

# Modality Differences in the Comprehension of Frequently Occurring Nouns and Celebrity Names by Subjects with Aphasia

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Empirical research on neuropathology's idiosyncrasies and language-disturbance patterns has helped guide clinical management of individuals with aphasia and has enhanced understanding of the cognitive and linguistic mechanisms that subserve language processing. Without a thorough comprehension and explanation of language in disarray, we cannot hope to understand the relationship between the brain and the elegant human behavior within the linguistic domain. The lexicon is a rich avenue to explore. For example, in some subjects intact naming and comprehension of nouns and impaired verb performance suggest organizational principles in the lexical system that relate to grammatical classes of words (Hillis & Caramazza, 1990a, b; McCarthy & Warrington, 1985; Zingeser & Berndt, 1988). A still more interesting, although controversial, proposal of organizational structure indicates that specific semantic categories of concrete nouns (such as animals or fruit and vegetables) can be selectively impaired in some subjects (Basso, Capitani, & Laicono, 1988; Hart, Berndt, & Caramazza, 1985).

Traditional views and some recent research in aphasia indicate as well that the lexical system may consist of relatively independent processing systems that may be selectively impaired across modalities of language. One specific hypothesis about the structure of the lexical processing system is that it consists of a set of modality-specific input and output components interconnected by a semantic component (Hillis & Caramazza, 1990a, b). Various other reports document differential impairment of low-versus high-frequency words (Patterson, Marshall, & Coltheart, 1985); and closed- versus open-class words (Coltheart, Patterson, & Marshall,

1980). Other reported dissociations of lexical processing include differential performance between oral and written naming (Caramazza & Hillis, 1990; Kay & Ellis, 1987).

Recent observations on the structure and dissolution of the lexical system after brain damage suggest that hemispheric asymmetry may explain differential performance on certain categories of words. For example, Van Lancker, Klein, Hanson, Lanto, and Metter (1991) proposed that personal names do not have the same linguistic properties as nouns and verbs, and as such may not be processed in the same manner as other linguistic material. Instead, to Van Lancker et al. (1991) the *holistic properties*, affective nature, and personal familiarity of celebrity personal names suggest right hemisphere specialization for processing this category of words. Van Lancker et al. (1991) and Van Lancker and Klein (1990) reported that globally aphasic left-hemisphere-damaged subjects performed poorly on the Peabody Picture Vocabulary Test (Dunn, 1983) and a noun recognition task but performed similarly to normal control subjects on the recognition of personal names. An experimental protocol in these studies focused on recognition of celebrity personal names of individuals displayed in photographs and was reported to differentiate between subjects with left hemisphere damage, right hemisphere damage, and no brain damage. It was reported that right-hemisphere-damaged subjects "had more difficulty than the LH and Controls, and the LH group did not perform as well as the Controls" (Van Lancker et al., 1991). Similar results, preserved recognition of names of celebrities in subjects with aphasia, have been previously reported by Van Lancker, and Canter (1982).

Additional evidence on a dissociation of performance across categories of the lexicon would not only illuminate language organization within and across the hemispheres, but would also have implications for clinical management, particularly of globally aphasic persons. Facilitation and perhaps islands of relatively preserved performance could be exploited clinically by more attention to the use of individualized, personally familiar, or select categories or modalities of language.

Therefore, the purposes of this study were twofold: first, to determine if performance differences in aphasic subjects existed across the modalities of auditory comprehension versus visual matching of categories of nouns; and second, to determine if performance differences existed across the lexical categories of frequently occurring nouns versus photographs of well-recognized celebrities. Specific questions of the study included:

1. Do aphasic subjects perform differently within the auditory modality on the recognition of frequently occurring nouns versus celebrity names?
2. Do aphasic subjects perform differently in visually matching, frequently occurring nouns versus celebrity names?

**TABLE 2. INDIVIDUAL AND GROUP PERFORMANCE DATA FOR MODALITY AND LEXICAL CATEGORIES**

<i>Subject</i>	<i>Common Noun (Auditory)</i>	<i>Celebrity (Auditory)</i>	<i>Common Noun (Visual)</i>	<i>Celebrity (Visual)</i>
1	20	18	20	20
2	17	12	18	9
3	19	16	20	16
4	15	19	18	20
5	20	20	20	20
6	15	15	7	16
7	19	20	20	20
8	15	14	13	12
9	20	18	19	16
10	20	19	20	19
11	12	7	6	4
12	20	20	20	20
Range	12-20	7-20	6-20	4-20
Mean (SD)	17.67 (2.65)	16.5 (3.8)	16.75 (4.97)	16 (4.98)
Percent	88	83	84	80

**TABLE 3. ANALYSIS OF VARIANCE OF FOUR CONDITIONS**

<i>Source</i>	<i>df</i>	<i>Variance Estimate</i>	<i>F</i>
Common noun vs. celebrity	1	11.02	1.20
Visual vs. auditory	1	6.02	1.69
Interaction	1	0.05	0.20

Table 2 presents individual and summarized group performance data for the modality and lexical categories tested.

To determine whether the obtained mean differences were statistically significant, an analysis of variance (ANOVA) was computed. Results of a repeated-measures two-way (stimulus set  $\times$  modality) ANOVA (Table 3) indicated that no effect or interaction reached statistical significance.

## DISCUSSION

The twelve subjects with aphasia showed no statistically significant differences in performance for any of the stimulus sets or conditions. Our subjects were as adept at recognizing common nouns as celebrity names regardless of the presentation modality. Van Lancker et al. (1991) and Van

Lancker and Klein (1990) reported differences between auditorally presented nouns and celebrity names for four globally aphasic subjects and concluded that the difference supported the contention that personal names are stored and processed in the right hemisphere. Our results challenge that interpretation.

Several factors may have contributed to the different results obtained in our studies. The number of subjects, severity of aphasia, and specific experimental procedures differed between the two studies. While all of our subjects were not globally aphasic, they presented a mean severity level at the 34th percentile on the SPICA, and only two of our subjects did not make errors across the experimental conditions of common noun versus celebrity name recognition. To equate the difficulty of the two stimulus sets, our auditory-comprehension measurement focused on familiar words. These differences in the studies, in our view, do not account for the magnitude of disparity of the findings and conclusions across the studies. Based on our data we are forced to conclude the following:

1. Our 12 subjects with aphasia showed no statistically significant differences in performance for any of the stimulus sets or conditions.
2. Our subjects were as adept at recognizing common nouns as celebrity faces regardless of presentation modality.
3. Our results do not support the conclusion by Van Lancker et al. (1991) or Van Lancker and Klein (1990) that subjects with aphasia retain a disproportionate lexical ability to recognize celebrity faces.
4. The hemispheric residence of familiar celebrity names is a complex issue within a nest of potentially interacting variables.
5. We have nowhere near the specific knowledge required to assign a permanent address for processing celebrity names.

As Lewis Thomas reminded us in 1974, "an active field of science is like an anthill; the individual almost vanishes into the mass of minds tumbling over each other, carrying information from place to place, passing it around."

Our hope is that this conference will be an anthill for years to come so that we may continue our quest to explain these puzzling disorders and help the people who experience them.

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