The relationships between anomia and short-term memory deficits

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Introduction

- Anomia is the most common symptom of language dysfunction occurring in aphasia. Moreover, verbal short-term memory (STM) impairments are a frequent characteristic of aphasic syndromes. However, the nature of these deficits and their relationships to language production impairments in these patients are still debated.
- Recent STM models have been proposed incorporating relationships between language representations and STM, including distinct capacities for temporary storage of phonological and lexical-semantic information (N. Martin & Saffran, 1992; R. Martin, Lesch, & Bartha, 1999).

Aims & Hypotheses

- This study explores the relationships between anomia and STM deficits.
- Based on recent STM models, we assume that a naming impairment may be related to either a phonological STM impairment with preserved lexical-semantic STM or to an impaired lexical-semantic STM with preserved phonological STM.

Methods

Participants

- BN (age 61) suffered from a left hemisphere CVA which resulted in temporo-parietal lesions.
- TM (age 59) suffered from a left hemisphere CVA which resulted in frontal lesions.
- Control participants: 15 healthy adults matched for age and for socio-economic background.

Tasks

Picture naming task

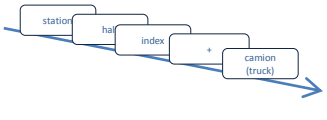
150 black and white drawings (adapted from Bonin et al., 2003) presented on a computer screen.
Analyses: number of correct responses, naming latencies, naming errors and effects of psycholinguistic variables.

Short-term memory tasks

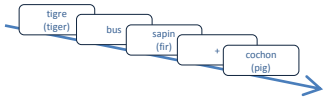
Phonological STM — ***Lexical-semantic STM***

Rhyme probe task — **Category probe task**

- Auditory presentation of bisyllabic words of medium lexical frequency.
- Sequences of 2 to 7 items.



Does "camion" share the rhyme with one of the words of the sequence?

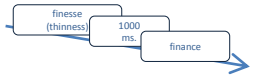


Does "cochon" belong to the same semantic category as one of the words of the sequence?

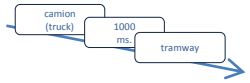
Lexical decision tasks

- with phonologically related primes — **- with semantically related primes**

- Primes and targets matched for lexical frequency and length.
- Primes = words and nonwords phonologically/semantically related vs. not related.



Phonologically related primes : differ only by one phoneme



Semantically related primes: belong to the same category

Results

Table 1
Performance of BN and TM

	BN	TM	Control Range
Short-term memory			
Rhyme probe task	72.73 % *	86.36 %	81.81 - 93.18 %
Semantic probe task	75 %	65.91 % *	72.73 - 96.46 %
Lexical decision task			
Size of phonological priming effect	- 170.87 ms. *	173.64 ms.	37.85 – 182 ms.
Size of semantic priming effect	184.44 ms.	4 ms. *	28.36 – 220.55 ms.
Picture naming task			
Accuracy	56.72% *	55.22% *	84.32 – 100 %
Naming latencies	4464 ms. *	3328 ms. *	1120.15 – 1803.86 ms.
Naming errors	• Phonological paraphasias • Repetitive self-corrections	• Semantic paraphasias • Omissions • Circumlocutions	
Effects	• Increased length effect • No frequency effect	• No length effect • Increased frequency effect	

Note. * Indicates performance significantly different from controls (Crawford and Garthwaite, 2005).

Discussion

- Results show a double dissociation between phonological and lexical-semantic STM deficits, as N. Martin and Saffran (1992); R. Martin et al. (1999) suggested. Indeed, BN presents a phonological STM impairment with preserved lexical-semantic STM while TM shows an impaired lexical-semantic STM with preserved phonological STM.
- Furthermore, both patients' word naming capacity, as assessed with the picture naming task, was impaired. BN produced phonological paraphasias, repetitive self-corrections and presented an increased length effect. We assume that BN's errors and effect may be related to her phonological STM deficit. TM instead produced semantic paraphasias, omissions and circumlocutions and presented an increased frequency effect. These errors and effect may be related to his lexical-semantic STM deficit.

References

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50th Annual Meeting of the Academy of Aphasia - October 28-30, 2012 - San Francisco