

Language Changes Associated with Alzheimer's Dementia
A Discussion Session

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STATEMENT OF PROBLEM AND PURPOSE

Following a brief review of the literature (Table 1), our study of Alzheimer's patients was reviewed. Two questions of interest to us were: 1) Is the aphasia associated with Alzheimer's dementia specifically one of memory, or is a specific language deficit also present? 2) How does aphasia associated with diffuse cortical degeneration differ from aphasia associated with focal cerebral lesions? The goals of the study were: 1) To analyze the spoken and written language of Alzheimer's patients on tasks that minimized the influence of immediate and recent memory. 2) To identify those features of Alzheimer's aphasia that are qualitatively different from focal aphasia.

A comprehensive study of Alzheimer's disease is being conducted at Duke University Medical Center. The second author (A.H.) is the principal investigator. Approximately 100 individuals have been referred to Duke Hospital for diagnostic evaluation; approximately 70 have been diagnosed as having Alzheimer's disease—presenile type. The speech and language characteristics of 32 patients were studied. The speech/language protocol for the study patients consisted of spoken and written language tasks, as follows,¹

Spoken language tasks included spontaneous picture description¹, naming pictures of decreasing familiarity², and word repetition. Written language tasks included: spontaneous picture description¹, writing words of decreasing familiarity to dictation², and word copying.

Of the 32 patients, 10 were mildly impaired, 14 were moderately to markedly impaired, and 8 were severely impaired, as measured by the speech and language protocol.

Because many patients were unable to perform spontaneous writing, the spontaneous speech sample was found to be the most valuable measure. Table 2 shows the five dimensions upon which speech was rated; speech sound integrity, grammatical completeness, semantic completeness (vocabulary), organization of speech, and fluency. This analysis showed that subtle deficits in word finding, organization, and fluency occur even in mildly impaired dementia patients. Grammatical integrity is compromised in moderately impaired patients. Speech sound disruption may present much later, in the most severely impaired individuals.

¹Goodglass and Kaplan (1972), Cookie Theft Picture.

²Kaplan, Goodglass and Weintraub (1978), Boston Naming Test (selected pictures).

Based on the performance of the Alzheimer's patients in this study, the distinguishing characteristics of Alzheimer's aphasia and focal aphasia were summarized (Table 3). These pertinent characteristics are organized according to naming ability, writing ability, modality of deficit, fluency of speech, and organization of speech. Illustrative examples of naming performance are shown in Table 4; of writing performance, in Figure 1.

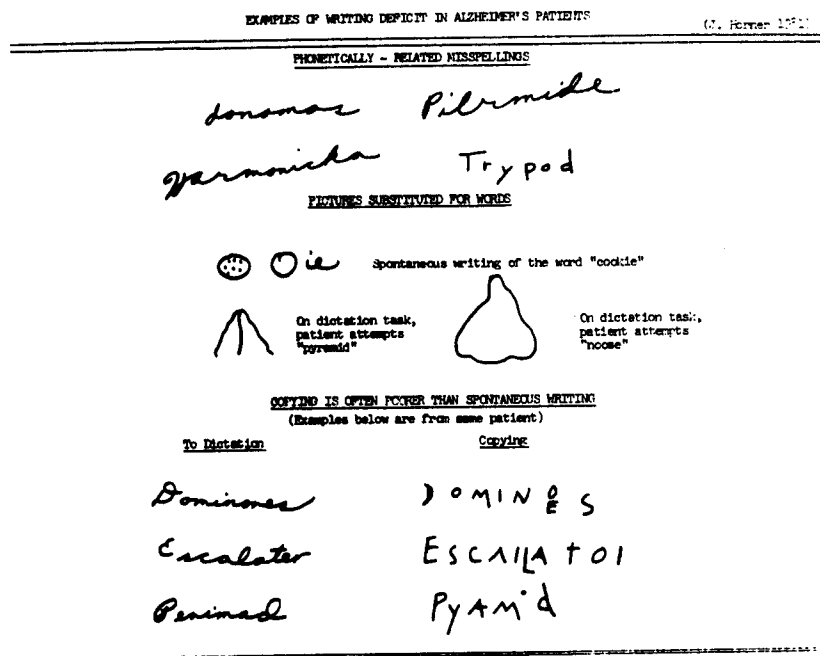


Figure 1. Examples of writing performance in Alzheimer's patients.

CASE DESCRIPTIONS

Five cases of patients presenting Alzheimer's disease were presented at the roundtable. Medical and neuropsychological data, when available, were briefly reviewed. Excerpts from their spontaneous speech samples are shown in Table 5.

Case 1. This 62 year old, right-handed female presented a memory disorder of 3 years duration. Both EEG and CT studies were abnormal. The patient had a high school education. Spoken and written language skills were judged to be mildly impaired.

Case 2. This 58 year old, right-handed male presented a memory disorder of less than 12 months duration. An EEG study was normal; a CT study was abnormal. He had a college education. His full scale IQ was 98 (verbal, 91; performance, 95). He achieved a score of 135 on the Peabody Picture Vocabulary Test. Spoken and written language skills were judged to be mildly impaired.

Case 3. This 59 year old, right-handed male presented a memory disorder of 3 years duration. EEG and CT studies were abnormal. The patient had a high school education. His full scale IQ was 89 (verbal, 99; performance, 80).

He achieved 111 on the Peabody Picture Vocabulary Test. Spoken and written language abilities were judged to be markedly impaired.

Case 4. This 55 year old, right-handed female presented a memory disorder for 2 years prior to admission. The EEG study was borderline; the CT, abnormal. She had completed some college. Her full scale IQ was 63 (verbal, 70; performance, 64). Spoken and written language skills were judged to be markedly impaired.

Case 5. This 75 year old right-handed female presented Alzheimer's disease for 48 months. Both EEG and CT studies were abnormal. The patient had completed college. She had a full scale IQ of 75 (verbal, 81; performance, 70). Spoken and written language skills were judged to be markedly impaired.

CONCLUSION

When tasks designed to minimize immediate and recent memory requirements are presented, it appears that Alzheimer's dementia patients suffer language-specific deficits, and that these deficits are qualitatively different from those seen in focal aphasia. Both types of patients demonstrate problems in retrieving language, but in focal aphasia the logical and conceptual organization underlying language performance is spared, while in Alzheimer's aphasia, the logical and conceptual organization underlying language performance undergoes a gradual process of disintegration.

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Table 1. Select references: Language changes associated with dementia.

Bartol, 1979	Nonverbal as well as verbal cues are important when communicating with Alzheimer's patients; specific guidelines for communication are provided.
Benson, 1973	Anomia in demented patients differs from anomia in aphasic patients in that neologisms and paraphasias are rare.
Benson, 1979	"The aphasia of Alzheimer's dementia is almost always limited to anomia and may not be a striking aspect."
Ernst, et al., 1970	Demented patients display a variety of aphasic disturbances with no specific pattern of deficits.
Gustafson, et al., 1978	Dementia patients with marked rCBF reduction in the temporo-parietal-occipital regions showed signs of receptive aphasia including alexia and agraphia; those with marked frontal reduction showed signs of expressive aphasia including stereotyped speech, echolalia and mutism in later stages.
Pirozzolo and Kerr, 1980	The most frequently encountered language problems are empty and circumlocutory speech and anomia.
Rochford, 1971	Naming errors are frequently visual perceptual in nature in a context of relatively fluent speech.
Rosen, 1980	Word fluency on timed category recall (e.g., animal names) is reduced.
Schwartz, et al., 1979	Longitudinal case study found relative preservation of syntax in contrast to semantic loss.
Wechsler, 1977	Reports a focal aphasic syndrome as the first and outstanding manifestation of a degenerative, presenile dementia.
Wilson, et al., 1981	Patients rely on ambiguity, stock phrases to obscure their inability to communicate. On object confrontation, semantically related words and perseverations occur frequently. Phoneme substitutions, neologisms and unrelated semantic errors are rare. Deficits in comprehending 2- and 3-part commands and connected speech are attributed to the memory impairment, as distinct from a linguistic impairment per se. Word repetition is preserved; phrase repetition difficulty is attributed to the memory impairment. Oral reading of words and phrases is preserved, while reading comprehension is severely impaired. Both the mechanical and linguistic aspects of writing are commonly impaired.

Table 2. Characteristics of spoken language in Alzheimer's dementia.

SPEECH SOUND INTEGRITY	GRAMMATICAL COMPLETENESS	SEMANTIC COMPLETENESS	ORGANIZATION	FLUENCY
MILD DEFICIT				
Preserved	Preserved	Normal range of vocabulary in spontaneous speech; mild word-finding difficulty on picture confrontation with good response to semantic and sound cues	Occasional repetition of ideas	Brief pauses interrupt the flow of speech
MODERATE DEFICIT				
Preserved; occasional first-sound repetition on revision	Occasional grammatical error; incomplete sentences mixed with complete sentences	Reduced vocabulary; marked deficit on confrontation naming of less familiar words; fair-poor response to semantic and sound cues	Repetition and revision of ideas; intrusion of tangential and self-referential comments	Excessive number of pauses interrupt the flow of speech; excessive intrusion of "uh"
SEVERE DEFICIT				
Occasional speech sound error; rarely a pre-dominant feature	Incomplete sentences predominate; utterances are paragrammatic	Markedly reduced vocabulary; severe confrontation naming deficit; little or no response to semantic or sound cues; stereotyped phrases appear in later stages	Repetitions, revisions, and intrusions predominate, speech severely disorganized	Two types: 1) fluent/melodic with pauses briefly interrupting the flow of speech; 2) nonfluent, characterized by prolonged hesitations, very short phrases, hypophonia may coexist

Table 3. Focal aphasia vs. Alzheimer's aphasia: Differential characteristics.

FOCAL APHASIA	NAMING ABILITY	ALZHEIMER'S APHASIA
<p>Semantically related errors (e.g., chair for table, fork for knife) are typical; Semantic and first-sound cues facilitate naming Underlying concept is intact, but word retrieval is disorganized</p>		<p>Visually related errors and circumlocutions are typical; Response to semantic and sound cues is highly variable; Underlying concept is unstable or lost (See examples below)</p>
WRITING ABILITY		
<p>Misspellings characterized by letter substitutions and sequencing errors Errors increase as words increase in length Copying usually better than spontaneous writing Examples: "dook" (door); "somke" (smoke); "cirtimic" (cigarette); "crofefene" (screwdriver)</p>		<p>Misspellings often phonetically related Letter additions occur frequently Copying (with printed letters) usually poorer than spontaneous writing Examples: "faucette" (faucet); "eskerlator" (escalator); "pear a mind" (pyramid); "try bond" (tripod) (See also examples below)</p>
MODALITY OF DEFICIT		
<p>All modalities -- speech sounds, grammar, vocabulary -- usually impaired to some degree</p>		<p>Modality of deficit usually related to degree of deficit (i.e., stage of disease); first, vocabulary, as reflected in naming ability; second, grammar; third, speech sounds</p>
FLUENCY OF SPEECH		
<p>Fluent vs. nonfluent aphasia is discernible at all levels of severity, and is associated with locus of lesion; anterior dominant hemisphere lesion, nonfluent (Broca's) aphasia; posterior dominant hemisphere lesion, fluent (Wernicke's) aphasia</p>		<p>Fluency and melody of speech usually preserved at mild and moderate levels of impairment; at later stages, two types emerge: 1) fluent, semantically "empty" speech; normal phrase length; brief pauses interspersed 2) nonfluent speech; below normal phrase length; prolonged hesitations; sometimes hypophonic</p>
ORGANIZATION OF SPEECH		
<p>Logical and temporal sequence of ideas usually intact; ideas are relevant to the task or situation</p>		<p>Logical and temporal sequence of ideas usually poorly organized; speech is redundant and characterized by repetition and revision of ideas; tangential and self-referential statements are typical</p>

Table 4. Picture naming responses by Alzheimer's patients.

VISUALLY-RELATED ERRORS WITH VARIABLE RESPONSE TO CUES

- | | |
|-----------|---|
| harmonica | <p>1. "that looks a great deal like a brick wall that you might be able to sit on"
 [semantic cue: it's a musical instrument] "a violin?" or a horn?"
 [sound cue: "ha-"] "harmonica"</p> <p>2. "it appears to be a mattress"
 [semantic cue: "it's a musical instrument"] "that's a big help...not accordian..."
 [sound cue: "ha-"] "harmonica"</p> |
| telescope | <p>1. "it looks like a tube but it's not a tube"
 [semantic cue: it's used to look through] "I know, it's a periscope"
 [sound cue: "te-"] "telescope"</p> <p>2. "oval object, carpet rolled"
 [semantic cue: it's used to look through] "periscope, binocular"
 [sound cue: "te-"] "te--te--transit"</p> |

SEMANTICALLY-RELATED ERRORS

- | | |
|-----------|---|
| escalator | <p>1. "steps - uh - that are electrified while you're walking up"
 [sound cue: "es-"] "steps, rolling up steps"</p> <p>2. "chairs going upstairs and another to the basement"
 [sound cue: "es-"] "es--es--..."</p> <p>3. "chimney"
 [semantic cue: you go up on it] "stepladder"
 [sound cue: "es-"] "escalator"</p> |
|-----------|---|

Table 5. Excerpts from the spontaneous speech of five Alzheimer's patients, presented in order of increasing severity.

- Case # 1 There's a boy at the cookie jar, he climbed up into the, chair, and the girl is holding her hands up as if he wi- she wished to join him, he climbed up on the stool, and it's turning over with him...the mother's, drying dishes, and the little boy has got his shoes on...
- Case # 2 There's a cookie, on a, a cookie jar on a shelf and cookies are in the jar. The top is off of the, uh jar, uh, boy has a cookie in his hand. . .There is a, girl watching, and uh, probably I-laughing it looks like, uh, mother is, or the, either a girl, is uh, washing dishes, or drying dishes. . .
- Case # 3 Left to right, I see that the, cookie jar is being emptied, by a, young man, and possibly his, sister, helping him, but he's gonna get in trouble, because that stool that he's standing on is uh, gonna, tip over. . . But unfortunately, water is gonna, water is gonna come out of here because she, isn't looking what she'd doing and, there goes water. . .and that boy is going to, have a very, oh I said I said that, didn't I, okay. . .
- Case # 4 Right there is, gettin' up, this, right there, he gonna, get this, cookies, [cue] I don't know, [cue] well uh, the, this coming out, [cue] water is coming out, [cue] I don't know, [cue] she's, drying that uh, [cue] uh, plates [cue] this is a, girl, and this is a boy, [cue] I don't know, he's coming on out, this, this stool on, is coming out. . .
- Case # 5 Oh I see a little girl looking for something that she put on the top of the, the uh room, and here she's knocked over a, a t-table-chair, and up here, the boy sees a cookie, uh, jar and he can't, stay away from it, and over here, uh, she, continues to work with the children, and they like, here, and they like the things she's doing and here are the little aprons for the girls, they, it, helps give them a little pull when they've done something wrong. . .