

Verbosity and Labeling Behavior: The Performance of Right Hemisphere and Non-brain-Damaged Adults on an Inferential Picture Description Task

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The verbal expression of right hemisphere damaged (RHD) patients has been characterized as rambling, verbose, and generally inefficient (Myers, 1985; Burns *et al.*, 1985). They are said to miss the point of verbal exchange (Wapner, 1981), to fail to stay on topic, and to confabulate (Burns *et al.*, 1985). But what exactly is the nature of their inefficient communicative style? Can it be attributed solely to confabulation, irrelevant responses, and tangential comments? Or can it at least partly be attributed to comments that are relevant and related, if excessive? Could their verbal excess be characterized by a tendency to catalogue seemingly unrelated elements in an effort to deduce their relationship? In other words, could their verbosity be partly attributed to an overt expression of a step-by-step analysis used in an effort to arrive at interpretation and conclusion? Is their verbosity a result of a sort of "thinking out loud" that perhaps compensates for a failure to integrate individual elements normally processed in rapid synthesis?

In 1979 Myers suggested that the copious verbal output of RHD patients in open-ended exchanges was seldom characterized by confabulation and tangential comments, but rather by excessive itemization, cataloging of detail, and by lack of the item integration necessary to interpretation. The results of her study suggested that when describing the Cookie Theft picture from the Boston Diagnostic Aphasia Examination (Goodglass and Kaplan, 1983) RHD subjects used fewer inferential labels than normals did. This study, however, did not address verbosity itself and did not explore the nature and use of non-inferential concepts.

The present study was designed to explore the nature of RHD verbosity to see first if RHD subjects were more verbose than normal subjects on an inferential picture description task, and secondly, to examine the nature of that verbosity to determine the role of tangentiality and of labeling versus inferences. It was hypothesized that when describing highly inferential pictures, RHD patients would be less efficient and more verbose than non-brain-damaged subjects. It was further hypothesized that their verbosity would be characterized less by tangential remarks than by a tendency to itemize or label individual elements in an effort to interpret the picture.

#### METHOD

Subjects. The subjects included 10 right-handed adults with unilateral RH damage. Familial handedness history was obtained. Nine of the ten subjects reported that their parents and grandparents were right-handed. The one exception was an ambidextrous maternal grandfather. Lesion location was obtained by CT scan. All subjects had suffered a right hemisphere CVA 1 to 9 months prior to testing, and were medically stable at that time. Their

average age was 57.5 years and average years of education was 13.1. Control subjects included 10 right-handed adults with no history of neurological impairment. Their average age was 58.5 years with an average of 14.4 years of education. Table 1 provides pertinent information on the individual subjects in each group. t-test comparisons revealed no group differences in age or education.

Table 1. Information on Control and RHD subjects.

	$\bar{X}$	Range	SD
AGE:			
Control group	58.5	38 - 76	11.47
RHD group	57.5	38 - 70	12.46
EDUCATION:			
Control group	14.4	8 - 18	3.24
RHD group	13.1	8.5 - 20	4.31

Procedure. The following tests were administered to the subjects prior to the administration of the experimental task: (1) Lateral Dominance Examination (Reitan, 1979); (2) The Word Fluency subtest from the Neurosensory Center Comprehensive Examination for Aphasia (NCCEA) (Spren and Benton, 1969); (3) Boston Naming Test (BNT) (Goodglass and Kaplan, 1983); and (4) a line bisection and cancellation task (Albert, 1973) to test for left neglect. See Table 2 for test results.

Table 2. Pretest scores for the RHD subjects.

Subject	GWU	RB	TC	M	RBB	UP	JLB	PM	AC	RT
<u>Handedness:</u>										
Dextral	x	x	x	x	x	x	x	x	x	x
Familial	x	x	x	x	x	-	x	x	x	x
<u>NEGLECT</u>										
Line bisection deviation	10%	5%	0	0	0	0	0	0	0	0
Line crossout (Max. score = 18)										
Left	18	13	16	18	18	18	18	18	18	18
Right	18	2	17	18	18	18	18	18	18	18
<u>NCCEA</u>										
Word Fluency	48	19	33	31	12	15	32	29	20	15
BNT	48	52	52	51	53	56	60	53	50	47

A training task was administered to all subjects prior to the administration of the experimental task. The training stimuli consisted of four simple colored action photographs (DLM Photogrammar, 1984), depicting people engaged in familiar activities -- for example, a man crossing the finish line at a track event. These pictures were presented, in the same order, one at a time, with the instruction, "I want you to tell me what's happening in this picture." If a subject did not perceive what was depicted in the picture, then the examiner trained him with whatever explanation was necessary. Criterion for entry into the study was an adequate explanation of at least 2 of the 4 pictures. All responses were tape recorded and transcribed.

The experimental stimuli consisted of 6 inferential pictures. The inferential stimuli were presented on 8 x 10" cards with a black border. They were colored photographs of Norman Rockwell paintings and were presented in the same order, one at a time, with the same instruction used in the training task. The stimuli were placed to the right of the midline and subjects were prompted with the instruction, "Follow the border and tell me what is happening in this picture" to compensate for left-sided neglect when necessary. All responses were tape recorded and transcribed.

Scoring. Because the primary interest was in labeling behavior, scores were based on noun use. All nouns were divided into 6 categories. Pictured nouns (correct and incorrect), pictured nouns about which the subject had made an inference (correct and incorrect), and nouns that were inferred but not pictured (correct and incorrect). The operational definitions for each category can be found in Appendix A.

In an effort to exclude repeated references to a particular inference, the number of different inferred nouns in each of the inferential categories was computed and separated from the total count.

A total word count was also taken and the following were excluded: repetitions, closing statements, fillers, extraneous comments, and tangential comments (see Appendix B for definitions). The total number of words used in the tangential comments were counted separately. Qualifiers, such as "I think" or "I guess" were included in the total word count, and contractions were counted as 2 words.

Responses were scored by 2 independent judges. Point-by-point agreement between the 2 judges was 92%.

## RESULTS

The total word count, the total number of nouns, and the percentage of nouns to words was computed for each subject group. The RHD subjects used more than twice as many total words and total nouns. These differences were statistically significant. However, the percentage of nouns to words did not differ significantly between the two groups (Table 3).

The two groups also did not differ significantly in their use of tangential comments. Tangential comments were made by 3 of the 10 control subjects and 3 of the 10 RHD subjects. The mean number of tangential words was 14.3 for the control group and 12.3 for the RHD group.

The percentage of each type of noun to total noun count used by both groups, and comparisons within each group and between the two groups on noun use were analyzed using two-tailed t-tests. Figure 1 shows the mean percentage of nouns in each category for control subjects. Figure 2 shows the mean percentage of nouns in each category for the RH subjects. There were no significant differences in either group between the percentage of total versus different nouns in the inferential categories.

Table 3. Total words, total nouns, and noun-to-word ratios for Control and RHD subjects.

	TOTAL WORDS			TOTAL NOUNS			% NOUNS/WORDS		
	$\bar{X}$	Range	SD	$\bar{X}$	Range	SD	$\bar{X}$	Range	SD
Control	160.2	58-247	62.16	29.9	12-37	21.0	16.4%	12-21	2.87
RHD	*434.2	117-748	234.00	*74.6	37-137	36.9	18.0%	15-22	2.40

\*Significantly different from control group ( $p \leq .005$ )

The percentage of correct nouns in each category was then compared between the groups (Table 4). The experimental subjects used a significantly greater percentage of pictured nouns than the controls did. In contrast, the RH group used a smaller percentage of different and total pictured-inferred nouns than controls. This difference was significant for the different pictured-inferred category and approached significance at the .006 level of confidence for the total pictured-inferred noun category. There was no difference between the groups for any of the error categories.

Table 4. Mean percent correct nouns by category for the RHD and Control groups.

Noun Category	Control Group	Experimental Group
Pictured	40.9	57.9*
Pictured-Inferred	37.6	23.1
Pictured-Inferred (Different nouns)	37.6	20.4*

\*Significantly different ( $p \leq .005$ )

Analysis of the breakdown of noun categories within each group revealed: 1) both groups used a significantly greater percentage of pictured nouns than not-pictured-inferred nouns; 2) both groups used a significantly greater percentage of pictured-inferred nouns than not pictured-inferred nouns for both total and different nouns; and 3) the RHD, but not the control subjects, used a significantly greater percentage of pictured nouns than pictured-inferred nouns (Table 5).

In order to examine the possible relationship between the BNT, the Word Fluency subtest, the tests for visual neglect and the experimental variables, Pearson product-moment correlation coefficients were computed. Results did not reveal significant correlations between these measures and the dependent variables, with the exception of a moderate correlation of .60 between the BNT and the pictured-inferred incorrect total and different noun categories. There appeared to be no logical explanation for this relationship. It was concluded that rapid retrieval, naming, and neglect were not related to the experimental variable.

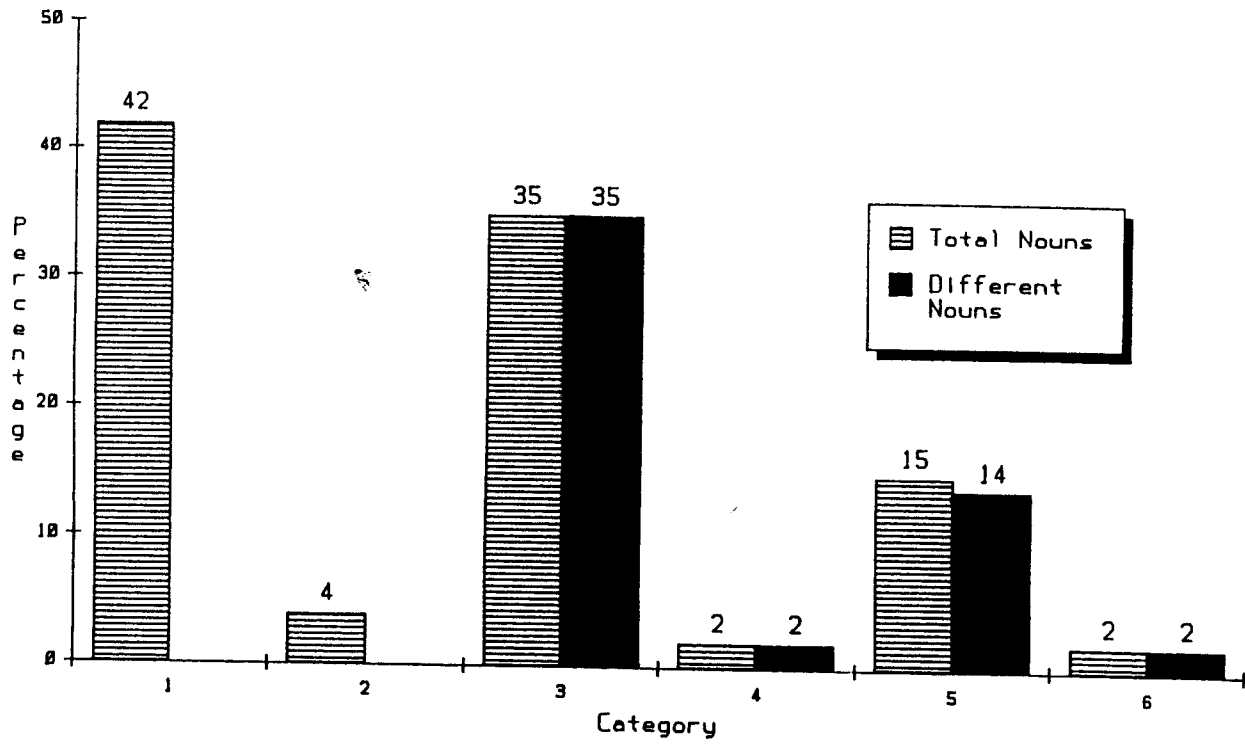


Figure 1. Mean percentage of nouns in each category for control subjects.

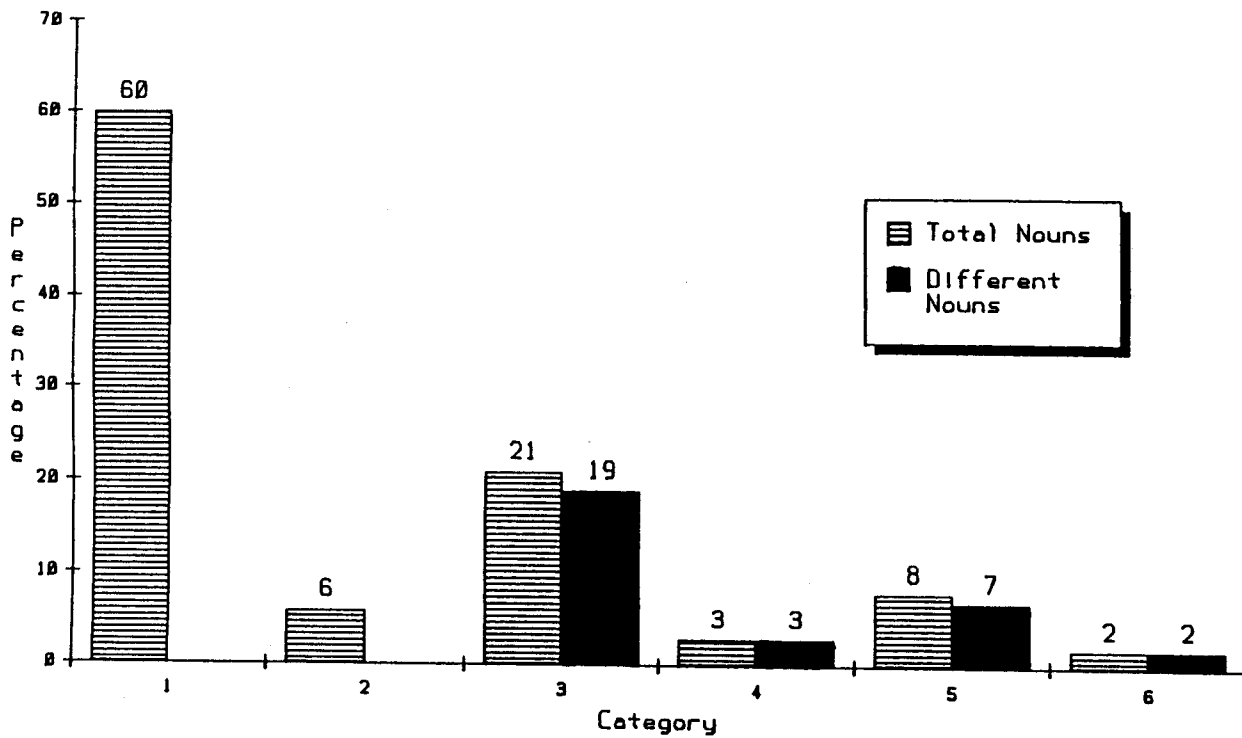


Figure 2. Mean percentage of nouns in each category for experimental subjects.

Table 5. Comparisons of the mean numbers of pictured, pictured-inferred, and not pictured-inferred nouns used by the Control and RHD groups.

Noun Category	Control Group	RHD Group
Pictured vs. Pictured-Inferred	40.9 37.6	57.9* 23.1
Pictured vs. Not Pictured-Inferred	40.9* 13.5	57.9* 7.7
Pictured-Inferred vs. Not Pictured-Inferred	37.6* 13.5	23.1* 7.7
Pictured-Inferred vs. Not Pictured-Inferred (Different nouns)	37.6* 12.8	20.4* 6.7

\*Significantly different ( $p \leq .005$ )

#### DISCUSSION

The results of the present study revealed that RHD subjects were more verbose than control subjects in an inferential picture task. RHD patients used significantly more words than controls in the experimental task. In fact, they used more than double the number of words to describe the pictures. Since tangential comments were excluded from total word count, the excessive verbal output in the RHD group cannot be attributed to irrelevant remarks or confabulation. In fact, when the total number of tangential remarks was compared, there was no significant difference between the experimental and RHD groups.

Further, the percentage of nouns to total words was not significantly different between the two groups. However, the noun types used by the RHD group did differ from the control group. The RHD group used a significantly greater percentage of pictured nouns, suggesting that they were labeling or cataloging the pictured items more than the control group was. The RHD group also used a significantly smaller percentage of pictured-inferred different nouns than the control group did. This finding suggests that the control group was making more inferences about what they actually saw in the picture. Rather than simply labeling a depicted item, a suit jacket, for example, they may have said "military uniform" based on other contextual cues. Interestingly, there was no significant difference between groups in the number of not-pictured inferential nouns. This finding may be attributed to two things. First, the nature of the pictures may have limited the number of not-pictured inferences that could be drawn. Secondly, it suggests that like the control subjects, RHD subjects do arrive at conclusions. Relative to control subjects, their excessive use of pictured nouns combined with nonsignificant differences on the not-pictured inferred category suggests that they arrive at the same number of overall conclusions as normal subjects, but that they have a concrete method of getting there. Both groups infer. Control subjects are more efficient because they more immediately and covertly arrive at an inference. It appears that the excessive attention to detail and labeling behavior found in this study may be a strategy that RHD patients use in an effort to arrive at a conclusion about inferentially depicted events.

Finally, the scoring system presented here might be useful as a clinical tool to determine the nature of the verbal inefficiency in RHD patients. It could be used as an objective diagnostic measure for determining the degree to which their verbal excess can be attributed to tangential irrelevant comments, versus relevant remarks leading to an interpretation.

#### ACKNOWLEDGMENT

The authors wish to thank Beth Hillis-Trupe of the Medical Rehabilitation Center of Maryland for her assistance in obtaining subjects for this study. We would also like to thank Craig Linebaugh for running the statistics for us.

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#### APPENDIX A

##### OPERATIONAL DEFINITIONS

##### Pictured

- |              |   |
|--------------|---|
| 1) Correct   | A label that accurately refers to a person or object, the meaning and function of which is unambiguously depicted.                  |
| 2) Incorrect | A label that inaccurately or imprecisely refers to a person or object, the meaning and function of which is unambiguously depicted. |

Pictured - Inferred

- 3) Correct                    A label that refers to a person or object, visible in the picture whose function or meaning is accurately inferred from the context of the picture.
- 4) Incorrect                  A label that refers to a person or object, visible in the picture whose function or meaning is inaccurately inferred from the context of the picture.

Not Pictured - Inferred

- 5) Correct                    A label that refers to a person, object, or abstract idea not visible in the picture whose function or meaning is accurately inferred from the context of the picture.
- 6) Incorrect                  A label that refers to a person, object, or abstract idea not visible in the picture whose function or meaning is inaccurately inferred from the context of the picture.

APPENDIX B

OPERATIONAL DEFINITIONS

WORDS EXCLUDED FROM THE TOTAL WORD COUNT

- Tangential Comments        Comments that may be related to the picture but in no way describe or further a description of the picture itself.
- Repetitions                  A syllable, single word, or phrase that is directly followed by an identical syllable, word or phrase (i.e. "He's in, he's in.").
- Closing Statements         Any statement at the end of a description that signalled completion of the task (i.e. "That's all that I can see in this picture.")
- Fillers                      Word or phoneme clusters that served to fill pauses (i.e., "um," "ah," "yeah," "oh,").
- Extraneous Comments        Comments or questions directed to the examiner about the task in general (i.e. "I didn't do well on those last two pictures." "Can you tell me what this is?").

INCLUDED IN THE TOTAL WORD COUNT

- Qualifiers                   A statement or phrase beginning with "I" that indicates uncertainty about a response (i.e. "I think." "I guess.").

DISCUSSION

Q: Did you look at your RHD patients in terms of any grouping? Do you have any severity measures, any site of lesion measures?



- A: We did get site of lesion measures. They all had CT scans and they had to pass the criterion measure to do the training task, and if they were able to do that then we put them into the study.
- Q: Did you look at any performance differences in terms of any groupings in the subjects that you looked at?
- A: No. The performances when we did all the pretest data showed them to all be within the same group. They were a very homogeneous group.
- Q: How many people did you exclude because they couldn't do the pretest?
- A: I think we had one, no two. They were excluded because they had more severe neglect and even with cuing were unable to remember to look at the whole picture.
- Q: In my clinical experience some RHD patients don't have excessive speech. They have very little speech and they don't do this labeling behavior. My feeling is that they don't come to conclusions and that might support what you're saying that this labeling actually helps them. Have you ever seen such patients?
- A: Clinically yes, but the patients that we used in this study did not have that problem. Actually we had that problem with one of the control subjects. We didn't with any of our subjects.