

# Cinderella, Cinderella!—Longitudinal analysis of qualitative and quantitative aspects of seven tellings of Cinderella by a Broca's aphasic

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## Introduction

The ability to produce a narrative such as a fairy tale presupposes a complex interaction of various processing components and linguistic levels. The content of the fairy tale must be conceptually available and the chronological order of the sequence of events must be activated and produced proposition by proposition. The resulting narrative should be informative, coherent and cohesive. The complexity of this discourse task becomes evident when transcriptions of narratives, i.e. fairy tales from different test times are analyzed. Longitudinally, the increasing availability of information and the accessibility of word forms over time provide insight into the processes of coordinating word forms with syntactic plans and, in turn, sentence and discourse production (cf. Bock, 1987).

In this paper seven tellings of the fairy tale 'Cinderella' are analyzed which were produced by a participant (TH) with Broca's aphasia over a period of 3 years. The content of the narrative is assessed in terms of omitted, implicitly and explicitly produced content units (i.e., propositions), and the distribution of narrative words in relation to fillers, repetitions and false starts.

## Methods

### Participant

TH, a 44-year-old, right-handed male, suffered a massive left hemisphere CVA. His initial global aphasia evolved into a Broca's aphasia with severe agrammatic sentence production, apraxia of speech and syntactic comprehension. Verb retrieval was initially severely impaired. TH's language abilities have been evaluated extensively and he has participated in treatment protocols since 14.5 months post onset. The time period under investigation in this paper is from 36 to 72 months post onset: Test 5 (36 months), Test 6 (41 months), Test 7 (48 months), Test 8 (56 months), Test 9 (62 months), Test 10 (69 months), Test 11 (72 months). (The narrative Cinderella was not tested in Test 1 to 4.)

## Procedure

Seven administrations of this task were video- and audiotaped and the narratives were transcribed and timed for speaking rate. The fairy tale Cinderella was interpreted in terms of its superstructure: orientation, development (episode 1, 2a, 2b, 3), complication (=4), solution (episode 5) and coda or evaluation of the narrative (cf. Labov & Waletzky, 1967). Each of these sequences of events was further broken down into content units or propositions. The narratives were evaluated by two clinicians. Various parameters of the Quantitative Production Analysis (QPA) (Berndt, Wayland, Rochon, Saffran, & Schwartz, 2000) were applied for segmenting the narratives.

## Results

With regard to the content of the produced narratives, analysis of the content units or propositions produced is given in Table 1 with respect to the number of omitted, implicitly and explicitly produced content units.

For Test 5 to 8, the number of omitted content units is high: 15, 10, 10 and 12 respectively out of 35 target units. The number of implicitly produced and explicitly produced units is comparable. As of Test 9, the number of explicitly produced units showed a marked increase ( $n = 23, 22$  and 29 respectively out of 35) in contrast to the number of omitted and implicitly produced units. TH's best performance is on the last narrative: 1 omitted *versus* 5 implicitly *versus* 29 explicitly produced content units out of 35.

For each test, the total number *versus* the number of different narrative words, nouns and verbs and the number of fillers is:

	Total narrative words (Speaking time) words	Different narrative words	Total verbs	Different verbs	Total nouns	Different nouns	Fillers
Test 5	209 (8.9 min)	59	22	7	70	28	229
Test 6	180 (9.7 min)	79	15	15	69	34	28
Test 7	349 (13.1 min)	8	45	15	109	35	57
Test 8	448 (15.9 min)	15	73	30	119	44	27
Test 9	450 (16.2 min)	22	59	22	119	46	328
Test 10	653 (19.5 min)	141	79	32	191	65	369
Test 11	774 (22.3 min)	158	119	40	169	61	373

An increase in the number, total and different narrative words, verbs and nouns is found. The number of fillers remains high. In contrast, repetitions and false starts are produced less frequently.

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**Table 1**  
 Content analysis of Cinderella for seven tellings of Cinderella produced by TH according to the number of omitted, implicitly *versus* explicitly produced target propositions, i.e., chunks, propositions based on a breakdown of the superstructure of fairy tale into 35 target units

Structure:	Setting orientation (n = 4 Ps) <sup>a</sup>			Development episode 1 (n = 6 Ps)			Development episode 2a (n = 3 Ps)			Development episode 2b (n = 7 Ps)			Development episode 3 (n = 3 Ps)			Complication episode 4 (n = 5 Ps)			Solution episode 5 (n = 4 Ps)			Coda (n = 3 Ps)			Total props. (n = 35)			
	Om	Imp	Expl	Om	Imp	Expl	Om	Imp	Expl	Om	Imp	Expl	Om	Imp	Expl	Om	Imp	Expl	Om	Imp	Expl	Om	Imp	Expl	Om	Imp	Expl	
Test 5 (36 months)	1	1	2	5	1	0	1	1	1	1	5	1	1	0	2	2	2	2	0	2	1	0	2	1	0	15	12	8
Test 6 (41 months)	0	2	2	2	3	1	1	1	0	1	1	5	1	1	1	3	0	2	1	3	0	0	0	0	3	10	11	14
Test 7 (48 months)	1	1	1	5	2	0	2	0	1	0	3	4	0	1	2	1	2	2	1	3	0	0	2	1	10	14	11	
Test 8 (56 months)	1	1	2	3	0	3	1	0	2	1	1	5	1	2	0	4	1	0	1	1	2	0	3	0	12	9	14	
Test 9 (62 months)	0	0	4	0	2	4	1	0	2	0	0	7	0	2	1	1	2	2	1	2	1	0	1	2	3	9	23	
Test 10 (69 months)	0	1	3	0	2	4	2	1	0	0	0	7	1	0	2	2	2	1	1	0	3	0	1	2	6	7	22	
Test 11 (72 months)	0	0	4	0	1	5	0	0	3	0	1	6	0	0	3	1	1	3	0	1	3	0	1	2	1	5	29	

The number of possible target propositions for a *complete* retelling of the fairy tale ‘Cinderella’ is given in parentheses. For example episode 1 encompasses 5 separate propositions. For Test 5 for episode 1, 5 out of the total 6 propositions were omitted, 1 was implicitly and 0 explicitly produced.

<sup>a</sup> The notation (n = x Ps) stands the number of target ‘content units’ or propositions for the fairy tale Cinderella.

**Discussion**

Over time, TH produced a more informative, coherent and cohesive narrative. This is due to TH’s improved lexical retrieval, which is mirrored by the increase in number of explicit propositions. Overall, TH’s narrative production of Cinderella mirrors his improved language processing abilities. On oral sentence production tasks to picture stimuli, TH was able to produce grammatically correct semantically reversible sentences with a mean length of 11 words as of Test 5. TH’s retrieval of verbs and nouns improved steadily. However, the carryover to discourse production is not apparent until Test 10 and 11. An improvement in terms of syntactic structures is observed, although the utterances remain agrammatic. For Test 5 to Test 8, it is often difficult to decide whether a content unit is implicitly produced. With regard to the number total number and the number of different nouns and verbs, a steady increase is observed with the most produced at the last test times. Longitudinally, TH also produced direct speech and explicit questions more adequately. Particular target content units are never implicitly or explicitly produced, whereas elaborations for other propositions are observed.

Interesting aspects of TH’s improved discourse abilities—which can only be appreciated by viewing the videos—are his use of gestures and modulation of prosody. ‘Elaborations’ which are difficult to capture in the transcriptions, e.g., the magical performance of the fairy godmother or the inebriated state of the stepsisters at the ball, greatly enhance his narrative performance.

In summary, longitudinal analysis of narratives provides insight into the evolution of discourse processing and reveals the ramifications of improved lexical retrieval on narrative production.

**References**

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