20. Confrontation Naming Performance in Dementia and Aphasia

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Impairment of naming has frequently been reported as a hallmark of the language disorder in dementia (Kirshner, Webb, & Kelly, 1984) and naming tests are sometimes recommended as reliable indexes of the severity of dementia (Flicker, Ferris, Crook, & Bartus, 1987; Skelton-Robinson & Jones, 1984). However, considerable dispute exists as to the nature of the naming impairment in dementia patients, particularly when confrontation naming is used to define anomia.

Confrontation naming is a complex process involving several stages. In the first (perceptual) stage, following the presentation of a picture, the pictorial image is analyzed for correct identification of the stimulus. The information is transmitted to the second (semantic) stage, where its semantic representation is activated, then to the third (label retrieval) stage, where the phonological representation corresponding to the semantic representation is retrieved. This is followed by the motor programming stage, where the articulatory sequence is activated, leading to correct naming.

In dementia patients, Rochford (1971) has implicated impairment at the first stage, whereas other researchers have assumed that impairment lies at the semantic and/or label retrieval stage (Bayles & Tomoeda, 1983; Huff, Corkin, & Growdon, 1986; Smith, Murdoch, & Chenery, 1989). Yet another explanation has suggested that naming deficits in dementia patients involve perceptual as well as semantic and label retrieval stages (Kirshner et al., 1984). Systematic comparison of naming performance between dementia and aphasia patients should increase our understanding of naming impairment, but sporadic studies aimed at this comparison have shown inconsistent results (Huff et al., 1986; Rochford, 1971).

The purposes of the present study were (a) to describe the nature of confrontation naming errors made by dementia subjects and aphasia

subjects matched for severity of naming impairment and (b) to examine the factors related to the nature of naming errors in the two groups of subjects.

METHOD

Subjects

Two subject groups were studied: subjects with Alzheimer-type dementia and stroke patients with aphasia. The dementia subjects were diagnosed by neurologists and psychiatrists. Fifty-two mild-to-moderate dementia subjects who were able to complete a battery of 20 neuropsychological tests (Sasanuma et al., 1985) were included in the study. The aphasia group consisted of subjects whose scores on the present naming test fell within the range of dementia, in order to control the severity of naming impairment between the two subject groups. Fifty-four aphasic subjects met this criterion out of 120 aphasic subjects who were given the test. All subjects were right handed, had at least 6 years of education, and were screened for gross impairment in vision and hearing. Table 20.1 summarizes the characteristics of the two subject groups.

Test Materials

On the basis of a preliminary investigation using 100 items on 50 aged controls, stimulus pictures to which at least 90% of the controls responded correctly were selected for the present 50-item naming test representing each of the nine word categories (Table 20.2). The use of the nine word categories was based on the findings of selective preservation in naming of special word categories such as letters, body parts, and colors in the aphasia population (Goodglass, 1980; Goodglass & Kaplan, 1972; Goodglass, Wingfield, Hyde, & Theurkauf, 1986).

Black-and-white line drawings mounted on 15-by-10-cm cards covered with plastic coating were used as stimuli except for colored paper and photographs used in the categories of color names and proper nouns, respectively.

Method of Analysis

All responses that appeared during the 15-second time limit per item were transcribed from audiotape. The results were examined in the following

TABLE 20.1. CHARACTERISTICS OF SUBJECTS WITH DEMENTIA AND APHASIA

		Dementia (N = 52)	*Aphasia* (N = 54)
Age (years)	*M*	74.5	59.7
	(SD)	(9.5)	(12.9)
Sex (male/female)		12/40	35/19
Education (years)	*M*	9.5	12.0
	(SD)	(3.1)	(3.2)
Type of aphasia		—	Anomic 17
			Broca 15
			Conduction 2
			Wernicke 8
			Other 12

TABLE 20.2. EXAMPLES OF ITEMS IN THE 50-ITEM NAMING TEST

Word Category	*Number of Items*	*Examples of Items*
1 Common nouns	10	dog, clock, giraffe
2 Parts of objects	5	pocket, roots, lid
3 Body parts	5	hand, foot, ear
4 Color names	5	red, yellow, white
5 Proper nouns	5	Mt. Fuji, Kakuei Tanaka (former prime minister)
6 Verbs	5	write, sleep, drink
7 Adjectives	5	small, thick, hot
8 Spatial terms	5	under, on, left
9 Numbers & shapes	5	18, 700, circle

order: (a) the mean number of correct responses, (b) error type analyses, and (c) analyses by the nine specific word categories.

RESULTS

Mean Number of Correct Responses

The mean number of correctly named pictures for the dementia and aphasia groups did not differ. The means were 36.94 (SD = 10.82) and 36.07 (SD = 10.70), respectively.

Error-Type Analyses

The 22 error types used for the analyses were derived from the results of earlier studies (Bayles & Tomoeda, 1983; Kohn & Goodglass, 1985; Smith et al., 1989) and the authors' own clinical experiences (Figure 20.1). The percentage of agreement for error-type analyses among the four raters was 89%.

Table 20.3 shows the mean number of each error type for the dementia and aphasia groups. The three most frequent error types were identical for both groups: "semantically related" words came first, followed by the sum of two "simple delay" responses and "don't know" responses. These three error types accounted for over 50% of total errors. Statistically significant differences between the two groups were found in the six less frequent error types. The four error types that appeared more frequently in the dementia group were "description of attributes," "visually related" errors, "personal comments," and "uncertainty." "Personal comments" appeared in direct relation to the task difficulty in the dementia group. Of the total of 45 errors of this type, 62% were in the adjective category, in which naming was achieved after conscious comparisons of the pictured stimuli. The two remaining error types appearing more frequently in the aphasia group were related to phonological abilities: "unrelated phonological combinations" and "phonologically related" errors. Thus, the error-type analyses revealed that although differences were found in less frequent error types between dementia and aphasia groups, the most frequent error type for both groups was identical: "semantically related" errors.

Further analyses of the content of semantically related errors in each subject group, however, revealed some differences between the groups. Figure 20.2 illustrates examples of these differences. For the picture of a giraffe, 67% of the dementia subjects' semantically related errors were substitutions of the word *deer,* which is probably the most familiar exemplar of Japanese long-necked animals. In aphasic subjects, this response accounted for only 12% of semantically related errors. Instead, aphasic subjects responded with names of animals that are not necessarily visually similar to the stimulus but are foreign, such as a camel, a kangaroo, and an alligator. Another example in Figure 20.2 also demonstrates the difference between the two groups. For the picture of Momotaro (a famous folk tale child-hero born from a big peach), 67% of aphasic subjects' semantically related errors were the substitution of another folk tale child-hero's name, Kintaro. On the other hand, dementia subjects responded with the word *child,* which indicates a failure in processing the critical visual features of this stimulus. Similar differences in semantically related errors between the two groups were consistently observed in the other items.

1. *Simple delay*
   Correct naming appearing between 6 and 15 seconds after stimulus presentation. No circumlocutory responses are present.
2. *Circumlocutory delay*
   Correct naming appearing between 6 and 15 seconds after stimulus presentation. Circumlocutory responses appear during the delay period.
3. *Repetition of syllables*
   Two or more repetitions of the same syllable or syllables.
4. *Self-correction*
   Self-corrected response initiated during the first 5 seconds after the presentation of the stimulus. Responses that are classified as types 3 and 12 are not included in this error category.
5. *Uncertainty*
   Expression of uncertainty (e.g., *I am not sure, but it may be* a dog).
6. *Perseveration*
   The same response (a word or a part of a word) that was given for the immediately preceding stimulus.
7. *Intrusion*
   The same response appearing during the test but not immediately before the target stimulus.
8. *"Don't know"*
   No response for 15 seconds or the subject gives a response that clearly indicates his or her inability to name the target (e.g., "I don't remember," "I don't know," "What is the name for it?").
9. *Empty utterance*
   Responses with common idioms or highly nonspecific words (e.g., "It's that," "This is this," "Doing something").
10. *Personal comments*
    Giving personal comments or judgment on the stimulus (e.g., "I like sweeter ones," "The larger one is more expensive," "It's dangerous").
11. *Retrieval of part of word*
    Recalling a part (larger than a morpheme) of a target word that consists of multiple morphemes.
12. *Conduites d'approche*
    Approaching the phonological form of the target word through repetition of a similar but not identical combination of syllables.
13. *Phonologically related*
    Substitution, omission, or distortion of syllables that constitute the target word.
14. *Semantically related*
    Substitution by a word that has one of the following relationships with the target word: the same semantic category; superordinates; part-whole relation; or words that have function, material, place, or time in common.

Figure 20.1. Error types and descriptions.

15. *Description of attributes*
    Correctly describing the stimulus picture using visual or semantic attributes but unable to retrieve the name matching those attributes.
16. *Visually related*
    Responses elicited through an erroneous impression caused by the visual characteristics of the stimulus picture.
17. *Unrelated paraphasia*
    Real-word response that was not related phonologically or semantically to the target word.
18. *Unrelated phonological combinations*
    Neologistic response consisting of phonological combinations that have no approximation with the real word.
19. *Unrelated word combinations*
    Response combining two or more real words that do not exist as existing word combinations (e.g., "skin of a pot" for "a lid of a pot").
20. *Unrelated multiword response*
    Multiword response uttered in sentence form that has no relation with the target word but that cannot be classified as empty utterance (e.g., "I feel as if I put it on what I have written" for telephone).
21. *Concrete response* (for adjective stimuli only)
    Naming or describing one of the stimulus pictures that demand an adjective response.
22. *Inability to name numbers* (for number stimuli only)
    Inability to name multiple-figure numbers.

Figure 20.1. (continued)

Analyses by Nine Specific Word Categories

Figure 20.3 shows the frequency distribution of the subjects' scores for each of the nine specific word categories. Upon visual inspection, three word categories (colors, spatial terms, and numbers and shapes) showed a highly skewed pattern, indicating that the majority of subjects scored full marks. The patterns of score distribution for the remaining six word categories were distinctly different from those for the three word categories.

DISCUSSION

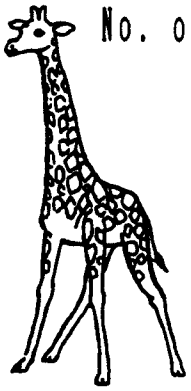
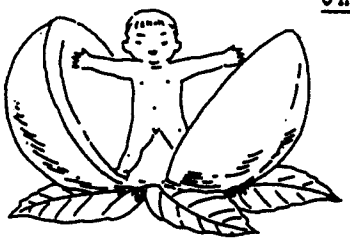
Although the number of errors in the 50-item naming test was not statistically different, the error-type analyses revealed similarities and differ-

TABLE 20.3. MANN-WHITNEY *U* TEST RESULTS FOR EACH ERROR TYPE IN DEMENTIA AND APHASIA GROUPS

	Dementia (N = 52)	*Aphasia* (N = 54)	p
1. Simple delay	2.08	2.61	NS[a]
2. Circumlocutory delay	0.81	0.53	NS
3. Repetition of syllables	0.27	1.41	NS
4. Self-correction	0.52	0.61	NS
5. Uncertainty	0.77	0.04	*
6. Perseveration	0.21	0.30	NS
7. Intrusion	0.06	0.07	NS
8. "Don't know"	2.79	3.13	NS
9. Empty utterance	1.15	0.11	NS
10. Personal comments	0.87	0.11	*
11. Retrieval of part of word	0.04	0.24	NS
12. Conduites d'approche	0.00	0.37	NS
13. Phonologically related	0.06	1.22	*
14. Semantically related	4.60	5.00	NS
15. Description of attributes	1.40	0.26	*
16. Visually related	0.96	0.04	*
17. Unrelated paraphasia	0.13	0.43	NS
18. Unrelated phonological combinations	0.04	1.31	*
19. Unrelated word combinations	0.02	0.15	NS
20. Unrelated multiword response	0.27	0.07	NS
21. Concrete response	0.38	0.19	NS
22. Inability to name numbers	0.21	0.07	NS

[a]NS = not significant.
*$p < 0.002$ (Mann-Whitney *U* test with Bonferroni adjustment for multiple comparisons).

ences between the dementia and aphasia groups. The most frequent error type for both groups consisted of semantically related responses. The dementia subjects frequently substituted a word that was visually similar and the most familiar exemplar of the category for the target word. This finding is in accord with the results of Bayles and Tomoeda (1983), who reported that the naming errors of their dementia subjects were both semantically related *and* visually similar to the stimulus. The observed response characteristics of dementia subjects may be related to the reduced activation of the semantic network. That is, the subtle difference in perceptual features needed to identify the target word may not be sufficient to activate the semantic network in dementia subjects and they

Stimulus	Dementia	Aphasia
"Giraffe"		
 No. of Errors	2 1	8
	deer 67%	camel 38%
	horse 5%	deer 12%
	goat 5%	kangaroo 12%
	dog 5%	alligator 12%
"Momotaro" (Name of a folk tale child-hero)		
No. of Errors	2	6
	child 100%	Kintaro* 67%
		child 33%

* Name of another folk tale child-hero.

Figure 20.2. Examples of semantically related words produced by dementia and aphasia subjects.

may stop processing after they reach the most familiar, prototypical exemplar. Aphasic subjects, on the other hand, appear to be able to activate the semantic network, although inefficiently.

Inspection of another feature of the stimulus, word category, further elucidated the mechanism of naming impairment in dementia versus

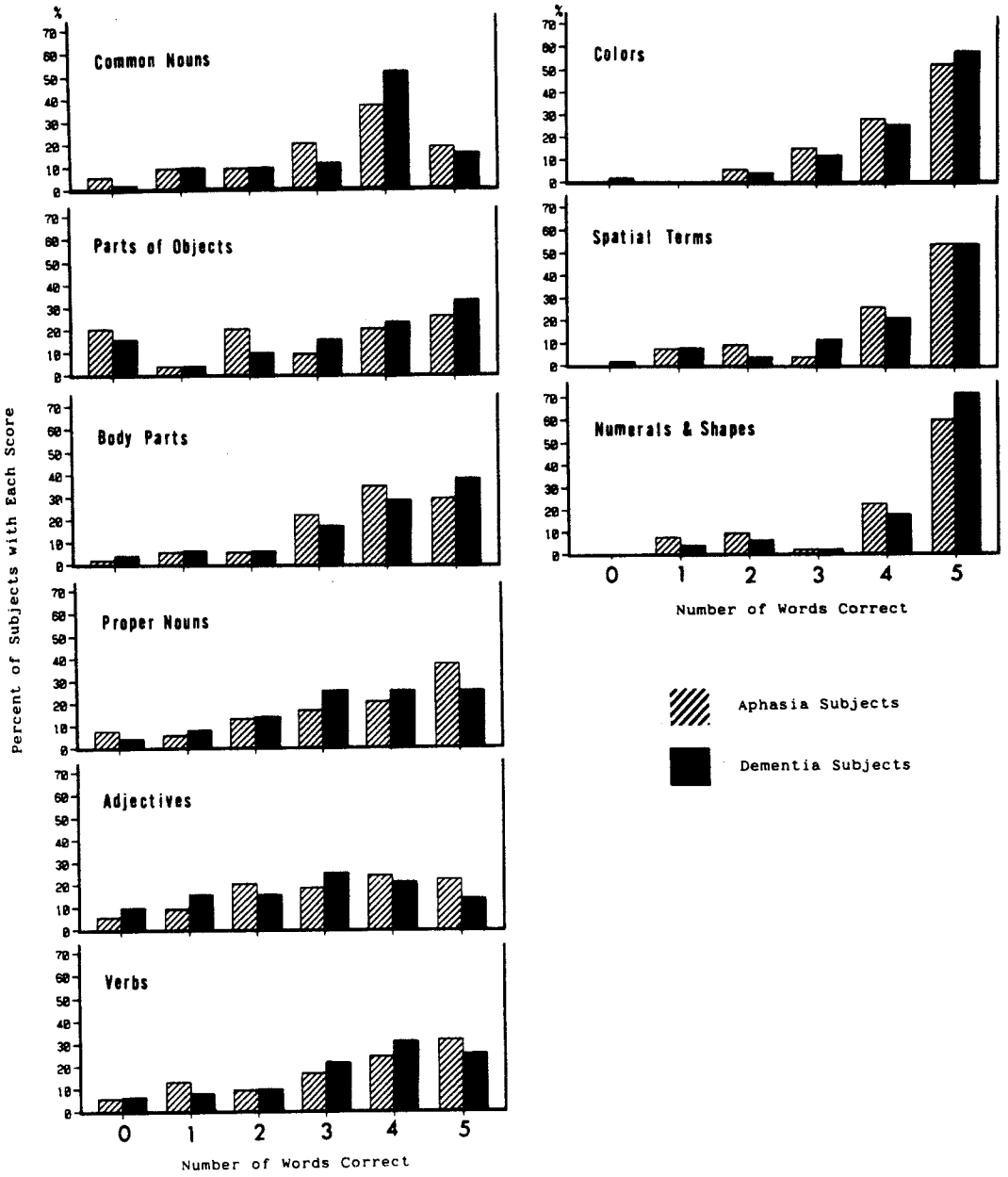


Figure 20.3. Frequency distribution of scores for the nine word categories.

aphasia. The majority of the subjects in both groups scored full marks in three specific word categories: colors, spatial terms, and numbers and shapes. These categories partially overlap with the previously reported "preserved" categories in aphasia literature. The words in these preserved categories seemed to share certain features: For example, there may be a strong one-to-one associative link between stimulus and response, with a limited amount of overlearned vocabulary in the cate-

gory. There also may be less ambiguity in terms of the physical attributes of the stimulus. These features may possess significant "conceptual arousal" strength (Goodglass & Baker, 1976) and thus may demand less effort to activate the semantic network for naming. In sum, the data in our study may be interpreted to support the findings by Kirshner et al. (1984), who suggested the close interaction of perception and semantics in dementia subjects.

The examination of the differences in the less frequent errors between the two groups also shed light on the different mechanisms of naming difficulty in dementia and aphasia subjects. For the dementia group, "description of attributes" was common, which suggests an error at the semantic and/or label retrieval stage. Although dementia subjects made more "visually related" errors, suggesting an error at the perceptual stage, the proportion of such errors was small, consistent with the findings of previous reports (Bayles & Tomoeda, 1983). Other error types characteristic of the dementia group—"personal comments" and "uncertainty"—could not be attributed to one of the four specific stages of the naming process described earlier, but were thought to reflect coping behavior associated with general cognitive difficulty.

Errors related to phonological problems were more common in the aphasia group than in the dementia group. Although the majority of these responses may be attributable to difficulty in stages after label retrieval, a possibility remains that some of the responses may stem from dysfunctions in earlier stages. However, the absence of behaviors that reflect cognitive difficulty for aphasic patients indicates that their naming difficulty was confined to the impairment in the linguistic sphere.

Future investigation should carefully control stimulus characteristics such as naming ambiguity, visual complexity, familiarity, and prototypicality (Snodgrass & Vanderwart, 1980; Vanderwart & Snodgrass, 1977) as well as task difficulty in order to delineate factors contributing to naming impairment in dementia and aphasia.

CONCLUSIONS

Subjects with dementia and aphasia, matched for severity of naming impairment, shared a number of characteristics in naming behavior. However, detailed analyses showed that while the aphasic subjects' naming errors were mainly confined to the linguistic sphere, dementia subjects' naming errors reflected interaction between linguistic and cognitive difficulties.

REFERENCES

Bayles, K. A., & Tomoeda, C. T. (1983). Confrontation naming impairment in dementia. *Brain and Language, 19,* 98–114.

Flicker, C., Ferris, S. H., Crook, T., & Bartus, R. T. (1987). Implications of memory and language dysfunction in the naming deficit of senile dementia. *Brain and Language, 31,* 187–200.

Goodglass, H. (1980). Disorders of naming following brain injury. *American Scientist, 68,* 647–655.

Goodglass, H., & Baker, E. (1976). Semantic field, naming and auditory comprehension in aphasia. *Brain and Language, 3,* 359–374.

Goodglass, H., & Kaplan, E. (1972). *The assessment of aphasia and related disorders.* Philadelphia: Lea & Febiger.

Goodglass, H., Wingfield, A., Hyde, M. R., & Theurkauf, J. C. (1986). Category specific dissociations in naming and recognition by aphasic patients. *Cortex, 22,* 87–102.

Huff, F. J., Corkin, S., & Growdon, J. H. (1986). Semantic impairment and anomia in Alzheimer's disease. *Brain and Language, 28,* 235–249.

Kirshner, H. S., Webb, W. G., & Kelly, M. P. (1984). The naming disorder of dementia. *Neuropsychologia, 22,* 23–30.

Kohn, S. E., & Goodglass, H. (1985). Picture-naming in aphasia. *Brain and Language, 24,* 266–283.

Rochford, G. (1971). A study of naming errors in dysphasic and in demented patients. *Neuropsychologia, 9,* 437–443.

Sasanuma, S., Itoh, M., Watamori, T. S., Fukuzawa, K., Sakuma, N., Fukusako, Y., & Monoi, H. (1985). Linguistic and nonlinguistic abilities of the Japanese elderly and patients with dementia. In H. Ulatowska (Ed.), *The aging brain* (pp. 175–200). Austin, TX: PRO-ED.

Skelton-Robinson, M., & Jones, S. (1984). Nominal dysphasia and the severity of senile dementia. *British Journal of Psychiatry, 145,* 168–171.

Smith, S. R., Murdoch, B. E., & Chenery, H. J. (1989). Semantic abilities in dementia of the Alzheimer type: 1. Lexical semantics. *Brain and Language, 36,* 314–324.

Snodgrass, J. G., & Vanderwart, M. (1980). A standardized set of 260 pictures: Norms for name agreement, image agreement, familiarity, and visual complexity. *Journal of Experimental Psychology: Human Learning and Memory, 6,* 174–215.

Vanderwart, M., & Snodgrass, J. G. (1977). *A new set of 165 picture stimuli with norms for naming ambiguity, visual complexity, familiarity, and prototypicality.* Unpublished manuscript.