonstration, Illustration, Inferior Explanation, Repetition) and Error responses. On the other hand, the nonaphasic individuals also used the concrete definitions, although their most frequent responses were of the abstract type (Synonym and Explanation). The mean frequency with which Explanation-type responses was

produced by the two groups did not differ significantly.

For all subjects, however, low- and high-frequency words did create a differential effect in the frequency of response on two of the definition types (Synonym and Use and Description). The nature of this effect was indicated by a significant increase of Synonym responses to low-frequency words and by a significant decrease of Use and Description responses to high-frequency words.

With respect to the rate of Error response, it was noteworthy that while the aphasic subjects made significantly more Error responses than the nonaphasic subjects, neither group's rate of Error responses increased significantly as a function of frequency of word occurrence.

It appears that there is some linear relationship between the variable education and type of responses given. In particular, the higher the level of education, the more likely were Synonym definitions offered.

The theroretical and clinical implications of these observations are discussed in the following sections.

Theoretical Implications

The finding in the present study that aphasic subjects used both abstract and concrete levels of conceptualization in their word definitions suggests that aphasic individuals may not be sharply dichotomized in terms of the quality of their verbal ability. That is, the aphasic individuals' responses appear to be distributed along a continuum. The finding in general throws doubt on the validity of Goldstein's hypothesis of impairment relative to

degree of abstraction in aphasia. The current finding empirically supports the conclusions of Brown (1955), Eisenson (1954), Siegel (1959), and Wepman (1951) that the absolute loss of ability to abstract was not a general characteristic of the aphasic individual.

Even though a continuum was observed in the aphasic individual's level of conceptualization in their word definition performance, there was a tendency to use more concrete responses. This finding suggests that despite the ability to shift from one level to another, there seems to be a preferred conceptual mode . Consequently, we cannot dismiss the notion that there may be a concrete-abstract dimension in language performance.

Further findings revealed that aphasic and nonaphasic individuals' frequency counts of Explanation type responses did not differ significantly, even though Explanation responses have been traditionally classified as abstract responses (Paparia, 1954). The lack of significant group differences with respect to the frequency of production of explanation definitions may be related to the stimulus word. It has been noted in the literature (Gray & Holmes, 1938; Green, 1931; Litowitz, 1977, 1981; Terman, 1937) that a word which lends itself readily to a definition by a Synonym, an Explanation response will not be given by adults; but if it is a word for which a Synonym is inadequate, an Explanation will be the most common type of adult response. If this were so, it suggests that aphasic

individuals, as well as nonaphasic individuals, might manifest Explanation type responses as an alternative verbal definition.

Even when our findings suggests that aphasic individuals demonstrated a preferred conceptual mode in their word definition response performance, it appears that word definition response performance is, nevertheless, a complex issue. For example, no systematic frequency of production in word definition responses were observed for either group for concrete or abstract levels of conceptualization. This observation suggests that whether an individual provides a certain type of definition response may depend on linguistic factors such as word frequency and extralinguistic factors such as age and education. Thus, it may be difficult to classify an individual into a neat, dichotomous category relative to abstract or concrete dimensions of language.

The lack of an increase in the rate of error responses by the two groups as a function of frequency does not lend support to Siegel's (1959) conclusion that infrequent words produced more errors than frequent words. This contradictory finding that infrequent words did not produce more errors than frequent words might be related to some aspect of the stimulus words that were used in this study. One such possibility is the function of the relative differences in the degree of abstractness between the two frequency levels of the stimulus words. Although the investigator

selected the frequent and infrequent words with a substantial buffer zone between the two frequency levels, there is a possibility that in specifying concrete words, one is not dealing with concrete words per se but, rather, with concrete ideas. For example, Halpern (1965) reported that although names of family members are polysyllabic and fairly uncommon, they are quite easily grasped because kinship experiences provide the concretizing factor. Our word list, similarly, represented familiar words with numerous referents. Thus, the frequency of the referents may have provided the concretizing factors for the subjects of this study. Spreen (1968) demonstrated that familiar words, indeed, have more meanings than unfamiliar ones and that the number of different meanings is directly propotional to the word's frequency of usage. Therefore, it seems likely that the aphasic subject's knowledge of the meanings of the concrete words used in this study and concrete words, in general, is more likely preserved in aphasia, irrespective of their frequency of occurrence.

Clinical Implications

On the basis of the current study, it is likely that the speech-language pathologist may find a continuum model rather than the categorical model of the abstract-concrete dimension of verbal language the most appropriate framework for evaluating aphasic individuals' verbal ability. This type of analysis may not only foster our general

understanding of language and its disorders, but it may also permit a more precise focusing of diagnosis and treatment of aphasia. The diagnostic and therapeutic implications that arise from the finding that a continuum rather than a categorical model of the abstract-concrete dimension in the verbal ability of aphasic individuals seems more appropriate are discussed in the following sections.

Diagnostic implications. Since the findings of this study support the observation that aphasic individuals are impaired in their ability to symbolize verbally at both abstract and concrete levels, it may be diagnostically advisable to perform a more systematic evaluation of the quality of their responses. Such an analysis may be more informative in differentiating concrete versus abstract language deficits in aphasia than traditional standardized approaches which employ the individual's vocabulary test score alone.

Beyond this, generalizing from the results of the current study, speech-language pathologists may expect to find aphasic individuals relying on Use and Description attributes when retrieving the word's meaning in language tasks. Because this definition type implies knowledge of words, their occurrence should indicate to the clinician that the individual comprehends the target word but uses a lower level of conceptualization in expressing its meaning.

The use of specific cues to aid language retrievals has been stressed as an important intervention technique (Davis, 1983; Marshall, 1976). Thus, identifying the definition types used by a particular individual could provide guidelines for choosing appropriate cueing and organizing techniques for that individual. Further, abstract verbal language evaluative procedures could be used to evaluate the effectiveness of an abstract verbal language therapeutic effort.

Therapeutic implications. If aphasia is an abstract and a concrete verbal language impairment, as the results of this study seem to suggest, therapeutic effort should be directed toward minimizing both components of the impairment and stimulating the disrupted processes to function maximally. For example, whereas evaluation of langauge abilities might involve the discrimination between abstract and concrete dimensions of verbal language within the residual speech of the aphasic individual and his/her ability to respond categorically, intervention might be directed toward facilitating a hierarchy of concept usage skills, from concrete responses to awareness of categories, to simple categorization, to exhaustive categorization within groups.

Along these same lines, remedial strategies could consist of cues directly related to the complexity of the response required. For example, a clinician, in order to

facilitate abstract verbal responses, may instruct an adult to think of a word that means the same as "car." Similarly, frequent use of the concrete attribute category by aphasic individuals may suggest that providing subjects with functional attributes of the target verbal response could aid their retrieval of those words. In other words, a clinician could establish strategies particular to an aphasic individual's own retrieval which may aid the individual's verbal language retrieval or usage.

The influence of education relative to word definition performance may provide additional insight into the design of therapy for aphasic subjects. In particular, Synonym and Explanation-type responses were observed to be positively related to education, whereas Use and Description responses were negatively related to education. This observation was shared by Feifel (1949) who showed that control over Synonym responses grows increasingly greater during higher grades in school. Clinically, this suggests that additional factors such as the educational background of the aphasic individual should be considered as a variable in the desired conceptual level of the response during therapeutic assessment of aphasic individual's vocabulary performance.

The findings revealed that high and low frequency words did create a differential effect for two of the definition types. The nature of this effect was indicated by a significant increase of Synonym responses to low frequency

words and by a significant decrease of Use and Description responses to high-frequency words. Clinically, this would seem to suggest that aphasic individuals are more likely to manifest Synonym type responses when presented with low-frequency words and Use and Description type responses when presented with high-frequency words.

In conclusion, the results of the present study suggest that a word definition response task can be a useful paradigm for the investigation of verbal language ability and especially of conceptual strategies used by aphasic persons. However, a note of caution is necessary, i.e., word definition response performance is a very complex issue as a range of factors may interact to influence the giving of an abstract and/or concrete response at any one time.

Limitations of the Study

Two limitations in particular influenced the generalizability of the findings of this study: (1) the subjects selected and (2) the study's method of scoring definitional responses. These limitations are discussed below.

Subjects. The criteria established for subject selection (for example, the minimal level of behavioral performance required on the PICA, etc.) limited the type of aphasic subject that was included in the present study. Therefore, only a narrow segment of the aphasic population was sampled. Consequently, the results can only be generalized to subjects with similar characteristics.

Method of scoring definitional responses. Because of limitations of the materials which are currently available to assess abstract and concrete verbal behavior, this study was unable to categorically define aphasia as an abstract rather than a concrete verbal disorder. To establish this, one would need to construct abstract and concrete tasks calling for the production of identical final (verbal) products. For example, hypothetically, one would need a language task that looks at only concrete verbal definitions or only abstract verbal definitions. If subjects were capable of producing specific verbal responses using a concrete verbal thought process and unable to generate the same responses using an abstract thought process, only then could one conclude that the individual possessed an abstract verbal disorder as opposed to a concrete verbal disorder. Rather, this study explored subject ability to produce some components of abstract verbal behavior and compared these behaviors with the concrete verbal behaviors of the same subjects. As we did make judgments of subjects' levels of definition (i.e., conceptualization), the present investigation was also limited in that it did not evaluate subject ability to learn or acquire abstract verbal behavior.

The summary, conclusions, and implications for further research are discussed in Chapter VI.

CHAPTER VI

SUMMARY, CONCLUSIONS, AND IMPLICATIONS FOR FURTHER RESEARCH

Summary

The purpose of this study was to investigate, using a qualitative scoring system, aphasic individual's level of verbalization to selected noun stimuli relative to a concrete-abstract dimension of word meaning. Three research questions concerning the aphasic individual's use of five qualitative types of definition responses (Synonym, Explanation, Use and Description, Inferior-type, and Error) were examined. The research questions were derived primarily from the hypotheses of Chapey (1977) and Goldstein (1942, 1948) that aphasia is accompanied by a loss of the ability to conceptualize on an abstract level and by an increased tendency toward the use of concrete forms of conceptualization. Specifically, the research questions posed were as follows:

1. Are there qualitative differences in the verbal definitions of selected nouns between aphasic and nonaphasic adults?
2. What types of word definitions are observed within the aphasic group and within the nonaphasic group?

3. Are there differences between aphasic and nonaphasic groups in their word definition responses to high- and low-frequency nouns?

The sample consisted of 20 aphasic and 20 nonaphasic subjects ranging in age from 45 to 83 years. Each group included an equal number of males and females. The aphasic and nonaphasic subjects were equated on the variables of age, education, and sex. The aphasic individuals were secured from three speech and hearing facilities. The nonaphasic individuals came essentially from the Lansing, Michigan, Tri-County Office on Aging.

The stimulus material for the study consisted of a 20-item experimental word list selected from Gorman's (1961) list of single nouns which has been scaled according to their parts of speech (noun), level of word abstractness (concrete and abstract), and frequency levels (high and low). The verbatim verbal definition response of each subject to each of the 20 stimulus words were audiotape recorded. The responses were replayed and evaluated by the investigator and one independent observer who had no prior knowledge of the subject's background or group status. Each definition response was analyzed, qualitatively, using a five-fold qualitative category system. The responses of the subjects were further subjected to statistical analysis using the Multivariate Analysis of Covariance (MANCOVA) and t-tests.

With respect to this study's research findings, research question one was answered affirmatively ($p < .05$) by comparison of between-group differences in four of the five conceptual levels of definition responses (Synonym, Use and Description, Inferior-type, and Error). The mean numbers of Explanation definitions produced by the two groups did not differ significantly from each other.

Research question two was answered by examining within-group differences observed between the mean scores for each of the two groups. We were concerned with determining the order of preference for the definition types for aphasic and nonaphasic subjects. Results revealed that there were significant differences between the mean frequencies of production of each definition type for each of the two groups. It is noteworthy that examination of the results for each of the two groups revealed generic similarities in quality but specific differences in quantity of the two groups' responses.

With respect to research question three, the results revealed significant differences in the number of verbal definitions produced by the two groups for the two levels of frequency in the definition responses, revealing that specific responses either increased or decreased with an increase or decrease in frequency of word occurrence. However, with respect to frequency of occurrence and error response rate, the low-frequency words did not produce significantly more verbal error responses than high-

frequency words for either the aphasic or the nonaphasic group.

Although not systematically investigated in this study, a significant linear relationship was found for education and word definition response but not for age.

Conclusions

On the basis of the results obtained in this study, the following conclusions are drawn:

1. From the theoretical point of view, the findings appeared to cast some doubts on the previous contention that a complete loss of abstraction is a component of aphasia (Goldstein 1942, 1948). The aphasic individuals, like the nonaphasic individuals, operated on both concrete and abstract levels. However, whereas the aphasic individual's preferred conceptual mode was concrete, the nonaphasic individual's preferred conceptual mode was abstract.

2. The clinical value of the findings of this study lies in the observation that a continuum model, rather than a categorical model, along the abstract-concrete dimension of language must be considered in evaluating an aphasic individual's level of conceptualization in verbal language. In other words, a qualitative analysis using word definition tasks may be a more informative approach than standardized vocabulary tests in focusing diagnostic and therapeutic techniques in aphasia.

3. The use of definition responses to classify an

individual into a neat, dichotomous category relative to abstract or concrete dimensions of language has been found to be a complex issue. Whether an individual provides a certain type of definition response may depend on linguistic factors such as word frequency and extralinguistic factors such as age and education.

4. The word definition task, as used in this study, seems to be a useful paradigm in the qualitative analysis of aphasic individuals' verbal responses. It appears to have both diagnostic and therapeutic value in the consideration of aphasia.

Implications for Further Research

It is believed that subsequent studies of abstract and concrete verbal ability in aphasia should include aphasic subjects who display a greater range of verbal impairment, because generalization of our results is limited only to subjects who would have met subject selection criteria of this study. The results of such a study could then possibly be generalized to the aphasic population in general.

In addition, future research using the word definition paradigm might focus on the relationship of word definition performance and site of lesion, e.g., frontal versus posterior lesions and in left versus right hemisphere brain damaged individuals. The results of this study revealed that aphasic individuals with left hemisphere lesion gave significantly fewer abstract definitions and significantly more concrete definitions than equated non-aphasics. To investigate the specific nature of this connection in other samples, e.g., frontal, posterior, and right brain damaged individuals, may be a fruitful task for future research.

Finally, future studies on the complexity of the response required in the vocabulary performance of aphasic individuals can be investigated as a function of other word parameters: various parts of speech, concrete and abstract levels of word abstraction and length--all of which were not investigated in the present study. It seems that for the clinician employing word definition tasks to plan therapy must do so carefully, taking into consideration the notion that task performance may be related to other factors besides productive language ability. For example, evidence from the present study suggests that the type of definition response given may be heavily dependent on education but not age. Further investigation is necessary to enlighten us further regarding the nature

of the interaction between related factors as those cited above and spontaneous language production.

APPENDICES

APPENDIX A

DESCRIPTION OF RESEARCH PROJECT FOR THE SPEECH AND HEARING FACILITY

MICHIGAN STATE UNIVERSITY

DEPARTMENT OF AUDIOLOGY AND SPEECH SCIENCES EAST LANSING · MICHIGAN · 48824

Description of Research Project for the Speech and Hearing Facility

NAME OF FACILITY _____

ADDRESS _____

TELEPHONE _____

NAME OF INVESTIGATOR IN CHARGE OF RESEARCH S. Graves

Your assistance is requested in the identification of 15 aphasic individuals known to your facility for participation in a scientific study being conducted in the Department of Audiology and Speech Sciences at Michigan State University. This project is concerned specifically with speech and language of persons with aphasia. The results of the study will help to provide implications for clinical management and potentially contribute to understanding the basic nature of the language disordered behavior in aphasia.

I have met with the Speech Pathologist of your facility and she has expressed a willingness to aid us. Our intent is to acquire a list of names, addresses, and telephone numbers of individuals who have suffered left hemispheric pathology and have been judged to be aphasic.

The rights of subjects will be observed and respected. In obtaining informed consent, we realize that it will be necessary to safeguard the rights of the human research participants. We will (a) obtain permission from the subject prior to the start of the research project, (b) obtain an agreement from the subject that s/he has voluntarily expressed a willingness to participate, and (c) protect the confidentiality of research data. We will be pleased to send you a copy of the research results if you desire. Thank you for your cooperation.

Signed _____

Title _____

Date _____

APPENDIX B

DESCRIPTION OF RESEARCH PROJECT FOR THE TRI-COUNTY OFFICE ON AGING

MICHIGAN STATE UNIVERSITY

DEPARTMENT OF AUDIOLOGY AND SPEECH SCIENCES EAST LANSING · MICHIGAN · 48824

Description of Research Project for
the Tri-County Office on Aging

NAME OF FACILITY _____

ADDRESS _____

TELEPHONE _____

NAME OF INVESTIGATOR IN CHARGE OF RESEARCH S. Graves

Your assistance is requested in the identification of 15 normal, older individuals to serve as a control group in a scientific study being conducted in the Department of Audiology and Speech Sciences at Michigan State University. The project is concerned specifically with speech and langauge of persons with aphasia. The results of the study will help to provide implications for clinical management and potentially contribute to understanding the basic nature of the language disordered behavior in aphasia.

I have met with the director of your facility, and she has incicated a willingness to aid us. Our intent is to acquire a list of names, addresses, and telephone numbers of individuals who are healthy, older adults. The rights of subjects will be observed and respected. In obtaining informed consent, we realize that it will be necessary to safeguard the rights of the human research participants. We will (a) obtain permission from the subject prior to the start of the research project, (b) obtain an agreement from the subject that s/he has voluntarily expressed a willingness to participate, and (c) protect the confidentiality of research data.

We will be pleased to send you a copy of the research results if you desire. Thank you for your cooperation.

Signed _____

Title _____

Date _____

APPENDIX C

LETTER REQUESTING PERMISSION FOR RELEASE OF SUBJECTS' TELEPHONE NUMBERS

MICHIGAN STATE UNIVERSITY

DEPARTMENT OF AUDIOLOGY AND SPEECH SCIENCES EAST LANSING • MICHIGAN • 48824

Letter Requesting Permission for
Release of Subjects' Telephone Numbers

November 11, 1982

Dear _____:

I am requesting permission to contact you by telephone to arrange a time to give you several selected tests of language usage. These tests will take approximately 45 minutes to an hour of your time. The results of the tests will be used in a study entitled "A Qualitative Analysis of the Word Definitions of Aphasic and Nonaphasic Subjects," which is being done as a doctoral dissertation in the Department of Audiology and Speech Sciences at Michigan State University. Your name will be excluded from the study.

If you elect to provide consent to release your telephone number to me, you will be contacted to discuss this study further and to set a day and time that you can be tested. You will also be asked to sign an Informed Consent Form which permits the testing at your home or at our speech and hearing clinic.

This study is seen to be a worthwhile project and has been reviewed and approved by the Research Review Committee of Michigan State University.

If you wish to be contacted for participation in this study, please call Ms. Silvia Graves no later than November 30, 1982. You may call 353-9206 between 9:00 am and 5:00 pm or 353-7938 after 6:30 pm.

I greatly appreciate your cooperation in this study.

Sincerely,

Silvia A. Graves

cc: Ms. Jan Jones, Speech Pathologist
Sparrow Hospital, Lansing, Michigan

APPENDIX D

INTERVIEW FORM

Study #_____

Interview Form

PART I: BIOGRAPHICAL DATA

Name_____ Date_____

Residence_____
Is this at home? (Circle one.) YES NO

Date of birth_____ Sex (circle one): Male Female
(mo.-day-year)

Information given by_____

Race (check one): white_____ non-white_____

Education

How far did you go in school? (Fill out below.)

High school: grade completed_____ Diploma? YES NO

College: No. years completed_____ Degree? BS MS PhD
BA MA

Spouse's Education

How far did your spouse go in school?

High school: grade completed_____ Diploma? YES NO

College: No. years completed_____ Degree? BS MS PhD
BA MA

Occupational History

What is or was your occupation?_____

What were your dutues?_____

Do you expect to return to work?_____

Spouse's Occupational History

What is your spouse's occupation?_____

What are your spouse's duties?_____

PART II: LANGUAGE BACKGROUND

Cirlce one: English only Bilingual
(If English, how long have you spoken English? Age_____
Grade_____
If bilingual, brief language history:_____

_____)

Describe your speech (good? normal? abnormal?)_____

PART III: HEALTH HISTORY

Have you had any history of illness such as stroke, accident or brain injury?_____ If so, please fill in below.

Nature and duration of illness_____

_____

How long ago was illness?_____ Date of illness_____

Cause of the illness?_____

_____

What type of lesion exists (vascular, traumatic, tumor, embolism, thrombosis) (please explain)_____

What diagnostic tests were performed to determine this information?_____

_____

By whom? (name of neurologist/physician)_____

Hospital_____ Address_____

Hemiplegia (circle one): RIGHT LEFT RECOVERED ABSENT
Which hand did you prefer (circle one): RIGHT LEFT
Do you see normally?_____ If not, state the reason:

_____

Do you hear normally?_____ if not, state the reason:

_____

PART IV: HISTORY OF SPEECH THERAPY

Have you had any speech and language therapy since the onset of aphasia? (Circle one.) YES NO If so, give the name

of therapist_____

Address of therapist_____

Address of therapist_____

Type of therapy_____

_____

_____

APPENDIX E

INFORMED CONSENT CONTRACT

Informed Consent Contract

Description of Project

You are asked to give your permisiion to be tested as part of a scientific research study. You will be given a test of language usage and a task of identifying and defining 20 words.

_____ I have freely consented to take part in a scientific study being conducted in the Department of Audiology and Speech Sciences at Michigan State University.

_____ The study has been explained to me, and I understand the explanation that has been given.

_____ I agree to attend all the testing sessions of the study.

_____ I understand that I am free to discontinue my participation in the study at any time.

_____ I understand that any results will be treated in strict confidence and that I will remain anonymous.

_____ Within these restrictions, I understand that general results may be presented at professional meetings and may appear in appropriate journals and other publications.

Signed_____

Date_____

APPENDIX F

DESCRIPTION OF THE PICA SUBTESTS USED

Description of the PICA Subtests Used[a]

Subtest	Output	Task
I	Verbal	To discuss each test object, differentiating its primary characteristics
IV	Verbal	To anme each object
IX	Verbal	To say the name of each object
XII	Verbal	To imitate the name of each object
II	Gestural	To demonstrate the function of each object
III	Gestural	To demonstrate the function of each object as it is handed to subject
V	Gestural	To read each of ten cards and place it according to printed instructions near the object whose function is stated on the card
VI	Gestural	To point to each object whose function is given verbally by the examiner
VII	Gestural	To read each of ten cards and place it according to printed instructions near the object whose name is stated on the card
VIII	Gestural	To match a picture of each object with the appropriate object
X	Gestural	To point to each object as it is named by the examiner
XI	Gestural	To match identical objects with each object

NOTE: Test objects include cigarette, comb, fork, key, knife, matches, pen, pencil, quarter, toothbrush. Each subtest is composed of 10 tasks. Answers to each task are scored on a 16 point continuum according to the accuracy, responsiveness, completeness, promptness, and efficiency of a response.

[a]Porch, B. Porch index of communicative ability. Palo Alto, CA: Consulting Psychologists Press, 1967.

APPENDIX G

RESPONSE SCORE SHEET

CODE: Aphasics--1st digit of ID = 1-2-3, 2nd digit = 0-9
Normals---1st digit of ID = 5-6-7, 2nd digit = 0-9

RESPONSE SCORE SHEET

Name_____ Date_____ Study #_____ (1-2) 1(3)

Examiner_____ Test conditions_____

Missing: 5, 35, 66, 11, 41, 17, 47, 23, 53, 29, 59	I	II	III	IV	V	
Stimulus Word	Synonym	Explanation	Use, Description, and Use and Description	Inferior Explanation Repetition Demonstration, Illustration	Wrong Definition, Repetition Without Explanation, Misinterpretation, Incorrect Demonstration, Omission, Clang Association	
1. Overalls						(4-8)
2. Ambulance						(10-14)
3. Necklace						(16-20)
4. Valentine						(22-26)
5. Microscope						(28-32)
6. Revolver						(34-38)
7. Bulb						(40-44)
8. Volcano						(46-50)
9. Bacon						(52-56)
10. Vase						(58-62)
11. Plate						(64-68)

RESPONSE SCORE SHEET, continued

Stimulus Word	Categories I	II	III	IV	V	
12. Telephone						(70-74)
					Study # (1-2)	2(3)
13. Airplane						(4-8)
14. Lamp						(10-14)
15. Cap						(16-20)
16. Map						(22-26)
17. Knife						(28-32)
18. Scale						(34-38)
19. Clock						(40-46)
20. Bell						(48-52)
RAW SCORES						

NOTE: Sex (53)
Age (54-55)
Education (56-57)

APPENDIX H

TOTAL DEFINITION RESPONSE SCORES FOR EACH SUBJECT IN THE APHASIC AND NONAPHASIC GROUPS FOR THE FIVE QUALITY LEVELS OF WORD DEFINITIONS

Total Definition Response Scores for Each Subject in the Aphasic and Nonaphasic Groups for the Five Quality Levels of Word Definitions

				CATEGORIES				
Subjects	Age	Sex	Years in Education	Synonym	Explanation	Use and Description	Inferior Type; Demonstration; Inferior Explanation; Repetition; Illustration	Error: Wrong Definition; Repetition Without Explanation; Misinterpretation; Incorrect Demonstration; Clang Association; Omits
Aphasic								
1	61	M	16	6	11	2	0	2
2	61	F	12	2	2	13	3	0
3	86	M	12	1	1	18	0	0
4	53	F	8	1	0	11	4	4
5	67	M	8	1	0	11	5	3
6	65	M	18	3	1	8	6	3
7	70	F	12	0	0	4	10	8
8	61	F	12	2	0	18	1	0
9	54	F	12	6	1	9	2	2
10	68	F	12	5	2	12	1	0
11	69	M	21	4	13	4	0	0
12	54	M	12	5	5	11	0	0
13	69	M	16	9	8	7	0	0
14	65	F	14	8	10	3	0	0
15	72	F	13	4	0	7	9	0
16	78	F	14	1	0	17	1	1
17	48	M	19	5	8	5	4	0
18	82	F	12	1	0	14	4	1
19	50	M	16	4	2	7	7	0
20	63	M	9	6	4	10	0	0

Total Definition Response Scores, continued

Non-Aphasic								
21	60	F	12	8	9	9	1	0
22	64	F	12	7	0	12	2	0
23	65	F	11	16	1	4	0	0
24	65	F	12	10	4	6	0	0
25	75	M	16	12	7	1	0	0
26	68	M	12	9	3	6	1	1
27	70	F	8	6	3	11	2	0
28	59	M	17	10	11	5	0	0
29	67	F	12	6	9	3	2	0
30	68	F	14	13	4	5	0	0
31	59	M	10	7	6	7	0	0
32	59	F	13	14	3	5	0	0
33	61	M	14	2	18	1	0	0
34	61	F	14	6	8	6	1	0
35	55	M	15	10	5	5	0	0
36	61	M	21	16	2	2	0	0
37	65	M	18	11	7	3	0	0
38	64	M	18	10	9	1	1	0
39	48	M	9	6	1	9	5	0
40	63	F	10	11	6	4	1	0

NOTE: Rows total more than 20 responses because subjects could give more than one level of the five quality definition responses

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