



Narrative discourse in anomie aphasia

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ABSTRACT

Anomic aphasia is a disturbance affecting lexical retrieval. Nonetheless, persons with this disorder may also experience difficulties in the construction of coherent narratives. Whether this symptom is a sign of a macrolinguistic difficulty per se or reflects the lexical disorder is still an open debate. In order to analyze the effect of the lexical impairment on macrolinguistic processing, we compared the narrative skills of a group of ten participants with chronic anomic aphasia with those of ten healthy control individuals matched for age and educational level. The anomic participants produced narratives with lowered speech rate, reduced mean length of utterance, fewer grammatically well-formed sentences, more semantic paraphasias. The macrolinguistic analysis showed that they also produced more errors of cohesion and global coherence and fewer lexical information units. Interestingly, their levels of thematic selection were normal. A bivariate correlational analysis showed a strong correlation between the production of errors of cohesion and production of complete sentences, and between production of errors of global coherence and lexical information units. These correlations showed that aspects related to lexical retrieval may affect macrolinguistic processing during the construction of a narrative. Indeed, it is suggested that lexical deficits lead to two main consequences: First, patients with anomia frequently interrupt the utterances they are producing and this reduces the levels of sentence completeness and the overall degree of cohesion across the utterances; Second, they use strategies to cope with the lexical impairment and produce a quantity of lexical fillers and repetitions that, clustered in utterances, reduce the levels of global coherence.

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1. Introduction

Anomic aphasia is a complex disorder affecting the process of lexical production (Laine & Martin, 2006; Cuetos, Monsalve, & Pérez, 2005). A distinctive feature of this disorder is the inability to correctly retrieve lexical items from the mental lexicon for specific referents. Some of the most influential models of linguistic production (e.g., Frederiksen, Bracewell, Breuleux, & Renaud, 1990; Indefrey, 2011) postulate that the process of lexical generation relies on three major stages: (1) a pre-linguistic conceptual phase, where the speaker generates a mental plan of what he/she wants to say; (2) a phase of linguistic formulation, where (a) the preverbal message is converted into a speech plan, (b) the lexical concepts trigger the process of lexical selection, (c) the intended word is selected, and (d) the system gains access to the information stored in the lexical representation; and (3) a phase of linguistic expression, where production actually takes place. Accordingly, it has been hypothesized that the

lexical problems experienced by persons with anomic aphasia may occur at different stages of the process of word production (e.g., Goodglass & Wingfield, 1997), and this has led to the identification of three main typologies of anomic aphasia: *semantic anomia*, *word form anomia* and *disordered phoneme assembly* (Laine & Martin, 2006). *Semantic anomia* may interfere with the process of meaning retrieval (in terms of either prelinguistic conceptual formulation or identification of lexical concepts). Persons with semantic anomia tend to produce neologisms and semantic paraphasias, i.e., words semantically related to the target, but the output phonology is quite well preserved. Due to the semantic impairment these individuals exhibit, they also have difficulties in word comprehension. *Word form anomia* may affect the retrieval of word form (i.e., morphologic and phonologic information). In production tasks persons with this form of anomia tend to produce circumlocutions and occasionally omissions but score within normal range on tasks of word comprehension and semantic association (e.g., Lambon Ralph, Sage, & Roberts, 2000). *Disordered phoneme assembly* may impair the later stages of syllabification and phonetic encoding that are required to subsequently produce the target word. As a result these persons may produce phonological paraphasias due to the substitution, addition, exchange and/or omission of phonemes.

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Despite their lexical impairment, persons with anomic aphasia have been usually described as having fluent speech and using grammar and syntax appropriately (Dronkers & Larsen, 2001). However, it is not clear if anomic aphasia leads also to additional problems that go beyond the well-documented lexical impairment and may affect the level of discourse processing. Indeed, the production of a message relies not only on a set of lexical and grammatical skills. In order to generate well-structured and informative narratives, one also needs to establish accurate cohesive and coherent links among the utterances as well as integrate the sentential meanings with a linguistic and extralinguistic context. Accumulating evidence suggests that the narrative productions of persons with communication disorders can be analyzed in terms of two major levels of analysis (Glosser & Deser, 1990; Kintsch, 1994): a microlinguistic level, which focuses on lexical and grammatical processing, and a macrolinguistic one which focuses on pragmatic and discourse-level processing. As a consequence, new ways to assess not only lexical and grammatical processing skills, but also the ability to generate adequate cohesive and coherent links among subsequent utterances have been devised (for a recent review on this issue see Marini, Andreetta, Del Tin, & Carlomagno, 2011a). However, even if such procedures of micro- and macrolinguistic analysis have been applied to the assessment of narrative skills in persons with different neurological and psychiatric disturbances (e.g., traumatic brain injury or right hemisphere damage), only few studies directly assessed the macrolinguistic skills of persons with aphasia.

In a pioneering study, Gleason et al. (1980) showed that on a cartoon-picture story description task persons with Broca's and Wernicke's aphasia produced narratives with fewer themes than non-aphasic control participants (see also Ulatowska, Freedman-Stern, Doyel, Macaluso-Haynes, & North, 1983). Huber (1990) reported similar findings for a group of anomic aphasic participants suggesting a potential difficulty in the identification and/or organization of conceptual information at the macrolinguistic level.

Macrolinguistic difficulties have also been reported by Christiansen (1995) who analyzed the coherence skills in a group of mild to moderate aphasic persons compared to a group of 20 healthy participants. The persons with aphasia were divided in three subgroups: 5 anomic aphasic participants; 5 persons with aphasia of the Wernicke's type; and 5 patients with conduction aphasia. All participants were asked to perform a cartoon-picture description task. The analysis focused on the propositional content of the narratives produced by each participant and on the occurrences of coherence violations in these speech samples. Overall, the group of anomic participants produced the same amount of propositions as the healthy controls. Furthermore, the analysis of coherence violations showed that they produced narratives with more information gaps (considered as the number of omissions of essential propositions missing in their descriptions). However, they contained normal levels of both repetitions of utterances and illogical propositions. Overall, these results support the hypothesis that persons with anomic aphasia may also have problems in dealing with specific aspects of macrolinguistic processing. However, it is not clear whether these problems are to be interpreted as a sign of a macrolinguistic impairment per se or are the epiphenomenon of the underlying lexical deficit. Indeed, it has been suggested that they may reflect a strategy to cope with the lexical impairment. When the patient cannot retrieve the target word from the lexicon he/she simply skips the undergoing proposition and introduces a new argument (Christiansen, 1995). Unfortunately, the study from Christiansen (1995) included only five participants with anomic aphasia and the few others mostly limited to single case descriptions. For

example, Coelho and Flewellyn (2003) analyzed the story narratives produced by a 55-year old male with anomic aphasia over a 12-month period. In this interesting longitudinal study they showed that the participant had moderately impaired macrolinguistic skills. Notably, even if his microlinguistic abilities improved over time, no significant improvement was found in his ability to link utterances by means of local and global coherence ties.

Overall, the issue of discourse processing in anomic aphasia still awaits to be fully explored. Indeed, the above mentioned studies included only a limited number of individuals. Therefore, their results cannot be easily extended to the general population of persons with anomic aphasia. In an attempt to contribute to this important issue, in this study we present data regarding both micro- and macrolinguistic skills in a group of 10 individuals with anomic aphasia. The narrative analyses were performed using a multi-level approach that allowed us to explore not only their micro- and macrolinguistic performance per se, but also their interrelation in the process of narrative discourse production. We hypothesized that the lexical difficulties typical of these participants would determine a reduction in speech rate (words per minute) due to the insertion of frequent pauses reflecting lexical selection difficulties. We also hypothesized that these interruptions in the flow of discourse would determine frequent interruptions of ongoing utterances determining reduced levels of cohesion within the discourse. In our view, these lexical difficulties may also affect the way these persons establish coherence links among the utterances.

2. Materials and methods

2.1. Participants

Twenty Italian speaking adults were included in the study. They formed two groups: 10 persons with anomic aphasia made up the experimental group; 10 healthy participants formed the control group. All participants were in the phase of neurological stability and had been exposed to several months of rehabilitation. Furthermore, they were matched for age and level of formal education (cfr. Table 1). The diagnosis of anomic aphasia was formulated by administering the Aachener Aphasia Test (Luzzatti, Willems, & DeBleser, 1991). Namely, on the naming subtest of the AAT the patients included in this study showed relevant naming difficulties and tended to substitute the words they could not produce with circumlocutions. Furthermore, a similar difficulty was registered on the spontaneous speech subtest of the AAT.

Criteria for admission in the control group included normal range performance on Raven's progressive matrices (Raven, 1938) and normal performance on a series of neuropsychological tests assessing memory, attention, executive functions and visuo-spatial processing. None of the participants had a previous history of psychiatric or neurological illness, learning disabilities nor hearing or visual loss.

All participants released their written informed consent to participate to the study after all procedures had been fully explained. Approval for the study had previously been obtained from the local ethic committee.

2.2. Assessment of narrative abilities

All participants were asked to produce three narratives elicited with the help of one single picture depicting a story (the scene of a "Picnic") and two cartoon

Table 1
Means (and standard deviations) of demographic and clinical characteristics of the groups of anomic and healthy control (HC) participants.

	Anomic		HC	
	Mean (SD)	(Range)	Mean (SD)	(Range)
Age	50.5 (11.5)	(28–64)	50.7 (10.4)	(31–64)
Formal education (years)	12.8 (3.8)	(5–17)	13 (3.1)	(8–17)
Time after injury (months)	21.2 (19.5)	(6–60)	–	–

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