

A Longitudinal Case Study of Expressive Language Changes
in Aphasia Resulting from Herpes Encephalitis

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A number of recent investigations have focused on describing the recovery of function by aphasic adults (Keenan and Brassell, 1974; Ludlow, 1977; Kertesz and McCabe, 1977). Much of the available information about recovery rates in these patients is based on repeated observations of the patient over time. With few exceptions, most of these observations have been made on treated rather than untreated patients. These methods have limitations, as Kertesz (1979) stated:

"One of the difficulties of observation is that clinicians taking care of the patients in the acute state may not have the opportunity to follow their cases long term, and those in the rehabilitation setting rarely see them at the onset and in the earlier stages of recovery. Therapists interested in rehabilitation may overlook the extent of spontaneous recovery and attribute the gains to treatment. Others interested primarily in diagnosis, pathology, and their classification and measurement may not recognize the changing pattern, and they view the neuropsychological deficit as a static one." (p. 264)

In general, recovery studies in aphasia have focused on patients having thromboembolic or hemorrhagic aphasia. There is significantly less information about recovery from aphasia resulting from trauma and infectious disease processes.

The purpose of this paper is to present the findings of a longitudinal case study of expressive language changes in the spontaneous speech of a 32-year old aphasic patient during the course of recovery. This patient was of particular interest for two reasons: 1) her aphasia resulted from herpes encephalitis, a condition which is often fatal; and 2) her aphasia evolved from a Wernicke's type to an anomia type of aphasia, and from an anomia type to alexia with agraphia (on the basis of Boston Diagnostic Aphasia Examination profiles) during a one year period post onset.

In order to document changes in the patient's expressive language use during recovery, a language analysis protocol developed by Prins, Snow, and Wagenaar (1978) was applied to three spontaneous speech samples obtained from the patient. Sample I was obtained in January, 1979 (at one month post onset) when the client presented with a Wernicke's aphasia. Sample II was obtained in June, 1979, when she presented with an anomia aphasia. Sample III was obtained in January, 1980, when the patient presented with a speech and language diagnosis of alexia with agraphia. Aphasia severity ratings and rating scale profiles of speech characteristics from the Boston Diagnostic Aphasia Examination associated with the three samples are presented in Table 1.

Table 1. Boston Diagnostic Aphasia Examination aphasia severity ratings and rating scale profiles of speech characteristics for patient T.J.R.

	SAMPLE		
	I	II	III
Months Post Onset	1	7	13
Aphasia Severity Rating	1	3	5
Melodic Line	7	7	7
Phrase Length	7	7	7
Articulatory Agility	6	7	7
Grammatical Form	5	7	7
Paraphasia in Running Speech	3	7	7
Word Finding	3	3	4
Auditory Comprehension	3	7	7

Each of the samples was obtained using the same stimulus items and directions, and each consisted of a descriptive/narrative portion (in which contextual cues could be controlled relative to specific referents) and an open-ended portion (in which specific referents might have been unknown to the examiner). The descriptive/narrative portion of each sample was obtained using the Cookie Theft Picture from the Boston Diagnostic Aphasia Examination in conjunction with specific verbal cues adapted from Leonard, Bolders, and Miller (1976). The open-ended portion consisted of imperatives and questions designed to elicit personal and autobiographical information from the subject (e.g., "Tell me about the work you did.>").

Speech samples were segmented and transcribed from videotapes according to procedures suggested by Wagenaar, Snow and Prins (1975). Segmentation was done on the basis of, first, syntactic concerns, second, melodic criteria, and third, the presence of pauses. The rationale for this segmentation procedure is that pauses often occur in conjunction with word-finding or articulatory difficulties--that is, in the middle of a phrase or word, rather than at the end, as in normal speech. Furthermore, melodic boundaries are often difficult to establish in an objective manner. This procedure departs from other segmentation procedures which have been described in the literature (Brown, 1973). The segmented samples were then analyzed according to the 28 variables designed by Prins et al. (1978). These variables are outlined in the Appendix.

Results of the application of the Prins et al. (1978) language analysis protocol to the three language samples are provided in Table 2. The following trends in the data were noted from Sample I to Sample II and from Sample II to Sample III. Decreases were noted in utterances shorter than six words, seconds incomprehensible, personal pronouns, automatisms, verbal

Table 2. Results of spontaneous speech sample analyses for patient T.J.R.

VARIABLE	SAMPLE					
	I	II	III	II-I	III-II	III-I
Speech tempo	440	710	730	+270	+20	+290
Communicative capacity	2.33	4.33	6.66	+2.00	+2.33	+4.33
Melody	7.00	7.00	7.00	0	0	0
Articulation	6.33	7.00	7.00	+0.67	0	+0.67
Utterance production	57	93	78	+36	-15	+21
Utterances shorter than six words	50.88	45.16	34.62	-5.72	-10.54	-16.26
Mean length of utterance (MLU)	7.72	7.63	9.36	-0.09	+1.73	+2.24
Complex utterances	40.35	49.46	42.31	+9.11	-7.15	+1.96
Seconds incomprehensible	210	78	18	-132	-60	-192
Self-corrections	0	2.15	5.13	+2.15	+2.98	+5.13
Automatisms	1.36	0.28	0	-1.08	-0.28	-1.36
Imitations	3.51	3.23	0	-0.28	-3.23	-3.51
Literal paraphasias	0.56	0	0	-0.56	0	-0.56
Verbal paraphasias	4.20	0.84	0	-3.36	-0.84	-4.20

Table 2. continued

VARIABLE	SAMPLE						
	I	II	III	II-I	III-II	III-I	
Neologisms	2.52	0.21	0	-2.31	-0.21	-2.52	
Literal perseverations	0	3.23	0	+3.23	-3.23		
Verbal perseverations	19.30	5.26	1.28	-14.04	-3.98	-18.02	
Function word substitutions	3.51	3.23	1.28	-0.28	-1.95	-2.23	
Function word deletions	10.53	0	0	-10.53	0	-10.53	
Content word deletions	19.30	9.68	2.56	-9.62	-7.12	-16.74	
Syntactic mixtures	0	0	0	0	0	0	
Content word/function word ratio	4.30	2.02	3.22	-2.28	+1.20	-1.08	
Nouns	10.45	12.11	24.79	+1.66	+12.68	+14.34	
Personal pronouns	1.09	1.06	0.35	-0.03	-0.71	-0.74	
Pronouns	0.28	0.30	0.22	+0.02	-0.08	-0.06	
Word-order mistakes	7.02	0	0	-7.02	0	-7.02	
Tense mistakes	1.75	2.15	2.56	+0.40	+0.41	+0.81	
Unclassified mistakes	3.51	7.53	0	+4.02	-7.53	-3.51	

paraphasias, neologisms, imitations, verbal perseverations, function word substitutions, and content word deletions. Other trends noted were increases in speech tempo, communicative capacity, nouns, self-corrections, and tense mistakes with recovery. This latter finding in particular should be interpreted with caution, and should not be misconstrued to mean that our treatment caused the patient to develop more difficulty marking tenses than she initially had. This increase in tense mistakes is based on the observation of one tense mistake relative to 57 utterances in Sample I, two tense mistakes relative to 93 utterances in Sample II, and two tense mistakes in Sample III relative to 78 utterances. So, while the proportion of tense mistakes relative to the number of utterances increased with recovery, the number of tense mistakes did not fluctuate dramatically from sample to sample.

The speech and language symptomatology of the patient reported here should not be viewed as representative of all patients with aphasia resulting from herpes encephalitis for obvious reasons, such as extent and locus of damage. Nonetheless, the recovery pattern in expressive language parallels a pattern not atypical of patients with fluent aphasia resulting from cerebrovascular causes. In addition, it should be noted that this patient received 15 hours of speech/language treatment per week between Samples I and II and 10 hours of speech/language treatment per week between Samples II and III. Changes noted in spontaneous language then, reflect the combined effects of spontaneous recovery and intensive speech/language intervention.

REFERENCES

- Brown, R. A First Language: The Early Stages. Cambridge: Harvard University Press, 1973.
- Keenan, J.S. and Brassell, E.G. A study of factors related to prognosis for individual aphasic patients. J. Speech Hearing Dis., 39, 257-269, 1974.
- Kertesz, A. Aphasia and Associated Disorders: Taxonomy, Localization, and Recovery. New York: Grune and Stratton, 1979.
- Kertesz, A. and McCabe, P. Recovery patterns and prognosis in aphasia. Brain, 100, 1-18, 1977.
- Leonard, L.B., Bolders, J.G., and Miller, J.A. An examination of the semantic relations reflected in the language usage of normal and language disordered children. J. Speech Hearing Res., 19, 371-392, 1976.
- Ludlow, C. Recovery from aphasia: A foundation for treatment. In M.A. Sullivan and M.S. Kommers (Eds.), Rationale for Adult Aphasia Therapy. Omaha: University of Nebraska Medical Center, 1977.
- Prins, R., Snow, C., and Wagenaar, E. Recovery from aphasia: Spontaneous speech vs. language comprehension. Brain Lang., 6, 192-211, 1978.
- Wagenaar, E., Snow, C., and Prins, R. Spontaneous speech of aphasia patients: A psycholinguistic analysis. Brain Lang., 2, 281-303, 1975.

ACKNOWLEDGMENTS

The author wishes to acknowledge Michael Comerford, Ginger Daughtry, Carol Kvasnicka, Denise Von Hoene, and Gail Zschoche, who assisted in the collection and analysis of the data and the preparation of this manuscript.

APPENDIX

VARIABLES USED IN THE SPONTANEOUS SPEECH ANALYSIS

Variable	Method of Calculation
Speech tempo	Number of words produced in 6 min.
Communicative capacity	Average of the evaluations of each 6-min. sample
Melody	Average of the evaluations of each 6-min. sample
Articulation	Average of the evaluations of each 6-min. sample
Utterance production	Number of utterances produced in 6 min.
Utterances shorter than six words	Number of utterances shorter than 6 words expressed as percentage of total number of utterances
Mean length of utterance (MLU)	Number of words divided by number of utterances
Complex utterances	Number of complex utterances expressed as percentage of total number of utterances
Seconds incomprehensible	Number of seconds of speech which were incomprehensible in 6 min.
Self-corrections	Number of self-corrections expressed as percentage of total number of utterances
Automatisms	Number of automatisms expressed as percentage of total number of utterances
Imitations	Number of imitations of the test assistant expressed as percentage of total number of utterances
Literal paraphasias	Number of literal paraphasias expressed as percentage of number of content words
Verbal paraphasias	Number of verbal paraphasias expressed as percentage of number of content words
Neologisms	Number of neologisms expressed as percentage of number of content words
Literal perseverations	Number of literal perseverations expressed as percentage of number of utterances
Verbal perseverations	Number of verbal perseverations expressed as percentage of number of utterances

Appendix, continued

Function word substitutions	Number of deletions of function words expressed as percentage of number of function words
Function word deletions	Number of deletions of function words expressed as percentage of number of utterances
Content word deletions	Number of deletions of content words expressed as percentage of number of utterances
Syntactic mixtures	Number of syntactically confused structures expressed as percentage of number of utterances
Content word/function word ratio	Ratio of number of content words to number of function words
Nouns	Number of nouns expressed as percentage of total number of words
Personal pronouns	Ratio of personal pronouns to number of nouns
Pronouns	Ratio of all pronouns to number of content words
Word-order mistakes	Number of word-order mistakes expressed as percentage of number of utterances
Tense mistakes	Number of tense mistakes expressed as percentage of number of utterances
Unclassified mistakes	Number of all other kinds of grammatical mistakes expressed as percentage of number of utterances

Source: Prins, Snow, and Wagenaar (1978).