

Production of Narrative and Procedural Discourse
in Aphasia

Hanna K. Ulatowska and Sara Macaluso-Haynes
University of Texas at Dallas

Alvin J. North
University of Texas Health Science Center at Dallas

INTRODUCTION

In recent years the scope of studies of language has expanded from the investigation of simple sentences to the study of connected speech, i.e. discourse (van Dijk, 1977; van Dijk and Kintsch, 1978; Grimes, 1975; Labov, 1972; Longacre, 1976; Labov and Fanshel, 1977). In this work, we investigated the ability of aphasic individuals to produce discourse. We undertook this research for several reasons.

First, studies of discourse enable us to investigate speakers' knowledge of the contextual use of language, their communicative competence. Thus this present work would add to the body of literature on the communicative competence of aphasic individuals that has been accumulating over the last few years. In general, these studies (Holland, 1977; Ulatowska, et al., 1977; McCurdy, 1978; Wilcox and Davis, 1977; and Stachowiak, et al., 1978) have found that communicative context is an important aid which aphasic individuals are able to use in both production and comprehension of language.

Second, studies of discourse enable us to investigate the relationship among cognition, the organization of human knowledge, and language. Coherence and cohesion are the key factors in investigations of these relationships. Both relate to the wellformedness of text: coherence, in terms of the plausibility, conventionality and conclusiveness of text, is a general cognitive concept, while cohesion refers to linguistic devices such as anaphora and reference which produce coherence. Several studies have looked at production of discourse by the elderly (Obler, 1979) by schizophrenic patients (Rochester et al., 1977a, 1977b), by aphasic individuals (Berko-Gleason et al., 1977; Yorkston and Beukleman, 1980; Ulatowska and Freedman-Stern, 1979), by a patient with the diagnosis of acute confusional state (Freedman-Stern, 1978), and by right hemisphere patients (Huber, 1978). These studies suggest a number of interesting dissociation phenomena: among them, dissociation between sentence-level and discourse-level competence, and between spontaneous narrative speech and other language abilities. In the present work, we hoped to measure the quality of coherence and cohesion in the discourse of aphasic individuals.

Third, studies of discourse enable us to investigate formal and structural characteristics of discourse grammar. While research on formal properties of the discourse of normal populations is increasingly common, only a few studies have begun to characterize language features of the discourses of special populations. In the present work, we hoped to contribute to the characterization of discourse in aphasic patients.

We selected mildly impaired aphasic individuals because they are capable of producing an amount and variety of language adequate for our purpose. We chose to examine narrative discourse because it exhibits the most discernable and most extensively studied internal organization. We included procedural discourse because it consists of language which is simple syntactically and is more constrained to temporal order than narrative. Because of the simplicity of its language and its internal organization, it is conspicuously different from narrative discourse, and therefore, might be differentially impaired in aphasic subjects.

SUBJECTS

Ten aphasic subjects were selected for the investigation, eight males and two females between the ages of 54 and 70. The etiology of the aphasia in every case was a single cerebrovascular accident in the left hemisphere. Six patients exhibited right hemiplegia. Following initial speech and language evaluation, language impairment of one patient was diagnosed as mild, four as mild to moderate, and five as moderate to severe. At the time of experimental testing, which on the average was 23.6 months post onset, three subjects were described as mild to moderate, while seven were mildly aphasic. Based on available neurological data, initial speech and language evaluation, and the administration of standardized language tests for this investigation, two patients were classified as having anterior lesions, four as posterior, and four as mixed.

A control group of ten subjects was matched to the experimental population in age, sex, and education. Table 1 shows the descriptive data for the two groups.

Table 1. Description of populations.

Measure	Aphasic N=10 Subjects		Normal N=10 Subjects	
	Mean	Range	Mean	Range
Age (Years)	60.2	54-70	58.7	54-71
Education (Years)	13.4	10-18	14.4	12-20
Months post onset	23.6	6-103	--	--

MATERIALS AND METHODS

The diagnostic battery administered to the aphasic population consisted of the following tests:

- I. Standardized tests to evaluate language functioning
 - A. Boston Diagnostic Aphasia Examination--selected subtests
 - B. Token Test--Part V
- II. Standardized tests to evaluate cognitive functioning
 - A. Knox Cube Test
 - B. Associate Learning Test from Wechsler Memory Scale
 - C. Block Design and Picture Arrangement subtests of WAIS

III. Experimental tests to elicit verbal discourse

A. Narrative Discourse

1. self-generated account of memorable experience
2. "cat" story elicited with help of sequence pictures
(See Appendix A)
3. retelling of "rooster" story immediately following examiner's reading (See Appendix B)
4. summary for "cat" and "rooster" stories

B. Procedural Discourse--elicited with help of sequence pictures

1. routine procedures--brushing teeth, cutting bread, combing hair, making sandwich
2. procedures learned through special instruction--bowling, changing a tire

Linguistic Framework of the Study

In order to clarify our analysis of the language data, we will explain briefly some concepts of discourse grammar, particularly its structure. Discourse, like isolated sentences, conforms to storable rules.

Narrative discourse is a language representation of a happening, real or imagined, which consists of matching a verbal sequence of clauses to the sequence of events which actually occurred. It is characteristically in either first or third person. The clauses of a narrative are typically ordered in temporal sequence. A fully formed narrative consists of an episode with the following structure:

1. ABSTRACT* (What was it about?)
2. SETTING involving time and location, background, and identification of participants (Who, When, What, Where?)
3. COMPLICATING ACTION involving events (Then what happened?)
4. EVALUATION (So what?)
5. RESULT or RESOLUTION (What finally happened?)
6. CODA* (What is the moral?)

*Abstract and coda are optional.

This order is conventional; however, variants can occur.

Procedural discourse tells us how something is done. It consists of steps or procedures which are stated in specifiable order, and which are either conceptually or chronologically linked. Procedural discourse is goal-oriented since the focus is on telling how something is done, not on who does it or on what is done, as in narratives. Procedural discourse may contain introducer, resolution, and coda. It can also include evaluation, though this would be much less frequent than in narrative.

DATA ANALYSIS

We looked at these characteristics of sentences:

1. Length of T-units as measured in mean number of words (A T-unit is defined as one independent clause plus any independent modifiers of that clause; Hunt, 1965).
2. Complexity of language as measured by:
 - a. amount of embedding (expressed in number of clauses per T-unit)
 - b. ratio of coordinate to subordinate conjunctions
 - c. percentage of dependent clauses to total clauses
 - d. percentage of non-finite clauses to total clauses

And we looked at these characteristics of discourses:

1. Length of discourse type as measured by number of T-units
2. Occurrence of elements of superstructure in narratives (e.g. setting, resolution) and in procedures (e.g. procedural steps)
3. Length of elements of narrative superstructure as measured by number of T-units
4. Amount of evaluation in narratives and procedures as measured by number of clauses containing evaluation
5. Amount of adverbial modification in procedures as measured by number of adverbial phrases

RESULTS

Standardized Tests. Table 2 summarizes the language profiles obtained from the standardized testing. In general, all subjects displayed high auditory comprehension scores and all evidenced some degree of naming deficit. Oral expression deficits were manifested by motor speech disorders as well as naming errors.

Table 2. Aphasic subjects' performance on standardized language tests.

	Possible Points	Mean	Range	SD
Severity Rating	5	3.9	3-5	0.74
Boston Total Score	277	243.3	175-268	27.37
Auditory Comprehension	99	95.3	88-99	3.47
Oral Expression	178	148.0	77-174	27.21
Visual Confrontation Naming	105	95.5	43-105	18.99
Animal Naming	19	11.5	7-16	3.27
Token Test Part V	21	15.3	7-21	4.67

Cognitive Tasks. In cognitive tasks, there were no significant differences between groups, with the exception of a difference in favor of normal individuals on the Block Design test and on the easy Associate Learning items. (See Table 3)

Linguistic Tasks. First, we will describe the features of sentential grammars.

1. Aphasic individuals produced fewer clauses than normal subjects, but a comparable number of T-units except in the "Rooster" summary.
2. Aphasic individuals produced less complex language than normal subjects
 - fewer words per T-unit
 - less embedding of dependent and non-finite clauses

Table 3. Performance on cognitive tests.

Test	Aphasic Subjects			Normal Subjects			t
	Mean	Range	SD	Mean	Range	SD	
Knox Cube	12.2	9 - 14	1.99	13.4	9 - 17	2.17	1.29
Block Design Points	25.2	4 - 37	11.18	35.9	14 - 48	10.77	2.18 ^a
Block Design Time	39.1	15 - 60	19.59	16.5	9 - 60	15.41	2.87 ^a
Picture Arrangement Points	18.9	12 - 30	6.90	23.5	6 - 35	8.03	1.37
Picture Arrangement Time	41.4	22 - 60	14.06	30.3	14 - 51	14.51	1.74
Associate Learning Easy	13.6	8 - 18	3.34	16.7	15 - 18	1.06	2.80 ^b
Associate Learning Hard	4.1	0 - 12	3.72	5.8	1 - 10	3.33	1.08
TOTAL	10.9	4.5 - 19.5	4.51	14.1	9 - 19	3.72	1.76

Note: ^ap < .05

^bp < .01

This reduction in complexity was more pronounced in narratives than in procedures.

3. Aphasic individuals employed simpler language in procedures than they did in narratives, maintaining a distinction present in the discourses of normal subjects. There were no differences in the language characteristics of aphasic subjects or normal individuals within the group of narrative tasks.

Narratives. Tasks involving the cat and rooster stories produced no differences in language characteristics and will be considered together. We will limit discussion to general findings. The analysis of the aphasic subjects' performance on the cat and rooster stories revealed a preservation of the narrative superstructure. Specifically:

1. All narratives contained all the essential elements of the superstructure i.e., settings, complicating actions, and resolutions.
2. Some narratives displayed introducers and codas, which are optional elements.
3. The length of each element of the superstructure as measured by percentage of total T-units was not significantly different in aphasic subjects as compared to normal subjects. (See Table 4)
4. All narratives showed preservation of the chronological sequence of events.
5. Settings contained time, location, and motivational aspects of the background.
6. All narratives contained all of the participants in the action.
7. All narratives contained evaluations, which are considered a necessary component of acceptable narrative. The amount of evaluation was significantly lower in aphasic subjects compared to normal subjects (aphasic subjects \bar{X} = 18%, normal subjects \bar{X} = 33%).

Table 4. Length of superstructure elements as percentages of total T-units.

Element of Superstructure	Aphasic Subjects	Normal Subjects
Setting	23.6	25.6
Complicating Action	60.0	55.0
Resolution	12.6	14.7

Analysis of the linguistic forms relevant to the wellformedness of narrative structure revealed the following:

1. No significant difference between aphasic individuals and normal individuals in the ratio of coordinate to subordinate conjunctions.
2. No significant difference in the syntactic form of the first mention of the participants in the actions. Both aphasic subjects and normal subjects produced a comparable range of determiners in the form of definite and indefinite articles and possessive pronouns and modifiers.
3. Lower noun to pronoun ratio in aphasic subjects. (Aphasic subjects \bar{X} = .98, Normal subjects \bar{X} = 1.61)

4. Higher number of indefinite words such as "get" in aphasic individuals.
5. Reduced number of adverbial clauses in aphasic subjects (39% less than normal individuals).
6. No significant difference in the distribution of adverbial clauses in relation to the main clauses. The clauses following the main clause were more frequent in both aphasic subjects and normal subjects.

Performance on Summaries. All aphasic individuals produced a version of a summary. However, four merely retold the stories instead of producing proper summaries, including inappropriate amounts of detail. All summaries of both aphasic individuals and controls had settings and complicating actions; 70% had resolutions. It is assumed that a proper summary should contain all or most of the elements of the superstructure.

Procedures. Analysis of the aphasic individuals' performance on procedures involved two variables: presence or absence of essential steps within a given procedure (they were determined pragmatically) and number of steps included.

We found the following:

1. Less than half the aphasic subjects produced all the necessary steps in the procedures. Seven normal subjects included all of them.
2. Aphasic subjects produced a smaller number of steps within each procedure. This reduction was especially evident in the more complex procedures.
3. Both populations produced some procedures that contained optional structural elements such as introducers and codas.

Analysis of the linguistic forms relevant to the wellformedness of procedural structure revealed the following:

1. There were no significant differences between the two populations in:
 - a. tense and mood distribution
 - b. linkage between clauses
 - c. pronoun forms
 - d. amount of evaluative language
2. The aphasic subjects produced less adverbial specification of the procedural steps than normal subjects.

DISCUSSION AND CONCLUSIONS

In this final section, we will summarize the main findings of this study, relate them to the literature, and indicate some possible areas for future research.

1. The aphasic individuals studied produced well-structured narrative and procedural discourse in terms of the observance of the rules of superstructure: they properly utilized cohesive devices for identification of the participants in the action and for the connection of events and procedural steps. It is important to note that no simplification of superstructure was observed in terms of length of elements such as setting and resolution, as is the case in the narratives of young children, who devote a smaller proportion of their narratives to background information, e.g. setting of events (Kernan, 1977). To the best of our knowledge, this is the only study which looks at the taxonomy of discourse structure in a group of aphasic individuals, and therefore, it is not known to what extent this finding can be generalized

to aphasic persons with more severe disruption of language.

2. Aphasic subjects' discourse errors differed only in number, not in kind, from those of normals. This finding provides another piece of evidence for the concept of a continuum from disrupted to normal linguistic performance. It should be noted that all discourse errors identified by us are also features of the unplanned discourses of normal speakers, as reported in the literature (Ochs, 1979). One of the most powerful communicative strategies operating here is that in unplanned discourse, speakers rely on the immediate context to express propositions. The ability of aphasic individuals to utilize context in discourse production has been previously documented (Wilcox and Davis, 1977; Stachowiak *et al.*, 1978).

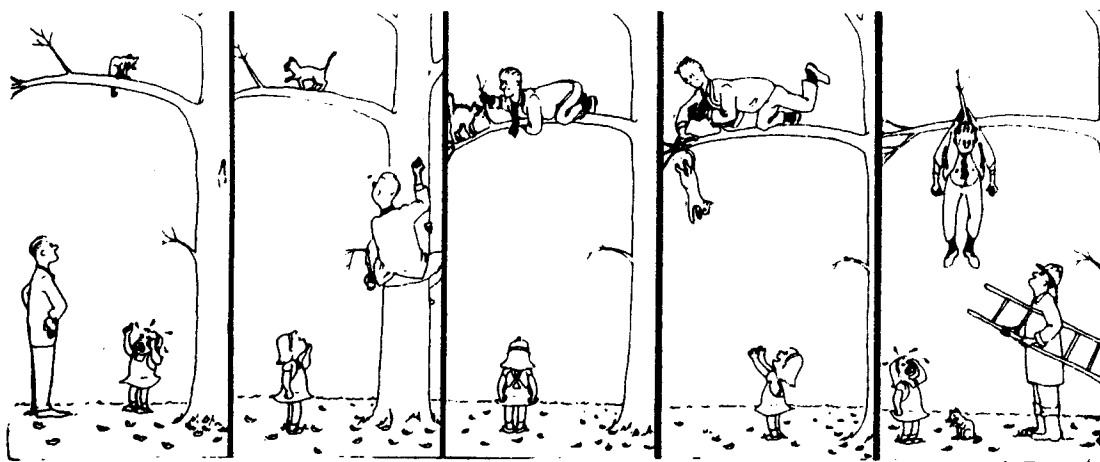
3. The aphasic subjects studied produced language which was reduced in both complexity and quantity. Reduced complexity of language was manifested by less embedding, i.e. smaller percentage of dependent and nonfinite clauses. Reduced quantity of language had some interesting consequences for the structure of discourse. It led to what looks like a selective decrease in information content in both narratives and procedures. In narratives it was the amount of evaluation which was primarily reduced by aphasic subjects. This part of narrative structure plays a secondary role, mainly that of elaboration, to the other necessary elements of the narrative and is the only expendable element in the story. Thus, reduction of evaluation does not drastically affect the plot structure. Moreover, evaluation involves use of some complex syntactic devices such as comparatives, negatives, and modals. The use of some of these evaluative devices has been found to increase in a regular and marked way from preadolescents to adults (Labov, 1972). It is plausible, therefore, that this reduction of evaluation in aphasic individuals is related to either its function (less important information) or form (more complex language) or a combination of both. In procedures, where the syntactic form of the language is much less complex than in narratives, reduction was primarily in the amount of language. This reduction led to procedures with a small number of steps. It is important to note that the reduction of steps involved essential as well as ancillary steps, and thus resulted in procedures of lower quality.

4. Fewer than half of the aphasic subjects produced summaries as opposed to a mere retelling of the stories. Their summaries were longer than those of normal individuals, and contained inappropriate amounts of detail. Experiments on recalling and summarizing stories in normal adults and children indicate that the quality of produced summaries is determined by a cognitive superstructure whose function is to reduce and organize information (van Dijk and Kintsch, 1978). Since these superstructures are cognitively quite complex, their operation is likely to be adversely affected in aphasic subjects, leading to the difficulties in producing summaries observed in this study.

To conclude, the present study allowed us insight into the structure of two types of discourses as produced by aphasic individuals. It showed us once again the systematic nature of language change in aphasia. Encouraged by the findings of the present study and wiser methodologically, we are embarking on a new study of more severely impaired aphasic subjects to find mechanisms underlying both the preservation and breakdown in discourse structure.

APPENDIX A

Cat Story



APPENDIX B

Rooster Story

Two roosters were fighting over the chicken yard. The one who was defeated hid himself in the corner. The other rooster flew to the top of the roost and began crowing and flapping his wings to boast of his victory. Suddenly, an eagle swooped down, grabbed the rooster and carried him away. This was good luck for the defeated rooster. Now he could rule over the roost and have all the hens that he desired.

REFERENCES

- Berko-Gleason, J., Goodglass, H., Green, E., Obler, L., Hyde, M., and Weintraub, S. Narrative strategies of aphasic and normal-speaking subjects. Journal of Speech and Hearing Research, 23, 2, 370-382, 1980.
- van Dijk, T.A. Text and Context. Explorations of the semantics and pragmatics of discourse. London: Longman, 1977.
- van Dijk, T.A. and Kintsch, D. Cognitive psychology and discourse in recallings and summarizing stories. In W.U. Dressler (Ed.), Current Trends in Textlinguistics. New York: Walter de Gruyter, 1978.
- Freedman-Stern, R. Discourse in acute confusional state - A case study. Unpublished paper, University of Texas at Dallas, 1978.
- Grimes, J. The Thread of Discourse. The Hague: Mouton, 1975.
- Holland, A.L. Estimations of aphasic patients' communicative performance in daily life. Final report submitted to National Institute of Health, 1977.
- Huber, W. Linguistic and non-linguistic processing of narratives in aphasia. Paper delivered at the 16th Annual Academy of Aphasia Meeting, Chicago, 1978.
- Hunt, K.W. Grammatical structures written at three grade levels. Research Report No. 3. Champaign, Illinois: National Council of Teachers of English, 1965.
- Kernan, K. Semantic and expressive elaboration in children's narratives. In Ervin-Tripp and Mitchell-Kernan (Eds.), Child Discourse. New York: Academic Press, 1977.
- Labov, W. Language in the Inner City. Philadelphia, University of Pennsylvania Press, 1972.
- Labov, W. and Fanshel. Therapeutic Discourse. New York: Academic Press, 1977.
- Longacre, R. An Anatomy of Speech Notions. Lisse: The Peter de Ridder Press, 1976.
- McCurdy, P. Selected performative utterances in aphasic language. Unpublished doctoral dissertation. University of Texas at Dallas, 1978.
- Obler, L. Narrative discourse style in the elderly. Paper presented at Conference on Language and Communication in the Elderly. Boston, 1979.
- Ochs, E. Planned and unplanned discourse. In T. Givon (Ed.), Syntax and Semantics, Vol. 12. New York: Academic Press, 1979.
- Rochester, S.R., Martin, J.R., and Thruston, S. Thought-process disorder in schizophrenia: The listener's task. Brain and Language, 4, 95-114, 1977.
- Stachowiak, F.J., Huber, W., Poeck, K., and Kerschensteiner. Comprehension in aphasia. Brain and Language, 4, 177-195, 1977.
- Ulatowska, H.K., Haynes, S.M., Hildebrand, B.H., and Richardson, S.M. The aphasic individual: A speaker and a listeners, not a patient. In R.H. Brookshire (Ed.), Clinical Aphasiology: Conference Proceedings, 1977. Minneapolis, MN: BRK Publishers, 1977.
- Ulatowska, H.K. and Freedman-Stern, R. Analysis of aphasic writing. Paper delivered at the Aphasia Research Group, World Federation of Neurologists, University of Iowa, Iowa City, 1978.

Wilcox, M.J., Davis, G.A., and Leonard, L.B. Aphasics' comprehension of contextually conveyed meaning. Brain and Language, 6, 362-377, 1978.
Yorkston, K.M. and Beukelman, D.R. An analysis of connected speech samples of aphasic and normal speakers. Journal of Speech Hearing Disorders, 45, 1, 27-36, 1980.

ACKNOWLEDGMENT

The authors wish to thank graduate assistants Gina Conti, Christie Seltzer, Alice Coyel and Jayne Larson for their assistance in data analysis, and speech pathologists Erin May, Beverly Morshed, Helen Ludwig, Bernice Paul, and Josephine Simonson for their help in selecting patients for this investigation.

A special thanks to Beverly H. Hildebrand for her assistance in testing the patients; to Temple Baker for statistical analysis of the data; and to Renee Freedman-Stern for the editorial help on the earlier versions of this paper.

SUMMARY OF THE DISCUSSION

Several issues were raised during the discussion. One of them dealt with the unit to be used in measuring the length of T-units. For the present study, that unit was the word. It was suggested that morpheme may be a more sensitive unit, especially in the case of more impaired patients when morpheme count could distinguish between patients with anterior lesions as opposed to those with posterior lesions. A question was also raised as to types of linguistic analysis used in the present study. Namely, that it is strongly structural (syntactic) as contrasted with semantic approaches which are characteristic of the present trends in linguistics. In response to this comment, it was stated that since very little is known at present about formal characteristics of discourse, especially in aphasic individuals, syntactic analysis has to be performed first. This provides grounds for subsequent semantic and pragmatic analyses. Another question which was asked dealt with the rationale for the choice of the specific discourse types, i.e. narrative and procedures. In response, it was pointed out that since these two discourses are different structurally, they may be differentially impaired in aphasic individuals. They also constitute communicatively important speech events, and as such, may be useful in the therapeutic setting. Finally, a question was raised as to the nature of the population studied; i.e., could we isolate anterior from posterior lesion patients on the basis of the performance on our experimental tasks? In response, it was stated that since the patients were primarily mildly impaired, the difference between the lesion groups was not apparent at the time of the testing.