PICTURE NAMING AND OBJECT NAMING ABILITIES IN MILD TO MODERATE, MODERATE TO SEVERE, AND SEVERE DEMENTIA OF THE ALZHEIMER'S TYPE

By

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PREFACE

This investigation compares the picture naming and object naming abilities of Alzheimer's patients classified as mild to moderate, moderate to severe, and severe.

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CHAPTER I

INTRODUCTION

The Profession of Speech-Language pathology has become increasingly involved in working with geriatric patients. This has been attributed in part to shifting age trends. Among the geriatric population referred for speech and language services are patients with aphasia or other focal neurological deficits such as apraxia or dysarthria, and those with a more generalized dementia which affects language. "Dementia" among the aging population has been estimated at less than 10% (Svanborg, 1983), and the term has been defined as "a general mental deterioration due to organic or psychological factors" (Stedman, 1984). Generally, onset of dementia occurs during the seventh decade of life. Thus the term "senile dementia" has come to be accepted and is defined as "an organic brain syndrome associated with aging and marked by progressive mental deterioration, loss of recent memory, lability of affect, difficulty with novel experience, self-centeredness, and childish behavior" (Stedman, 1984). Although onset of dementia is rare before age 65 years, when it does occur the disease is called "presenile dementia" (Stedman, 1984).

Among individuals identified as demented, Alzheimer's disease has received increased attention as an etiological factor. The patient suffering from Alzheimer's disease exhibits a variety of behavioral characteristics. Commonly observed deficits include language disorder, memory loss, and a global decline in intellectual functioning (Chui, Teng, Henderson, and Moy, 1985; Seltzer and Sherwin, 1983; Cummings, Benson, Hill, and Read, 1985; Rosen, 1983). Because of the variety of symptoms these patients exhibit and the variability in their behavior, some effort has been directed toward classifying these patients into more uniquely identifiable subtypes. Consequently, a three stage classification system based on time post-onset was developed. Shuttleworth (1984) described the typical clinical features of each of these three stage types.

Stage I (duration 1-4 years post-onset) was found to be characterized by insidious onset and steady progression of a memory disturbance followed by mood variation and changes in work habits and social relationships. Judgement became impaired, and patients developed a tendency to become lost. Furthermore, deficits in orientation, abstracting ability, judgement and affect were also noted. Recent memory abilities were more severely impaired during this stage than immediate and remote memory abilities. Additionally, constructional and calculating disabilities as well as geographic disorientation and word-finding anomias were prevalent.

Stage II (2-10 years after onset of the disease) was reported to begin when the patient started to become motorically restless and mentally and emotionally irritable. All characteristics found in Stage I continue to worsen, and apraxias and agnosias became prevalent. Memory abilities continued to worsen, and although oral speaking abilities remained fluent, they became empty. At this point in the development of the disease, the patient's language abilities were noted as markedly abnormal.

Stage III was characterized by the patient's return to the apathetic state of Stage I and by additional mental and physical deterioration culminating in immobility. Death most commonly occurred not from the disease itself but from aspiration pneumonia, a frequent occurrence in a bedridden patient. Neurologic "hard" findings became evident at this stage including gait disorders, rigidity, primitive reflexes, progressive inertia, extensor plantars, and quadriplegia. These symptoms frequently resulted in a mute, bedridden state.

In addition to studies which have described the progressive stages of dementia of the Alzheimer's type, referred to as DAT, other studies have examined the characteristics of DAT in general. Since no clinical tests have yet been developed to conclusively diagnose Alzheimer's disease while a patient is still living, diagnosis has been dependent upon behavioral characteristics and the elimination of other possible etiologies, a so called "diagnosis of exclusion". When dementia symptoms are present, however, a complete evaluation is recommended and often includes:

a) A detailed medical history, given by either the patient himself or someone well-acquainted with the patient. This portion of the evaluation is necessary in establishing progressive intellectual deterioration and personality changes, and difficulties with memory and daily activities; b) A thorough physical and neurological evaluation including evaluation of both the sensory and motor systems to rule out other diseases; c) A mental status evaluation directed toward evaluation of orientation, attention, recent recall and the ability to calculate, read, write, name, copy drawings, repeat, understand and make judgements; d) A psychiatric evaluation to rule out any psychiatric disorder; e) A thorough neuropsychological battery including evaluation of attention, orientation, language skills, and perception, and f) All routine laboratory tests including blood work, urinalysis, chest x-ray, electroencephalography (EEG), computerized tomography (CT scan), and electrocardiogram (EKG) (Alzheimer's Disease and Related Disorders Association, 1987). Additionally, other tests may also be included such as drug levels, toxic screen, brain scan, and lumbar puncture (Jenike, no date available). Due to the noted paucity of standardized measures available to identify these patients, several authors have developed and tested an inventory of diagnostic features characteristic of DAT, (Cummings and Benson, 1986) see Appendix A. The inventory developed by Cummings and Benson was based upon pathologically proven cases described in the literature, recent research findings involving DAT patients, and systematic investigations of DAT and non-DAT dementia patients. Additionally, fifty patients with clinically diagnosed dementia syndrome were selected to participate in a retrospective evaluation of the inventory. Results indicated that it was possible to differentially diagnose DAT from other dementing illnesses utilizing the criteria established in the DAT Inventory. It should be noted, however, that the DAT Inventory was found to be most useful in the middle stage of DAT and was deemed of limited usefulness for patients presenting atypical clinical features, i.e., disproportionate involvement of visuospatial abilities, memory, language, or behavior (Shuttleworth, 1984). In the early stages of DAT, the symptoms were not always extensive enough for identification using the DAT Inventory.

An earlier study by Chui, Teng, Henderson, and Moy (1985) attempted to define specific clinical subtypes of Alzheimer's disease based on age at onset, presence of asphasia, family history of dementia, and extrapyramidal signs. One hundred forty-six individuals with dementia of the Alzheimer's type served as subjects. The authors found that the three variables of family history of dementia, early onset, and presence of aphasia could be associated. Their data also indicated an association between early onset and a more obvious language disorder. No association was found to exist between a familial history of dementia and either presence of aphasia or age at onset. However, early onset as opposed to family history was felt to be a predictor of the early development of a language disorder. Drawing upon these findings, the researchers concluded that there were clinical subtypes of DAT, but further research would be necessary to specify these subtypes.

Although little has been written about means of classifying DAT patients, more has been written about the general speech and language deficits these patients exhibit. Among the more obvious deficits are difficulties in spontaneous speech, verbal comprehension, writing abilities, comprehension of commands, sentence completion, word list generation, completion of nursery rhymes, auditory comprehension, visual memory, visuo-perceptual skills, ability to follow commands, and reading. Deviations such as constructional disturbances, anomias, aphasia, aposiopsis, palilalia, perseveration and intrusions have also been noted (Seltzer and Sherwin, 1983; Cummings, Benson, Hill, and Read, 1985; Rosen, 1983; Knesevich, Toro, Morris, and LaBarge, 1984; Hier, Hagenlocker, and Shindler, 1985; Bayles, Tomoeda, Kaszniak, Stern, and Eagans, 1985; Shindler, Caplan, and Hier, 1984).

In their study involving 235 individuals with a history of dementia, Seltzer and Sherwin (1983) found that patients with an onset of dementia under age 65 years were significantly more likely to exhibit abnormalities during spontaneous speech. Verbal comprehension, object naming, and writing abilities were also deficient. Further data analysis revealed that the handedness of subjects was a differentiating feature, with left-handedness being more prevalent in the early-onset group.

Cummings, Benson, Hill, and Read (1985) also noted specific deficit areas of language functioning in their study of 30 patients with dementia of the Alzheimer's type (DAT). Deficits were noted in the information content of spontaneous speech, comprehension of commands, naming, sentence completion, word list generation, writing to dictation, narrative writing, and completion of nursery rhymes. Most importantly, those patients whose symptoms began before age 65 years also tended to have a more prolonged course of the disease with greater severity and longer life expectancy. Early symptoms also resulted in more rapid decline in intellectual functioning. Patient performance in the areas of phrase length, grammatical competence, and melodic line was felt to be normal.

In an earlier study by Rosen (1983), memory impairments for verbal material, constructional disturbances, anomias, and deficits in auditory comprehension were felt to be early appearing characteristics of DAT. Mildly involved patients exhibited normal ability to follow commands, normal visuo-perceptual skills, normal visual memory, normal reading abilities, normal ability to repeat high word-frequency sentences, and normal ability to name body parts, colors, letters, and numbers. The moderate to severe patients had additional difficulties with visual memory, visuo-perceptual skills, naming of body parts and colors, ability to follow commands, and reading low word-frequency sentences.

The presence or absence of aphasia in DAT has also been investigated. Knesevich, Toro, Morris, and LaBarge (1985) examined the relationship of aphasia and family history of dementia in 43 pairs of experimental subjects and controls. Their results indicated that the absence of aphasia could be associated with a slower patient decline or that cognitive functions were plateauing. Conversely, the presence of an aphasic condition was felt to indicate that the patient would move to a more severe state of dementia in a fairly short period of time.

Nicholas, Obler, Albert, and Helm-Estabrooks (1985) examined four subject groups -patients with Alzheimer's disease, Wernicke's aphasia, anomic aphasia, and normal controls to determine if they could be differentiated based upon characteristics of their discourse. The authors identified fourteen criteria which could be symptomatic of the speech of these patients.

1. empty phrases
2. indefinite terms
3. deictic terms
4. pronouns without antecedents
5. comments on the task instead of the picture
6. neologisms
7. literal paraphasias
8. unrelated verbal paraphasias
9. semantic paraphasias

10. verbal-phonological paraphasias

11. repeated words or phrases

12. personal value judgements about the picture

13. ands

14. conjunctions

Alzheimer's patients were found to produce the most words per response. However, when the informative nature of language was considered, Alzheimer's patients fell between those with anomic aphasia and those with Wernicke's aphasia with respect to closeness to controls. Additionally, patients with anomic aphasia and those with Alzheimer's dementia were found to produce many deictic (e.g. this, that, here, there) and indefinite terms but few neologisms (nonwords with no apparent relation to a target; e.g. filakers for scissors), literal paraphasias, and verbal-phonological paraphasias. Comparison of Alzheimer's patients and Wernicke's aphasics indicated that both groups produced many deictic terms, pronouns without antecedents, semantic paraphasias, and repetitions. These results do not support the suggestion that a naming deficit underlies the emptiness of discourse (Benson, 1979; Obler and Albert, 1984; Auerbach, Obler, and Firnhaber-White, 1982; Kirshner, Webb, and Kelly, 1984).

Hier, Hagenlocker, and Shindler (1985) compared the picture description abilities of patients with DAT, stroke related dementia, and normals. Overall, the demented subjects were found to use fewer total words, unique words, prepositional phrases, subordinate clauses and more incomplete sentence fragments. Severity of DAT was found to be positively correlated with marked difficulty in accessing mental lexicon. Typical features of patients suffering from DAT were aposiopsis (abrupt termination of an utterance that left a thought incomplete), logorrhea (excessive speech output that had to be interrupted by the examiner in order for testing to proceed), and palilalia (immediate repetition of a single syllable or word). Martin and Fedio (1983), attempted to determine if mildly impaired demented subjects would show differential performance across measures of semantic knowledge and whether the quality of these responses would reveal any consistent characteristics about the nature of the underlying deficit. An emerging pattern in the patients with dementia of the Alzheimer's type was noted which suggested that patients' abilities to define a given word using phrases or an appropriate synonym and knowledge of membership in a given category were better than their abilities to retrieve a specific word. Measurement of the latter was accomplished utilizing both confrontation naming and fluency. Patients were also noted to have difficulty when asked to make judgements based upon knowledge of word meaning.

Perseveration, or the inappropriate repetition of an activity once started, (Hudson, 1968) has also been noted in demented patients. Bayles, Tomoeda, Kaszniak, Stern, and Eagans (1985) investigated the relationship of severity of dementia and etiology to the type and degree of perseverative response. Their results indicated that demented patients perseverated more often than normal. Severity of dementia was found to be associated with an increased frequency of perseveration. Severity was also found to be more strongly associated with perseveration than etiology. Shindler, Caplan, and Hier (1984), also examined the frequency of perseveration and intrusions in DAT, aphasia, and normal controls. Their results, in keeping with the findings of Bayles, Tomoeda, Kaszniak, Stern, and Eagans (1985), noted the presence of perseverations (inappropriate repetitions of a directly preceding test response) and intrusions (inappropriate repetition of prior test responses after intervening test stimuli) in demented subjects. Intrusions, although occurring in all demented subjects, were found to occur more frequently in DAT. Dementia severity was not positively correlated with the occurrence of these intrusions.

The word association abilities of dementia patients have also been investigated. Gewirth, Shindler, and Hier (1984) noted that their subjects, both normal and brain-injured, were able to make judgements about the grammatical class of stimulus words. Comparison of normal and brain injured subjects' responses revealed that for both groups, nouns and adjectives tended to elicit paradigmatic responses (antonyms, synonyms, coordinates, subordinates, superordinates, and the functional context of nouns; i.e., semantically related to the stimulus and of the same grammatical class as the stimulus) while verbs and adjectives tended to elicit syntagmatic responses (words of a different grammatical class from the stimulus word and words that could occur sequentially within the same sentence as the stimulus word). The frequency of the latter did not change significantly with an increase in dementia severity. However, response latency was found to increase with increasing dementia severity. Once the dementia had advanced, these paradigmatic responses were replaced by idiosyncratic (no discernible semantic relation to the stimulus word), identity (identical responses or those very similar to the stimulus word), and null (subject stated he could not find a word or no response was given within 25 seconds) responses. The authors felt that these idiosyncratic responses may have been given after paradigmatic responses could not be generated.

The naming abilities of individuals suffering from DAT have also been of interest to researchers over the past 25 years, although to a very limited degree. A review of the available literature reveals that the results are relatively consistent and suggest that patients' abilities with respect to this task are significantly impaired throughout the course of the disease. Lawson and Baker (1968) and Rochford (1971) claimed that the object naming difficulties of demented patients may have been due to impaired visual recognition abilities. Martin and Fedio (1983) found no support for this hypothesis. When asked to name a drawn object, errors related to language were three times as common as those related to misrecognition, and perceptual errors as opposed to language errors were correlated with duration of symptoms. This suggested that perceptual errors might have increased as the disease progressed or as a result of chronological age. Further analysis revealed that this discrepancy in the results found by Lawson and Baker, (1968), Rochford, (1971), and Martin and Fedio, (1983) may have been accounted for on the basis of subject age. Lawson and Baker's subjects had a mean age of 74.5 years, while Rochford's subjects had a mean age of 75.6, and Martin and Fedio's sample had a mean age of 58.2 years. The naming errors of the Alzheimer's patients were frequently substitutions of a more general, higher order term or were the name of an object from the same semantic category. Results of a fluency task revealed a deficiency in the ability to produce general categorical lexical items.

An earlier study (Kirshner, Webb, and Kelly, 1982), investigating the confrontation naming abilities of these patients, revealed some additionally valuable information. In a comparison of twelve Alzheimer's patients and twelve controls on identification of 40 objects, 40 photographs, 40 line drawings, and 40 masked line drawings of the same object, it was found that the number of errors made by the Alzheimer's patients and normal controls increased with the abstractness of the drawing of the object. Interestingly, the normal controls made more perceptual errors than the

Alzheimer's subjects. Similarly, Wilson, Kaszniak, Fox, Garron, and Ratusnik (1981) noted that the naming errors found in their 32 Alzheimer's subjects were either semantically related or perseverative responses.

Bayles and Tomoeda (1983) attempted to describe the nature of the confrontation naming errors in etiologically different dementia patients. Their data indicated that although naming impairment was characteristic of dementing illness, the ability was relatively well preserved in mildly involved Alzheimer's patients with only the moderately involved being significantly impaired. The authors also found that as the severity of the disease increased, the error rate of the involved patient also increased, resulting in responses which were less logical and less semantically related to the target. The most common types of naming errors were those semantically related to the target item or those semantically and visually associated with the target. Appell, Kertesz, and Fisman (1982) described the naming and word fluency abilities of 25 Alzheimer's patients, who were all reported to be aphasic to some degree. Their results indicated that these patients were significantly better at naming objects than at word fluency tasks. The authors felt that object-naming abilities could be enhanced if the patient was allowed to view the object supplemented by phonemic cues or had the opportunity to manually manipulate the object. They reported that their subjects could name only 36% of objects on sight alone. When all three modes (viewing the object, phonemic prompts, manual manipulation of the objects) were incorporated, subjects could correctly identify 52% of objects. The results also indicated that for an average of one year following current hospital admission, length of stay was associated very significantly with a decline of all major language abilities except naming.

In 1985, Martin, Brouwers, Cox, and Fedio hypothesized that a verbal memory deficit was an underlying factor in Alzheimer's disease. The results of their investigation indicated that these patients consistently recalled fewer words than normal subjects but did not differ greatly from normal subjects with respect to the rate of acquisition of material. This deficit was thought to be due to an inability to encode semantic attributes encompassing an adequate number of features.

It is important to note that at least one author (Rosen, 1983) found that his patients, categorized in the mild range, retained the ability to name body parts, colors, letters, and numbers while the patients categorized in the moderate to severe range were unable to correctly name body parts and colors.

In summary, in recent years the object naming and picture naming abilities of Alzheimer's patients have been investigated. The results of these studies have contributed to the research base from which we can draw many of our conclusions about these patients. In general, the results indicate that patients suffering from DAT have noted difficulty when asked to name three dimensional objects and two dimensional pictures. The specifics of these difficulties have yet to be adequately defined, but it appears that a patient's ability to name a given object can be successfully enhanced by allowing the patient to physically manipulate the object as well as by orally prompting him. When asked to name a drawing, DAT patients were noted to have greater difficulty. However, additional studies comparing responses to picture and object naming tasks would be useful in further describing the change in speech and language abilities of these patients often associated with progression of the disease. As a result, the purposes of this study were as follows:

a. To compare the object and picture naming abilities of Alzheimer's patients in general and subgroups classified as mild to moderate, moderate to severe, and severe.

b. To compare response latency on object and picture naming tasks.

c. To analyze and classify the nature of error responses.

CHAPTER II

METHODS

Subject Selection

The patients selected for this study were two males and seventeen females residing in one of several Tulsa, Oklahoma, area nursing homes or attending one of several adult day care centers (See Table 1). Selection criteria for the study stipulated that patients meet the following criteria; (a) be diagnosed as suffering from Alzheimer's disease by a neurologist or internist; (b) be judged as mild to moderately, moderate to severely or severely demented according to the Mental Status Questionnaire (MSQ) (Goldfarb, 1974); (c) be a native English speaker; (d) have air conduction thresholds no greater than 25dB at frequencies of 500, 1000, and 2000 Hz (critical speech frequencies) in the better ear. Only one patient was evaluated utilizing pure tones. All other patients (18) exhibited behaviors which precluded traditional hearing testing. These 18 patients were evaluated utilizing an alternate method directed toward a gross evaluation of speech discrimination. The method consisted of a series of yes/no questions presented by the examiner during a social conversation. In order for hearing to be judged adequate, each patient had to respond using a format appropriate to the question (i.e.

Table 1

Summary of Patient Characteristics

Patient Number	Age	Severity Level of DAT	Sex
1	79	Moderate to Severe	F
2	68	Mild to Moderate	F
3	80	Mild to Moderate	F
4	84	Moderate to Severe	M
5	62	Severe	F
6	83	Severe	F
7	58	Severe	F
8	72	Moderate to Severe	M
9	76	Moderate to Severe	F
10	80	Severe	F
11	97	Moderate to Severe	F
12	84	Severe	F
13	67	Mild to Moderate	F
14	94	Severe	F
15	87	Moderate to Severe	F
16	84	Moderate to Severe	F
17	81	Severe	F
18	97	Severe	F
19	82	Moderate to Severe	F

Note. *M* Age = 79 years; Age Range = 39 years.

answers had to be syntactically but not necessarily factually correct); (e) be able to perform at 80% accuracy on a test of visual matching from the Minnesota Test for Differential Diagnosis of Aphasia, Subtest 1 "Matching Forms" (Section B); (f) have no bilateral upper extremity paralysis or paresis. Additionally, each patient was given Subtest 10 "Expressing Ideas" (Section C) from the Minnesota Test for Differential Diagnosis of Aphasia and a caregiver interview (Bayles-Tomoeda Inventory) was completed. The results of these evaluation techniques were not utilized as selection criteria but for purposes of further evaluating the patient.

To obtain patients for this study, a nursing home, neurologist, Alzheimer's support group, and adult day care center in the Tulsa, Oklahoma, area were contacted. Prospective patients or their families were provided with an explanation of the study and informed consent form (See Appendix B).

Additionally, a control group of twelve normal subjects (five males and seven females) composed of two patients each in five year age brackets between the ages of 45 and 75 were utilized to establish the fact that tasks to be attempted in the study were in fact tasks easily performed by the normal population. Selection criteria for the control subjects stipulated that they (a) have no personal history of neurological deficit, (b) be a native English speaker, (c) have air conduction thresholds no greater than 25dB at 500, 1000, and 2000 Hz (critical speech frequencies) in the better ear, (d) be able to perform at 100% accuracy on a test of visual matching from the Minnesota Test for Differential Diagnosis of Aphasia, Subtest 1 "Matching Forms" (Section B), (e) have no bilateral upper extremity paralysis or paresis, (f) be able to perform at an accuracy level of 90% on the Mental Status Questionnaire (Goldfarb, 1974). Additionally, each control subject was given Subtest 10 "Expressing Ideas" (Section C) from the Minnesota Test for Differential Diagnosis of Aphasia.

Experimental Stimuli

The test battery consisted of two sections: (a) object naming, and (b) picture naming. Fifteen stimulus words/pictures were chosen from those listed by Bayles and Tomoeda (1983). The stimulus words selected were chosen on the basis of their frequency of occurrence (common words) and ability to be easily represented by pictures and objects.

Object Naming

The experimenter individually placed each object of the chosen 15 in random order in front of the patient. The patient was allowed to visually examine and manually manipulate each object. The experimenter then said "What is this"?

Picture Naming

The experimenter individually placed each picture of the chosen 15 in random order in front of the patient. The pictures were colored line drawings taken from Peabody Language Development Kits (Dunn and Smith, 1965). The patient was allowed to visually examine and manually manipulate each picture. The experimenter then said "What is this"?

Presentation Procedure

Patients were seen on an individual basis in a room with a maximum 40dB noise level in a nursing home or adult day care setting. Noise level was monitored continuously during testing utilizing a General Radio Company Sound Level Meter, type 1565 A set on the A slow setting. Screening tests were administered (audiometric evaluation or gross audiometric evaluation, visual evaluation, Mental Status Questionnaire), and relevant history, (native English speaker, absence of bilateral paralysis or paresis) was collected. Upon completion, patients were selected based on the results. The Minnesota subtests (Subtest 1, "Matching Forms", Section B, and Subtest 10, "Expressing Ideas", Section C) were also administered at this time. The Bayles--Tomoeda Inventory was completed after initial testing at a time mutually convenient to the examiner and the primary caregiver. Individuals meeting the specified criteria were seen twice within a period of two weeks. On each of the two testing days, one portion of the test battery was administered to each patient. Length of session for each patient ranged from 15-20 minutes. Order of presentation was randomized with the object naming subtest being administered first to some subjects and the picture naming subtest being administered first to other subjects. Item presentation within each subtest was also randomized. The examiner began by presenting the first item in the appropriate subtest according to the stated presentation method. Patients were allowed a maximum response latency of one minute before the examiner said, "Let's move on to the next one". However, when patients became physically agitated, a maximum of ten seconds was allowed before the examiner said, "Let's move on to the next one". Following patient instruction, the examiner limited her comments to those related to the task or those utilized to get the patient back on task. On the second day of testing, the second portion of the test battery was undertaken using the same procedure. Each test session was audiotaped using a Toshiba cassette recorder model KT-P22 and a Realistic omnidirectional microphone model 33-1089. Patient responses were scored utilizing the audiotape and the score sheet found in Appendix C. The scoring procedure was based upon that utilized by Bayles and Tomoeda (1983) with the addition of an "unintelligible response" category by the examiner.

Categorization of responses occurred along the following continuum:

1. No response
2. Unintelligible response
3. Unrelated response (not linguistically or visually related)
4. Related response
    A. Visually related

B. Linguistically related

1. Phonemically similar (ex: pouch for purse)

2. Semantically associated

a. same category (ex: peach for pear)

b. function (ex: sweeping for broom)

c. part (ex: wings for airplane)

d. attribute (ex: blond for nurse)

e. superordinate (ex: bird for owl)

f. context (ex: context for situation in which target item is found as in jewelry story for watch.)

5. Correct

Additionally, response latency was also measured and evaluated within a one minute time frame as follows:

1. 1-15 seconds
2. 16-30 seconds
3. 31+ seconds

Numerical values were assigned for both the modified Bayles-Tomoeda Response Continuum and the response latency measures. Numerical values assigned utilizing the modified Bayles-Tomoeda Response Continuum were based upon closeness of relationship to the target response. Scores represented a continuum of correctness between 1 and 5 with 1 representing a "no response" and 5 representing a "correct response".

Reliability Measures

The reliability of the scoring procedure was evaluated by having two independent observers who were master's degree candidates in Speech-Language pathology score the object naming portion of the experimental test battery for all subjects utilizing the audiotapes (each examiner scored one half of the subjects). Observers judged both number of errors and correctness of responses on the modified Bayles-Tomoeda Response Continuum. A correlation of .991 was calculated between the investigator's and the observers' tally of errors utilizing the Pearson Product-Moment Coefficient of Correlation. A percentage of agreement of 93% was calculated between the investigator's and the observers' scoring of degree of correctness on the continuum.

Statistical Treatment

Means, ranges, and when appropriate, standard deviations, were calculated for the subjects on each preliminary test (Bayles-Tomoeda Inventory, Subtest 1 "Matching Forms" (Section B) from the Minnesota Test for Differential Diagnosis of Aphasia, Mental Status Questionnaire) and for the total patient score on all preliminary measures combined.

Statistical analysis of picture and object naming scores involved utilization of the Wilcoxon Matched-Pairs Signed-Ranks Test (Stahl and Hennes, 1980) to determine if there was a difference in performance on the two tasks based upon the modified Bayles-Tomoeda Response Continuum. Means and ranges were also calculated for the continuum.

Comparison of the number of errors made on the picture and object naming tasks involved utilization of a t-Test for Correlated Groups. Additionally, means, ranges, and standard deviations were also calculated.

Error response analysis involved grouping patients by severity level and classifying the noted errors according to the modified Bayles-Tomoeda Response Continuum. Additionally, a tally of items missed was completed and presented in table form.

CHAPTER III

RESULTS AND DISCUSSION

Summary of Patient Performance on Preliminary Tasks

Each patient was randomly assigned a patient number, and the results of his/her performance on screening measures are summarized in Table 2. The Bayles-Tomoeda Inventory score was based upon a fifteen question interview with the primary caregiver of each patient. Total points possible with respect to this evaluation device were 15. The visual matching task was accomplished utilizing a six item grid from the Minnesota Test for Differential Diagnosis of Aphasia, Subtest 1 "Matching Forms" (Section B). Total points possible with respect to this screening device were six. The Mental Status Questionnaire was composed of ten items utilized to assess patient orientation and severity level. Total points possible with respect to this task were ten. The Minnesota Test for Differential Diagnosis of Aphasia, Subtest 10 "Expressing Ideas" (Section C) was composed of two questions designed to assess patient memory. Total points possible with respect to this task were six. Total score count was calculated by simply adding each individual patient's score on each screening/evaluation measure.

Table 2

Summary of Patient Performance on Preliminary Tasks

Age	Patient Number	Bayles Score (15)	Matching Forms (6)	Expressing Ideas (6)	MSQ Score (10)	MSQ Rating	Total Score (37)
79	1	8	6	4	2	Mod. to Sev.	20
68	2	11	6	4	6	Mild to Mod.	27
80	3	11	6	2	7	Mild to Mod.	26
84	4	11	6	5	3	Mod. to Sev.	25
62	5	9	6	0	0	Sev.	15
83	6	10	6	4	1	Sev.	21
58	7	3	6	2	0	Sev.	11
72	8	7	6	1	3	Mod. to Sev.	17
76	9	8	6	0	4	Mod. to Sev.	18
80	10	4	5	1	1	Sev.	11
97	11	7	5	1	2	Mod. to Sev.	15
84	12	6	5	2	1	Sev.	14
67	13	12	6	6	8	Mild	32
94	14	9	5	4	1	Sev.	19
87	15	6	6	3	4	Mod. to Sev.	19
84	16	5	6	3	3	Mod. to Sev.	17
81	17	2	5	1	0	Sev.	8
97	18	5	6	1	4	Mod. to Sev.	16
82	19	3	6	0	1	Sev.	10

Note. Numbers represented within parentheses () represent the total score possible with respect to each preliminary task.

Means, Ranges, and Standard Deviations of Scores on Preliminary Measures

The means, ranges, and standard deviations obtained on each screening and evaluation measure for the experimental group are summarized in Table 3. As would be expected, the range of scores obtained on the entire screening/evaluation battery (24) exceeded that obtained on any one of these measures taken alone. Patient variability with respect to the Bayles-Tomoeda Inventory (10) (caregiver interview) produced the second greatest range of scores which could be expected based upon the noted variability of individual patient behavior. The Mental Status Questionnaire (MSQ) produced the third greatest range of scores (8) with Subtest 10, "Expressing Ideas" (Section C), from the Minnesota Test for Differential Diagnosis of Aphasia producing the fourth (6). The final screening device, Subtest 1, "Matching Forms" (Section B), from the Minnesota Test for Differential Diagnosis of Aphasia produced the least range of scores (1) and represented a consistently occurring visually related error involving the substitution of rectangle for square or vice versa.

Picture Naming versus Object Naming Abilities

The responses to picture naming and object naming were scored in two ways: (a) on a continuum of correctness and, (b) on number of error responses.

When scoring on a continuum (1-5) the results of the Wilcoxon Matched-Pairs Signed-Ranks Test (Stahl and Hennes,

Table 3

Mean, Range, and Standard Deviation of Scores on Preliminary Measures

	Mean	Range	SD
Bayles-Tomoeda Inventory	7.21	10	3.05
Subtest 1 "Matching Forms" Section B Minnesota Test for Differential Diagnosis of Aphasia	5.74	1	.45
Subtest 10 "Expressing Ideas" Section C Minnesota Test for Differential Diagnosis of Aphasia	2.32	6	1.78
Mental Status Questionnaire	2.68	8	2.33
Total Score	17.95	24	6.27

Note. SD = standard deviation.

1980) revealed no significant difference in picture naming ($\underline{M}$=63.9) and object naming ($\underline{M}$=65.7, t(17)=49, $\underline{p}$<.05). These results suggest that Alzheimer's patients' errors during object naming were no more likely to be closely related to the target item than during picture naming.

The means and ranges of scores obtained by patients during this task are summarized in Table 4. As can be seen, errors made during object naming were only somewhat closer to the target response on the average than errors made during picture naming.

However, when analyzing number of errors (+/0 scoring), the t-Test for Correlated Groups did reveal a significant difference between picture naming ($\underline{M}$=5.21) and object naming ($\underline{M}$=4.05, t(18)=2.71, $\underline{p}$>.01). These results suggest that, as hypothesized, Alzheimer's patients were better able to name three dimensional objects than pictures of the objects.

The means, ranges, and standard deviations of scores obtained by patients during this task are summarized in Table 5.

Control group subjects made no errors on either task and thus no further analysis was done.

Tally of Items Incorrect

The results of a tally of items missed are summarized in Table 6. It is interesting to note that all items presented in the picture naming section were named incorrectly by at least one patient while one object in the object

Table 4

Mean, Range, Overall Mean, and Overall Range of Scores on a Continuum of Correctness During Picture Naming and Object Naming for Patients Assigned to Three Severity Levels

	Possible Score	Mild to Moderate		Moderate to Severe		Severe		Total	
		Picture	Object	Picture	Object	Picture	Object	Picture	Object
Mean	75	74.3	73.3	67.9	71.1	56	57.4	63.9	65.7
Range		2	4	6	12	47	45	49	46

Table 5

Mean, Range, Standard Deviation, Overall Mean, Overall Range, and Overall Standard Deviation of Scores Relative to Number of Errors During Picture Naming and Object Naming for Patients Assigned to Three Severity Levels

	Mild to Moderate		Moderate to Severe		Severe		Total	
	Picture	Object	Picture	Object	Picture	Object	Picture	Object
Mean	.67	.67	4.38	2.38	7.75	7.0	5.21	4.05
Range	2	1	7	7	13	13	15	14
SD	1.15	.58	3.16	2.07	5.04	5.24	4.53	4.40

Note. *SD* = standard deviation.

Table 6

Tally of Items Incorrect During Picture Naming and Object Naming Including Number of Errors Per Item and Rank

Picture Naming				Object Naming			
Item Number	Item	Number of Errors	Rank	Item Number	Item	Number of Errors	Rank
1	iron	6	7	1	iron	2	13
2	broom	3	13	2	broom	3	12
3	dustpan	14	1	3	dustpan	15	1
4	watch	8	4	4	watch	6	4
5	whistle	11	2	5	whistle	7	3
6	purse	4	12	6	purse	4	9
7	towel	6	7	7	towel	5	7
8	pear	7	5	8	pear	4	9
9	apple	2	15	9	apple	0	15
10	bacon	7	5	10	bacon	6	4
11	toast	10	3	11	toast	8	2
12	comb	3	13	12	comb	2	13
13	telephone	6	7	13	telephone	6	4
14	alarmclock	6	7	14	alarmclock	4	9
15	drum	6	7	15	drum	5	7

naming section was consistently named correctly by all patients (apple). The most frequently misnamed test item for both the picture naming and object naming sections was item number three "dustpan" with a total of fourteen errors during picture naming and fifteen errors during object naming. Although patients were frequently able to describe the function of a dustpan during both the picture naming section and the object naming section, they were unable to recall the exact name of the item on demand. Clearly, presentation of the object versus the picture had no significant effect upon improving naming ability with respect to this item. A rank ordering of errors made during picture naming was as follows:

(2) "whistle"; 11 errors

(3) "toast"; 10 errors

(4) "watch"; 8 errors

(5) "pear", "bacon"; 7 errors each

(7) "iron", "towel", "telephone", "alarmclock", "drum"; 6 errors each

(12) "purse"; 4 errors

(13) "broom", "comb"; 3 errors each

(15) "apple"; 2 errors

Similarly, a rank ordering of errors made during object naming was as follows:

(2) "toast"; 8 errors

(3) "whistle"; 7 errors

(4) "watch", "bacon", "telephone"; 6 errors each

(7) "towel", "drum"; 5 errors each

(9) "purse", "pear", "alarmclock"; 4 errors each

(12) "broom"; 3 errors

(13) "iron", "comb"; 2 errors each

(15) "apple"; 0 errors

Analysis of these errors reveals that although total number of errors made with respect to individual item varied, items tended to be ranked in a similar manner in both the picture naming and object naming sections. Responses during picture and object naming were also analyzed for presence of an order effect, however, none was apparent.

Analysis of Error Responses

A summary of patient error responses is presented in Tables 7 and 8. Errors categorized in this manner were grouped according to the modified Bayles-Tomoeda Response Continuum described in Chapter II. A categorization of 1 (no response), was given to responses such as (a) No response, (b) "I don't know", (c) "I know but I can't get it out", (d) "I've forgotten", (e) "One of these", or (f) "I can't say the word". To receive a response categorization of 2 (unintelligible response), a patient was required to elicit some type of unintelligible response. To receive a categorization of 3 (unrelated response), a patient was required to respond with some type of response not linguistically or visually related. Examples of responses which fell into this category were "a leaf of something" for "bacon" and "chicken" for "purse". The fourth scoring

Table 7

Summary of Patient Error Responses by Error Type During Picture Naming

	Patient Number																		
RC	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
1					9		4		1	2		2				1	4	3	2
2					1												2		
3				1	5			3		2	1	1		3	1	1	4		
4A									1										
4B1																	1		
4B2a		1						1			1	1		2			1	1	
4B2b	1	1		1		1	1		1		1			5		2		4	1
4B2c						1		2											
4B2d																1			2
4B2e								2		1	1			2		3	1		
4B2f														1					
5																			
Total Errors	1	2	0	2	15	2	5	8	3	5	4	4	0	13	1	8	13	8	5

Note. RC = modified Bayles-Tomoeda Response Continuum assignment.

Table 8

Summary of Patient Error Responses By Error Type During Object Naming

	Patient Number																		
RC	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
1			1		10	1	1		1	2				1		1	4	1	2
2																	3		
3					2		1	1		1				5		2	6		1
4A										1									
4B1											1						1		1
4B2a		1		1	2									2				1	
4B2b	2						3	1	1		1	1		2		1			1
4B2c																			
4B2d																			
4B2e						1		1						1		3			
4B2f																			
5																			
Total Errors	2	1	1	1	14	2	5	3	2	4	2	1	0	11	0	7	14	2	5

Note. RC = modified Bayles-Tomoeda Response Continuum assignment.

category was broken down into several subscores. The main heading in this category was "related response". Within this main heading several types of related responses were judged. Initially, each response within this category was classified as either visually related (4A) or linguistically related (4B). If a response was placed into the former category (4A, visually related), no additional category assignment was needed. Examples of responses which fell into this category were "butter and bread" for "toast" and "cheese sandwich" for "toast". The latter category of 4B (linguistically related) was further segmented into "phonemically similar" (4B1) and "semantically associated (4B2) responses. If a response was categorized in the 4B1 (phonemically similar) category, no additional category assignment was needed. Examples of responses which fell into this category were "dustmop" for "dustpan" and "kay" for "comb". The latter category, semantically associated responses, represented the greatest number and variety of responses. Once assigned to this category (4B2, semantically associated) an additional letter (a through f) was given to each response. A response categorized as a 4B2a fell into the "same category" as the target response. Examples of responses assigned this number were "scoop" for "dustpan" and "cookie" for "toast". A response categorized as a 4B2b was one which described the "function" of an item. Examples of responses which were assigned this number were "that's an old clock that you wear on your wrist or something" for "watch" and "a duster-picker-up" for "dustpan". A response categorized as a 4B2c was one which described a "part" of the item to be named. Examples of responses which fell into this category were "melted butter" for "toast" and "handle" for "purse". A response categorized as a 4B2d was one which described an "attribute" of the target item. Examples of responses which fell into this category were "black" for "telephone" and "twenty after nine" for "watch". A response categorized as a 4B2e was one which substituted a "superordinate" response for the target response. Examples of responses which fell into this category were "piece of bread" for "toast" and "meat" for "bacon". The final segment of this category was a response listed as a 4B2f response. This category was assigned to responses which substituted the "context" in which the target item could be found for the name of the target item. This type of response was made only once during testing and resulted in an elicited response of "that's to use on your property" for "telephone". The final response category was a 5 and was assigned to "correct" responses such as "apple" for "apple" and "pocketbook" for "purse".

A comparison of the types of errors made by individual patients during the picture and object naming sections revealed a total of 99 errors during the picture naming section and 77 errors during the object naming section. In both sections, the number of errors classified as "no responses" far outweighed any other error classification with 28 errors noted in the picture naming section and 26 errors noted in the object naming section. The second most frequent type of error in both the picture naming and object naming sections was an "unrelated response" error with 22 errors of this type occurring in the picture naming section and 19 errors of this type occurring in the object naming section. The third most frequent error type in both the object naming and picture naming sections was a "function" error with 19 errors of this type in the picture naming section and 13 errors of this type in the object naming section. From this point on the rank of error types in each category became more diverse. The fourth most common error type in the picture naming section was a "superordinate" type with a total of ten errors while a "same category" error received this rank in the object naming section. The fifth rank in the picture naming section was assigned to "same category" errors with a total of eight, and in the object naming section the same rank was assigned to "superordinate" errors with a total of six. The sixth rank in the picture naming section was shared by three error types; "unintelligible response" errors, "part" errors, and "attribute" errors each with a total of three. In the object naming section this rank was shared by two error types; "unintelligible response" errors, and "phonemically similar" errors with a total of three. The rank of eight was assigned to "visually related" responses during object naming with a total of one error response. The rank of nine was shared by three error types in the picture naming section; "visually related", "phonemically similar", and "context" each with a total of one error and in the object naming section it was shared by four error types, "part", "attribute", "context", and "correct" each with a total of zero errors. During picture naming "correct" responses received a rank of twelve.

Additionally, only one patient exhibited responses felt to be perseverative in nature. During picture naming, patient number 5 named five items "chicken" and during object naming named two items "chicken" and two items "ap-ple".

Error Response Analysis by Patient Severity Level

Patient scores were calculated on preliminary measures and on the basis of the Mental Status Questionnaire (Gold-farb, 1974) each patient was placed in one of three cate-gories: mild to moderate, moderate to severe, or severe. The results of this categorization are summarized in Tables 9 and 10. Upon completion, three patients had been assigned to the mild to moderate range. Analysis of picture naming ability within this group revealed that only two error types were present; errors categorized as "same category" and errors categorized as "function" responses. In the moderate to severe range eight error types were noted. A ranking of these based upon number of occurrences revealed that the most common type of error in this group was a

Table 9

Summary of Patient Error Responses By Error Type During Picture Naming for Patients Assigned to Three Severity Levels

	Mild to Moderate			Moderate to Severe								Severe							
RC	2	3	13	1	4	8	9	11	15	16	18	5	6	7	10	12	14	17	19
1							1			1	3	9		4	2	2		4	2
2												1						2	
3					1	3		1	1	1		5			2	1	3	4	
4A							1												
4B1																		1	
4B2a	1					1		1			1					1	2	1	
4B2b	1			1	1		1	1		2	4		1	1			5		1
4B2c						2							1						
4B2d										1									2
4B2e						2		1		3					1		2	1	
4B2f																	1		
5																			
Total Errors	2	0	0	1	2	8	3	4	1	8	8	15	2	5	5	4	13	13	5

Note. RC = modified Bayles-Tomoeda Response Continuum assignment.

Table 10

Summary of Patient Error Responses By Error Type During Object Naming for Patients Assigned to Three Severity Levels

	Mild to Moderate			Moderate to Severe								Severe							
RC	2	3	13	1	4	8	9	11	15	16	18	5	6	7	10	12	14	17	19
1		1					1			1	1	10	1	1	2		1	4	2
2																		3	
3						1				2		2		1	1		5	6	1
4A															1				
4B1								1										1	1
4B2a	1				1						1	2					2		
4B2b				2		1	1	1		1				3		1	2		1
4B2c																			
4B2d																			
4B2e						1				3			1				1		
4B2f																			
5																			
Total Errors	1	1	0	2	1	3	2	2	0	7	2	14	2	5	4	1	11	14	5

Note. RC = modified Bayles-Tomoeda Response Continuum assignment.

"function" response with approximately ten occurrences. The second most frequently occurring error type was "unrelated response" errors with seven occurrences while the third was a "superordinate" type response with six occurrences. The fourth rank was given to "no response" type errors with a total of five occurrences and, with a total of three errors, the rank of fifth was given to "same category" responses. The sixth most commonly occurring error type was a "part" response with a total of two errors. The final rank, seven, was assigned to two error types both with a total of one error, "visually related" and "attribute" responses. In the severe range, ten error types were noted. The most frequently occurring error was a "no response" with a total of 23 responses. The second most frequently occurring error within this range was an "unrelated response" type error with a total of 15. "Function" errors were assigned the rank of three with a total of eight errors. The rank of four resulted in a tie between two error types; "same category" and "superordinate" each with a total of four errors. "Unintelligible response" errors received the rank of six with a total of three occurrences. The seventh rank was assigned to "attribute" type errors with a total of two occurrences. The final rank, eight, was divided among three error types; "phonemically similar", "part", and "context" errors each with a total of one error.

Analysis of object naming ability within the mild to moderate group revealed that only two error types were present; "no response" and "same category" each with one response. Within the moderate to severe range, six error types were noted. Receiving the rank of one was "function" responses with a total of six occurrences. The rank of two was assigned to "superordinate" type responses with a total of four occurrences. The third rank was assigned to two error types; "no response" and "unrelated response" with a total of three errors each. The rank of five was assigned to "unrelated response" errors with a total of two occurrences. The final rank within this patient group was six and was assigned to "phonemically similar" errors totaling one response. The final patient subgroup, those classified as severe, revealed eight error types. The rank of one was assigned to "no response" type errors with a total of 21 errors. The rank of two was assigned to "unrelated response" errors with a total of 16. The third rank was assigned to "function" errors totaling seven. The fourth rank was assigned to "same category" errors with a total of four responses, while the fifth rank was assigned to "unintelligible response" type errors with a total of three occurrences. The next rank, six, was shared by two error types, "phonemically similar" and "superordinate" each with two errors. The final rank, eight, was assigned to "visually related" errors, with only one occurrence.

As these results indicate, although the total number of error responses in the picture naming and object naming subtests differed by a total of 22 errors, (77 total errors in the picture naming section, 99 total errors in the object naming section), a comparison of the two tasks revealed several interesting patterns. Within the mild to moderate range, of the two error types noted within each section (picture naming and object naming), two were identical. The error type classified as "same category" occurred one time within each section. Within the moderate to severe range, the rank of one was assigned to the identical error type ("function"), in both the picture naming and object naming sections. Although the ranks of many of the error types did not correspond with respect to picture naming and object naming sections, "no response", "unrelated response", "same category", and "part" errors occurred in both sections within this severity range. Perhaps the most interesting error pattern occurred in the severe range. Of the ranks assigned to the picture naming and object naming sections, one through four were identical with respect to error type. A sequential ordering of error types according to rank was as follows: "no response", "unrelated response", "function", and "same category". Additionally, "phonemically similar" and "superordinate" error types also occurred in both the picture naming and object naming sections, however, were ranked differently within each section.

Response Latency

Response latency values for each patient during both the picture naming and object naming sections are summarized in Tables 11 and 12. To receive a response latency score of one, a patient was required to respond to the examiner between one and 15 seconds after the question was asked. To receive a response latency score of two, the patient was required to respond somewhere between 16 and 30 seconds after the examiner asked the question and to receive a response latency value of three the patient must have waited at least 31 seconds before responding. The final category of "NR", or "no response", was assigned to individuals who did not respond with any type of verbalization when asked. In some cases, these patients were not given a full 60 seconds to respond due to physical agitation. It should be noted that response latency scores were based upon the time required for initial vocalization from the patient and did not necessarily represent the time required for initiation of a correct response.

As can be seen in Tables 11 and 12, the parameter of response latency proved to be of little importance with this patient population in both the picture naming and object naming sections. Only one patient, number 5, deviated from the norm with a significant number of "no response's" in both test sections.

Table 11

<u>Response Latency Values Assigned to Patients During Picture Naming by Total Number of Responses Within Four Categories</u>

RL	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
1	15	15	15	15	6	15	15	15	15	15	15	15	15	15	15	15	15	15	15
2																			
3																			
NR					9														

Note. RL = response latency category assignment.

Table 12

Response Latency Values Assigned to Patients During Object Naming by Total Number of Responses Within Four Categories

RL	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
1	15	15	15	15	3	15	15	15	15	15	15	15	15	15	15	15	15	15	15
2	15	15	15	15	2	15	15	15	15	15	15	15	15	15	15	15	15	15	15
3																			
NR					10														

Note. RL = response latency category assignment.

CHAPTER IV

CONCLUSIONS

The purposes of the present study were as follows: (a) to compare the picture and object naming abilities of Alzheimer's patients classified in the mild to moderate, moderate to severe, and severe ranges, (b) to compare response latency on picture and object naming, and (c) to analyze and classify the nature of error responses. The results of the study did suggest that Alzheimer's patients were better able to name objects than pictures of the objects. Second, response latency (the time needed for a patient to respond to the examiner's question regardless of correctness of response) proved to be an unimportant parameter in all three patient groups. Third, although the total number of error responses in the picture naming section was greater than the number of error responses in the object naming section (99 as compared to 77), items missed and types of errors tended to be similar on the two tasks. Fourth, types of error responses varied according to the severity level of the patient with "no response" being most typical of the severe group and "related" responses being most typical of the mild and moderate groups.

Of the limited number of authors who have investigated the naming abilities of Alzheimer's patients, the results of the present study are in general agreement. Cummings, Benson, Hill, and Read (1985) were some of the most recent to suggest that a naming deficit, along with other similar speech and language deficits, accompanied DAT. In earlier studies by Lawson and Baker, (1968); Rochford; (1971), and Wilson, Kaszniak, Fox, Garron, and Ratusnik, (1981) results of naming tasks indicated that the errors of DAT patients were frequently perseverative responses, substitutions of a more general, higher order term, or were the name of an object from the same semantic category. The results of the present study were in agreement with those obtained by the previous authors. However, this is not to say that all error responses fell into the semantically related category, only that the majority in fact did. Word familiarity was felt to be related to the number of errors made on specific target items with less frequently occurring words resulting in a greater number of error responses (ie. "dustpan"). Several other authors, (Kirshner, Webb, and Kelly, 1982) investigating the confrontation naming abilities of these patients with respect to objects, photographs, line drawings, and masked line drawings, found that the number of errors made by DAT patients and normal controls increased with the abstractness of the drawing. The present study provides support for this hypothesis since number of errors with respect to pictures was significantly greater than that with objects.

In a later study by Bayles and Tomoeda (1983), which attempted to describe the nature of confrontation naming errors in etiologically different dementia patients, the suggestion was confirmed that although naming impairment was characteristic of dementing illness, the ability was relatively well preserved in mildly involved DAT patients with only the moderately involved being significantly impaired. They also found that as the severity of the disease increased, the error rate of the involved patient also increased resulting in responses which were less logical and less semantically related to the target. The most common types of naming errors were those semantically related to the target item or those semantically and visually associated with the target. The results of the present investigation are in agreement with those found by these authors. As previously discussed in this chapter, errors semantically related to the target item far outweighed other error types. Additionally, the present study was also in agreement with the suggestion that naming ability was relatively well preserved in mildly involved DAT patients with only the moderately involved being significantly impaired. The mildly involved patients in this study presented a total of two errors in both the picture naming section and the object naming section, while in the moderate to severe range this number increased to 35 in the picture naming and 19 in the object naming. The severe range produced the greatest number of error responses with a total of

62 in the picture naming and 56 in the object naming.

Finally, Appell, Kertesz, and Fisman (1982) felt that object naming abilities of these patients could be enhanced if the patients were allowed to view the object supplemented by phonemic cues or had the opportunity to manually manipulate the object. This investigation, although encouraging the patients to manipulate the objects, found the patients responded without touching the objects.

The final area investigated in this study was that of response latency. Gewirth, Shindler, and Hier (1984) noted that their subjects, both normal and brain-injured, exhibited increased response latency with increasing dementia severity. The results of this study were not in agreement with Gewirth, Shindler, and Hier in that 18 of 19 patients exhibited response latencies of one regardless of severity level. These results should, however, be investigated further as frustration level and correctness of response were not considered during assignment of latency values. In addition, latency was measured differently in the two studies. Gewirth, et al measured latency in finer increments (.05 second) than the present student (15 second) intervals.

Before applying the results of this investigation to the DAT population as a whole, it is important to consider several patient variables.

In studying a population of this type, there are many factors which could influence performance such as level and type of medications and time of day. Due to the extensive medication of this group as a whole, medication is difficult to control. It was noted that physical agitation increased during the afternoon with these subjects. Consequently, patients participating in this study were seen only before noon. A comparison of patient performance before and after noon suggests some interesting possibilities.

Another factor which could influence performance is hearing ability. Traditional pure tone testing is not feasible with this population. Alternatives, if the appropriate equipment is available, might include responding to speech or pure tones presented via sound field. Speech discrimination, using simple picture stimuli, might also be attempted. Fluctuation in performance level might necessitate repeated testing for hearing.

Age, sex, and severity level are also worthy of note. Although only two men were included in this study, this is proportional to the incidence of the disease in the general population. Also, the average age of this group was 79 years, but there was no clearcut relationship between age and severity level among this sample.

Additionally, the severity subgroups provided some interesting contrasts. It would be advisable to expand the size of these subgroups and see if these differences hold constant. Finally, response latency categories utilized appeared to be adequate for purposes of this study, however, further research in this area would reveal more interesting results if the latency categories were broken down into smaller time frames.

The results of the present study provide descriptive and objective data about the naming abilities of the DAT population. The results imply that while object naming abilities remain better than picture naming abilities and semantically associated responses far outweigh other error types, variability of response does exist in relationship to severity level.

Although speech and language therapy is contraindicated with many of these patients due to lack of adequate memory abilities, this information could be useful during selection of stimulus materials for evaluation of patient speech and language abilities. Object naming would seem to provide a more accurate measure of word finding ability than picture naming. Consequently, evaluation should be geared to use of concrete objects.

Similar application can be made in therapy. These findings suggest that object cues might prove useful to word recall among moderate to severe DAT patients. Milder DAT patients seem to need little cueing, and severe DAT patients would not appear to benefit from this type of cueing.

When counseling families and caregivers about the progression of Alzheimer's disease, this information would suggest that communication with these patients would be facilitated by use of concrete stimuli rather than abstract stimuli when the patient has progressed to the moderate level.

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APPENDIXES

APPENDIX A

DAT INVENTORY ITEMS AND CRITERIA FOR SCORING

Clinical Features

	0	1	2
Mental Functions			
Memory	Normal or forgetfulness that improves with cues	Recalls 1 or 2 of 3 words; spontaneously; incompletely aided by prompting	Disoriented; unable to learn 3 words in 3 minutes; recall not aided by prompting
Visuospatial	Normal or clumsy drawings; minimal distortions	Flattening, omissions distortions	Disorganized, unrecognizable copies of models
Cognition	Normal or impairment of complex abstractions and calculations	Fail to abstract simple proverbs and have difficulty with mathematic problems	Fails to interpret even simple proverbs or idioms; acalculia
Personality	Disinhibition or depression	Appropriately concerned	Unaware or indifferent; irritability not uncommon
Language	Normal	Anomia; mild comprehension deficits may be present	Fluent aphasia with anomia, decreased comprehension, paraphasia
Motor functions			
Speech	Mute, severely dysarthric	Slurred, amelodic, hypophonic	Normal
Psychomotor Speed	Slow; long latency to response	Hesitant responses	Normal, prompt responses
Posture	Abnormal, flexed extended, or distorted	Stooped or mildly distorted	Normal, erect
Gait	Hemiparetic, ataxic apractic, or hyperkinetic	Shuffling, dyskinetic	Normal
Movements	Tremor, akinesia, rigidity, or chorea	Imprecise, poorly coordinated	Normal

Note. From "Dementia of the Alzheimer Type: An Inventory of Diagnostic Clinical Features" by J. L. Cummings and D. F. Benson, 1986, _Journal of the American Geriatrics Society_, _34_, p. 13.

APPENDIX B

EXPLANATION OF THE STUDY

INFORMED CONSENT FORM

OKLAHOMA STATE UNIVERSITY

Explanation of Study

This is to inform you of an activity which may involve you or your family member. Carrie S. Gerhart, B.S., Masters Degree candidate in speech-language pathology, is conducting a study. She is interested in comparing the object naming and picture naming abilities of individuals with Alzheimer's disease and cognitive impairment so that more effective therapy methods can be developed to deal with any speech problems which might be present in individuals with these disabilities.

Ms. Gerhart is asking your permission to tape record a sample of your or your family member's speech and language. First, you or your family member will be given a series of screening tests. These initial tests will help determine the stage of the patient's speech and language involvement. Also included in these initial tests will be a hearing screening. Patients will be selected on the basis of these initial test results. Those patients selected will undergo an additional sampling procedure. This procedure will involve the examiner showing the patient a picture of a familiar object and asking the patient to name it. Following this, the patient will be given the actual object to manipulate and will once again be asked by the examiner to name it. During this procedure, the patient's responses will be tape recorded for analysis by the examiner at a later date. The recording procedure provides no risk to the patient.

Each patient will be tested once within the first week of the study and a second time approximately one week after the initial testing.

You have been asked to grant your permission to either be included in this study yourself or to allow your family member to be included. However, you are in no way forced to do so. You may discontinue your or your family member's participation at any time.

The results of this research will be kept confidential in that each patient involved will be referred to only by number. Your or your family member's name will not be used for any reason.

If you are willing to either participate in this study yourself or are willing to allow your family member to do so, please complete the attached form and return it to ______ by ______ 1987. Any questions you may have regarding the nature of this study or any portions thereof may be directed to Dr. Nancy Monroe, 120 Hanner Hall, Oklahoma State University, Stillwater, OK, (405) 624-6020, or Carrie S. Gerhart, (918) 492-9414.

OKLAHOMA STATE UNIVERSITY

Informed Consent Form

This is to certify that I hereby give permission and agree to participate myself or to allow my family member to participate as a subject for this study.

This investigation and my participation or my family member's participation in it has been explained to me and I understand the explanation.

I have been given the opportunity to ask whatever questions I may have had and all such questions have been answered to my satisfaction.

I understand that any data will remain confidential with regard to my identity or my family member's identity.

I further understand that I am free to withdraw my consent and terminate my or my family member's participation at any time. Furthermore, I agree that there has been no attempt, whether written or oral, to persuade me to waive any of my legal rights or to hold any person blameless except as provided by law.

I hereby give my informed consent to participate myself or to allow my family member to participate. In witness thereof, I affix my signature on ______________, 198__.

____
Name of participant

____
Signature of participant

OR

____
Signature of Guardian, Conservator, or Next of Kin on Behalf of Applicant

I have defined and fully explained the investigation to the aforenamed individual.

____
Investigator's Signature

APPENDIX C

PICTURE NAMING AND OBJECT NAMING

RESPONSE FORMS

PATIENT NAME________________________________

SEX __________

SECTION I - Picture Naming

PICTURE NAME	RESPONSE	CATEGORIZATION	RESPONSE LATENCY
1. iron			
2. broom			
3. dustpan			
4. watch			
5. whistle			
6. purse			
7. towel			
8. pear			
9. apple			
10. bacon			
11. toast			
12. comb			
13. telephone			
14. alarmclock			
15. drum			

PATIENT NAME________________________________

SEX __________

SECTION II - Object Naming

PICTURE NAME	RESPONSE	CATEGORIZATION	RESPONSE LATENCY
1. iron	________	____________	__________________
2. broom	________	____________	__________________
3. dustpan	________	____________	__________________
4. watch	________	____________	__________________
5. whistle	________	____________	__________________
6. purse	________	____________	__________________
7. towel	________	____________	__________________
8. pear	________	____________	__________________
9. apple	________	____________	__________________
10. bacon	________	____________	__________________
11. toast	________	____________	__________________
12. comb	________	____________	__________________
13. telephone	________	____________	__________________
14. alarmclock	________	____________	__________________
15. drum	________	____________	__________________

APPENDIX D

BAYLES-TOMOEDA INVENTORY

BAYLES-TOMOEDA INVENTORY

1. Is patient disoriented for time? _____
2. Is patient disoriented for place? _____
3. Is patient disoriented for self? _____
4. Does patient need assistance to eat? _____
5. Does patient need assistance to dress? _____
6. Is patient incontinent? _____
7. Does patient wander aimlessly? _____
8. Is patient verbally perseverative? _____
9. Is patient motorically perseverative? _____
10. Is patient emotionally labile? _____
11. Does patient respond inappropriately? _____
12. Can patient manage personal finances? _____
13. Does patient have memory loss for recent events? _____
14. Does patient have memory loss for remote events? _____
15. Does patient have difficulty communicating? _____

APPENDIX E

MENTAL STATUS QUESTIONNAIRE

MENTAL STATUS QUESTIONNAIRE

1. Where are we now? ____
2. Where is this place located? ____________________________
3. What is today's day, day of month? ______________________
4. What month is it? ____
5. What year is it? ____
6. How old are you? ____
7. What is your birthday? ___________________________________
8. What year were you born? _________________________________
9. Who is the president of the United States? _____________
10. Who was president before him? ___________________________

APPENDIX F

SCREENING RESULTS FORM

SCREENING RESULTS FORM

I. Bayles, Tomoeda Inventory Score

_____________________ of 15 possible

II. Native English Speaker

Yes _____

No _____

III. Hearing Screening

	Right	Left
500 Hz	_____	_____
1000 Hz	_____	_____
2000 Hz	_____	_____

IV. Visual Matching Score

_____________________ of 6 possible

V. Bilateral Paralysis on Paresis

Yes _____

No _____

VI. Mental Status Questionnaire

Severity Rating __________

VII. Minnesota Test For Differential Diagnosis of Aphasia

Subtest #10 _______________ of 6 possible

ADDITIONAL COMMENTS:

APPENDIX G

SUBTEST 10 "EXPRESSING IDEAS" (SECTION C)

MINNESOTA TEST FOR DIFFERENTIAL DIAGNOSIS OF APHASIA

SUBTEST 10 "EXPRESSING IDEAS" (SECTION C)

MINNESOTA TEST FOR DIFFERENTIAL DIAGNOSIS OF APHASIA

Expressing ideas (possible errors 6)

In each item the patient is asked for three responses. To receive credit, the response must be intelligent, must be appropriate, and must not repeat an idea previously expressed. Do not score for intellectual level. For example, responses like the following are acceptable for the second item: be honest, go to church, keep up your property, raise your children right, pay your bills, pay your taxes, be a good neighbor. Transcribe the responses.

Say: Tell me three things you did today.

1. ______________________________
2. ______________________________
3. ______________________________

Say: Tell me three things a good citizen should do.

1. ______________________________
2. ______________________________
3. ______________________________

VITA

Carrie Sue Gerhart

Candidate for the Degree of

Master of Arts

Thesis: PICTURE NAMING AND OBJECT NAMING ABILITIES IN MILD TO MODERATE, MODERATE TO SEVERE, AND SEVERE DEMENTIA OF THE ALZHEIMER'S TYPE

Major Field: Speech

Biographical:

Personal Data: Born in Lansdale, Pennsylvania, March 5, 1962, the daughter of Mr. John D. Gerhart and Mrs. Margaret A. Gerhart.

Education: Graduated from Memorial High School, Tulsa, Oklahoma, in May 1980; received a Bachelor of Science degree in Speech Pathology from Oklahoma State University in 1984; enrolled in the master's program at Oklahoma State University, 1984-1985; completed requirements for the Master of Arts degree at Oklahoma State University in July, 1987.

Professional Experience: Graduate Teaching Assistant, Oklahoma State University, Stillwater, Oklahoma, 1984-1986.