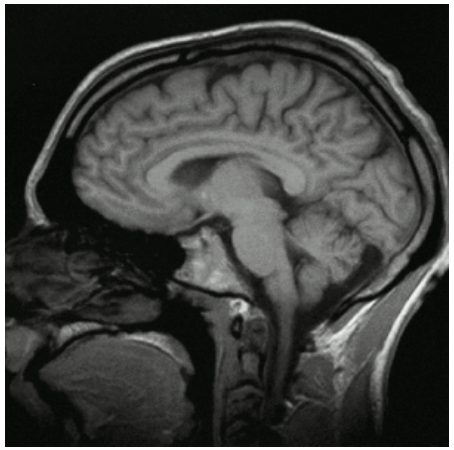
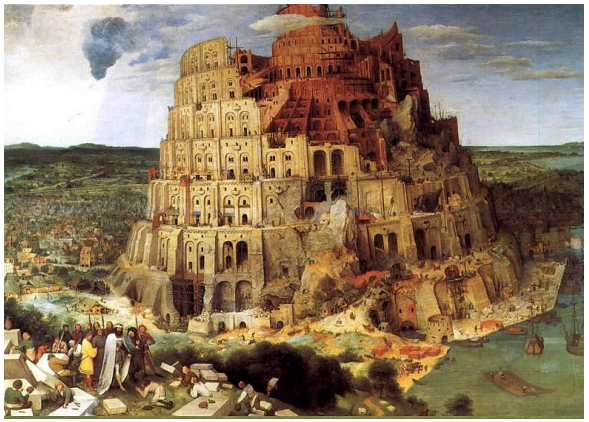


Narrative assessment in patients with communicative disorders



Andrea Marini
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Overview of the presentation

- Dimensions of linguistic analysis
- Presentation of a multilevel approach to the analysis of narrative language in patients with communicative disorders
- Examples of the application of the method to adult patients
- Rehabilitative perspectives
- Present and future directions

Two dimensions of linguistic analysis

Microlinguistic dimension

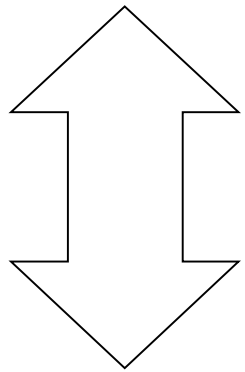
Macrolinguistic dimension

(Glosser and Deser, 1990; Davies et al., 1997; Marini et al., 2005)

Microlinguistic dimension

- ✓ Phonetic processing
- ✓ Phonological processing
- ✓ Morphophonological processing
- ✓ Morphological processing
- ✓ Lexico-Semantic processing
- ✓ Morphosyntactic processing
- ✓ Syntactic processing
- ✓ Sentential-Semantic processing

Lexical processing



Grammatical processing

Macrolinguistic dimension

- Pragmatic processing
  - Linguistic contextualization
  - Informativeness
  - Generation of inferences
- Text-Discourse processing
  - Structural processing of a discourse/written texts
  - Generation of mental models/situation models

A multi-level approach to the analysis of narrative language in aphasia

Andrea Marini [1,2], Sara Andreetta[1], Silvana del Tin[3], and Sergio Carlomagno[4]

Analysis of microlinguistic performance

- Productivity
  - Words
  - Speech Rate (words / minute)
  - Mean Length of Utterance (MLU)

- Lexical processing
  - %Phonological errors
  - % Semantic paraphasias
  - % Paragrammatic errors (bound morph.)

APHASIOLOGY, 2011, i*First*, 1–21

Analysis of microlinguistic performance

- Grammatical processing
  - % Substitution of function words
  - % Omission of Content Words
  - % Omission of Function Words
  - % Complete Sentences

Analysis of macrolinguistic performance

- Pragmatic-discourse level of processing
  - % Cohesive errors
  - % Local coherence errors
  - % Global coherence errors
  - % Lexical informativeness

- Conceptual processing
  - % Thematic selection
  - % Details to main themes

Assessment of linguistic and communicative performance in non-aphasic TBI patients

Narrative language in traumatic brain injury

Andrea Marini [a,b,*], Valentina Galetto [c,d], Elisa Zampieri [b], Lorenza Vorano [e], Marina Zettin [c,d], Sergio Carlomagno [f]

	TBI N=14			HC N=14		
	Mean	(SD)	(Range)	Mean	(SD)	(Range)
Age	35.4	(8.5)	(18-50)	35.5	(6.1)	(20-44)
Formal education (years)	10.9	(2.6)	(8-13)	12.3	(1.8)	(8-13)
Time after injury (months)	68.5	(38)	(15-134)	--		
Coma (days)	32.4	(18.4)	(5-59)	--		
GCS (score)	4.9	(1.7)	(3-8)	--		

NB → Severe non-aphasic TBI (in chronic phase - normal performance at the AAT)

Neuropsychologia 49 (2011) 2904–2910

Microlinguistic assessment

Table 3
Results of the microlinguistic analysis for the groups of TBI and healthy control participants.

Microlinguistic analysis	TBI	HC	Level of significance (p)	Effect size (partial η^2)
Words	82.5 (31.3)	80.9 (44.4)	<.964	.000
Speech rate*	94.7 (29.7)	129.5 (29.3)	<.001	.345
MLU	5.6 (1.1)	6.9 (1.9)	<.013	.213
% Phonological selection	99.2 (1)	99.6 (.8)	<.206	.061
% Semantic paraphasias	.8 (1.1)	.1 (.4)	<.024	.181
% Paragrammatic errors*	1.4 (1.1)	.2 (.6)	<.001	.365
% Complete sentences	57.9 (15.3)	63.1 (23.1)	<.412	.026

* When the group-related difference is significant after Bonferroni correction for multiple comparisons.

Macrolinguistic assessment

Table 4
Results of the analysis of the macrolinguistic and informative aspects of narrative production for the groups of TBI and healthy control participants.

Macrolinguistic and informative analysis	TBI	HC	Level of significance (p)	Effect size (partial η^2)
% Cohesive errors*	3.9 (1.9)	1.9 (.4)	<. 001	.331
% Global coherence errors*	22.1 (11.1)	3.8 (7.5)	.000	.553
% Lexical informativeness*	64.3 (10.7)	84.5 (9.6)	.000	.585
Thematic informativeness	6 (2)	7 (2)	<.037	.156
Ratio of thematic density*	.4 (.2)	1.2 (.6)	.000	.576

* When the group-related difference is significant after Bonferroni correction for multiple comparisons.

Narrative variable	Factor 1	Factor 2
% Global Coherence Errors	- .93	
%Lexical Information Units	.93	
Ratio of Thematic Density	.83	
% Cohesion Errors		.80
Speech Rate		- .79

If the interruptions of utterances were discarded from the errors of cohesion the difference was no longer significant!

It is then likely that the reduced speech rate was due not to microlinguistic problems but to the frequent interruptions in the flow of speech

It is a problem in the organization of information

- Is it possible to explore the functional problems of a macrolinguistic impairment?
- In what terms a reduced macrolinguistic ability determines reduced levels of informativeness?

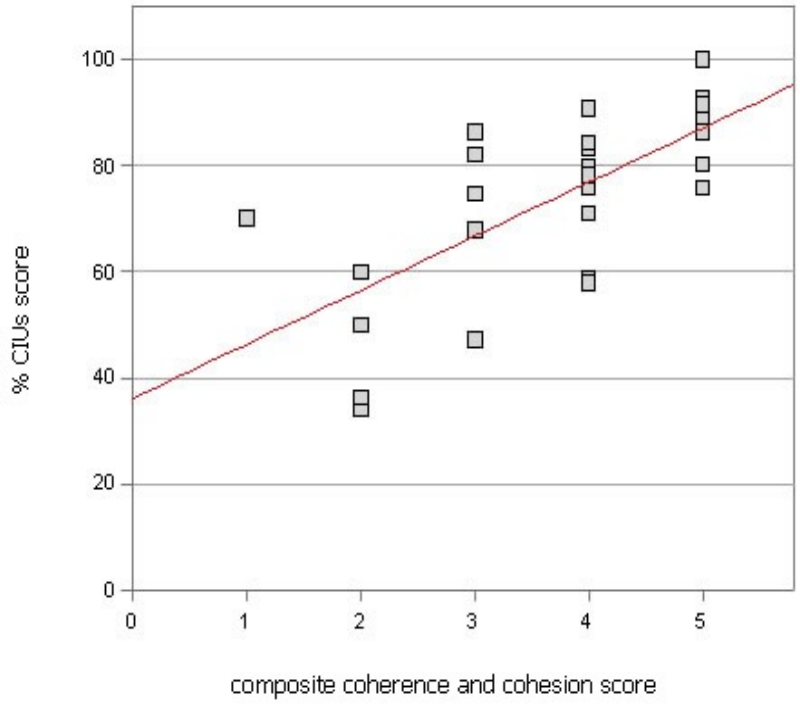
Discourse information content in non-aphasic adults with brain injury: A pilot study

S. Carlomagno et al.

Subjects	Controls (N = 44)	TBI (N = 10)
Age	36.9 (13.1)	34.8 (9.9)
Education	10 (2.0)	10 (2.4)

Brain Injury, September 2011; 25(10): 1010–1018

- For each story, a composite score of global and local coherence errors was calculated
  - 1 → severe (> 2 z-scores) + severe (> 2 z-scores)
  - 2 → severe + moderate (1-2 z-scores)
  - 3 → moderate + moderate
  - 4 → moderate + absent
  - 5 → absent + absent



This suggests that …

- Their verbal poverty and confusion seems linked to problems in the macrolinguistic organization of their discourse
- This narrative problem has a functional consequence: reduced levels of informativeness

Procedures of narrative analysis highlight problems that are not detected by traditional language assessment

Can this analysis be applied also to persons with aphasia?

Narrative discourse in anomic aphasia

Sara Andreetta [a], Anna Cantagallo [b], Andrea Marini [a,c,*]

	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)	–	–	–

S. Andreetta et al. / Neuropsychologia 50 (2012) 1787–1793

Microlinguistic analysis	Anomic	HC	Level of significance	Effect size (partial η^2)
Words	109.5 (40)	77.1 (32.2)	$p < .061$	.181
Speech rate*	51.1 (26.5)	140 (32.5)	$p = .000$	.714
MLU*	4.2 (.8)	7.4 (1.8)	$p = .000$	.589
% Phonological errors	2.4 (3.3)	.3 (.4)	$p < .062$	.181
% Semantic paraphasias*	1.4 (1)	.3 (.4)	$p < .005$	.361
% Complete sentences*	35.2 (12.7)	57.6 (18.1)	$p < .005$	.362

* Indicate when the group-related difference is significant after Bonferroni correction for multiple comparisons.

% Complete Sentences & % Cohesion Errors (r = -.745; p<.014)

Macrolinguistic and informative analysis	Anomic	HC	Level of significance	Effect size (partial η^2)
% Cohesion errors*	41.7 (10.6)	1.3 (.7)	$p=.000$	.889
% Local coherence errors	16.9 (10.7)	5.9 (3.4)	$p<.006$	.348
% Global coherence errors*	28.8 (13.1)	7.9 (5.7)	$p=.000$	.544
% Lexical informativeness*	57.9 (16.7)	80 (9.8)	$p<.002$	.420
%Thematic informativeness	47.9 (16.3)	51.9 (5.8)	$p<.479$	.028

* Indicate when the group-related difference is significant after Bonferroni correction for multiple comparisons.

% Global Coherence Errors & % Lexical Informativeness (r = -.900; p<.001)

How about the neural correlates of these abilitites?

Characteristics of Narrative Discourse Processing after Damage to the Right Hemisphere

Andrea Marini, Ph.D.[1,2]

	RHD	HC
Age	58.9 (12.4)	57.4 (12.4)
Formal education (years)	10.1 (3.9)	11.8 (4.6)
Time after injury (months)	14.2 (8.6)	–
Raven	30.1 (4.6)	30.1 (5.8)
MMSE	28.7 (1.5)	28.2 (1.2)

Semin Speech Lang 2012;33:

Microlinguistic Analysis	**RHD**	**HC**	**Level of Significance**	**Effect Size (Partial η^2)**
Words	121.9 (64.9)	115.8 (52)	P < .751	.004
Speech Rate	121.4 (26.5)	118.7 (25.6)	P < .504	.017
MLU	5.8 (1.2)	6.3 (2.7)	P < .245	.050
% Phonological Selection	99.4 (1.5)	99 (1.2)	P < .130	.083
% Semantic paraphasias	.6 (1)	.3 (.6)	P < .063	.122
% Paragrammatic Errors	.5 (.7)	.2 (.5)	P < .039	.149
% Complete Sentences	64.4 (16.1)	71.4 (21.7)	P < .061	.124

Macrolinguistic and Informative Analysis	**RHD**	**HC**	**Level of Significance**	**Effect Size (Partial η^2)**
% Cohesive Errors	3.5 (2.4)	3 (2.1)	p < .325	.036
% Local Coherence Errors	13 (13.8)	6.8 (6.4)	p < .076	.112
% Global Coherence Errors*	22.5 (16.1)	10.2 (9.8)	p < .003	.283
% Lexical Informativeness*	74.3 (17.2)	86.8 (8.7)	p < .004	.269

	Anterior RHD	**Posterior RHD**	**HC**	**Level of Significance**
%Lexical Informativeness	71 (6.7)*	78.5 (16.6)	86.8 (8.7)	χ^2 = 10.347; p < .006
%Global coherence errors	28.5 (5.7)*	19 (15.2)	10.2 (9.8)	χ^2 = 12.303; p < .002

The language of schizophrenia: An analysis of micro and macrolinguistic abilities and their neuropsychological correlates

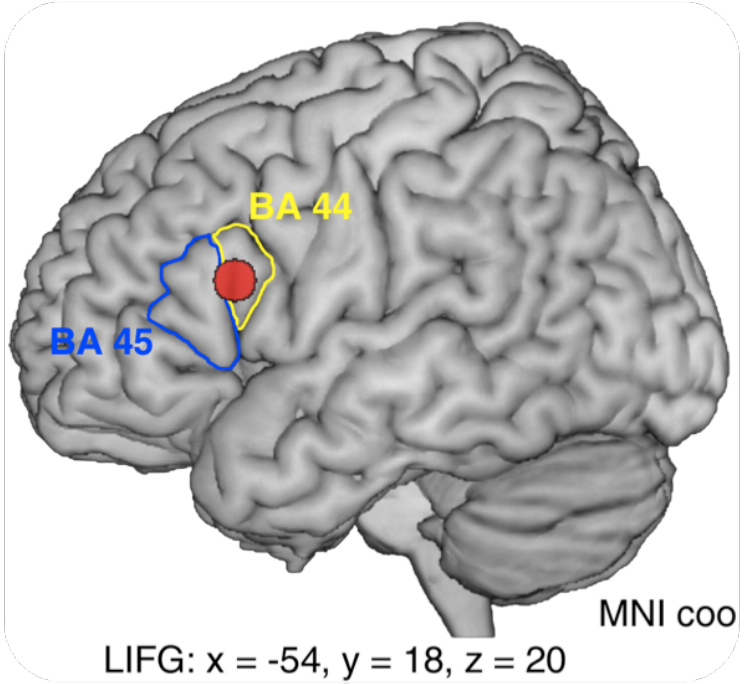
Abstract

Language disturbance is one of the main diagnostic features in schizophrenia and abnormalities of brain language areas have been consistently found in schizophrenic patients. The main aim of this study was to describe the impairment of micro and macrolinguistic abilities in a group of twenty-nine schizophrenic patients during the phase of illness stability compared to forty-eight healthy participants matched for age, gender and educational level. Microlinguistic abilities refer to lexical and morpho-syntactic skills, whereas macrolinguistic abilities relate to pragmatic and discourse level processing. Secondary aims were to detect the effect of macrolinguistic on microlinguistic ability, and the neuropsychological impairment associated with the linguistic deficit. The linguistic assessment was performed on story-telling. Three narratives were elicited with the help of a single-picture stimulus and two cartoon stories with six pictures each. A modified version of the Mental Deterioration Battery was used to assess selective cognitive performances. A series of *t*-tests indicated that all the macrolinguistic variables were significantly impaired in schizophrenic patients in at least one of the three story-tellings. Furthermore, the limited impairment found in microlinguistic abilities was influenced by macrolinguistic performance. Multivariate stepwise regression analyses suggested that reduced attention performances and deficit in executive functions were predictors of linguistic impairment. Language production in schizophrenia is impaired mainly at the macrolinguistic level of processing. It is disordered and filled with irrelevant pieces of information and derailments. Such erratic discourse may be linked to the inability to use pragmatic rules and to cognitive deficits involving factors such as attention, action planning, ordering and sequencing.

A. Marini et al. / Schizophrenia Research 105 (2008) 144–155

Cortico-subcortical underpinnings of narrative processing impairment in schizophrenia

Gianfranco Spalletta[a,b], Ilaria Spoletini[a], Andrea Cherubini[a], Ivo Alex Rubino[b], Alberto Siracusano[b], Fabrizio Piras[a], Carlo Caltagirone[a,b], Andrea Marini[a,c,*]



Atrophy of dorsal aspect of lIFG (BA 44/45) linked to reduced levels of lexical informativeness

Psychiatry Research: Neuroimaging 182 (2010) 77–80

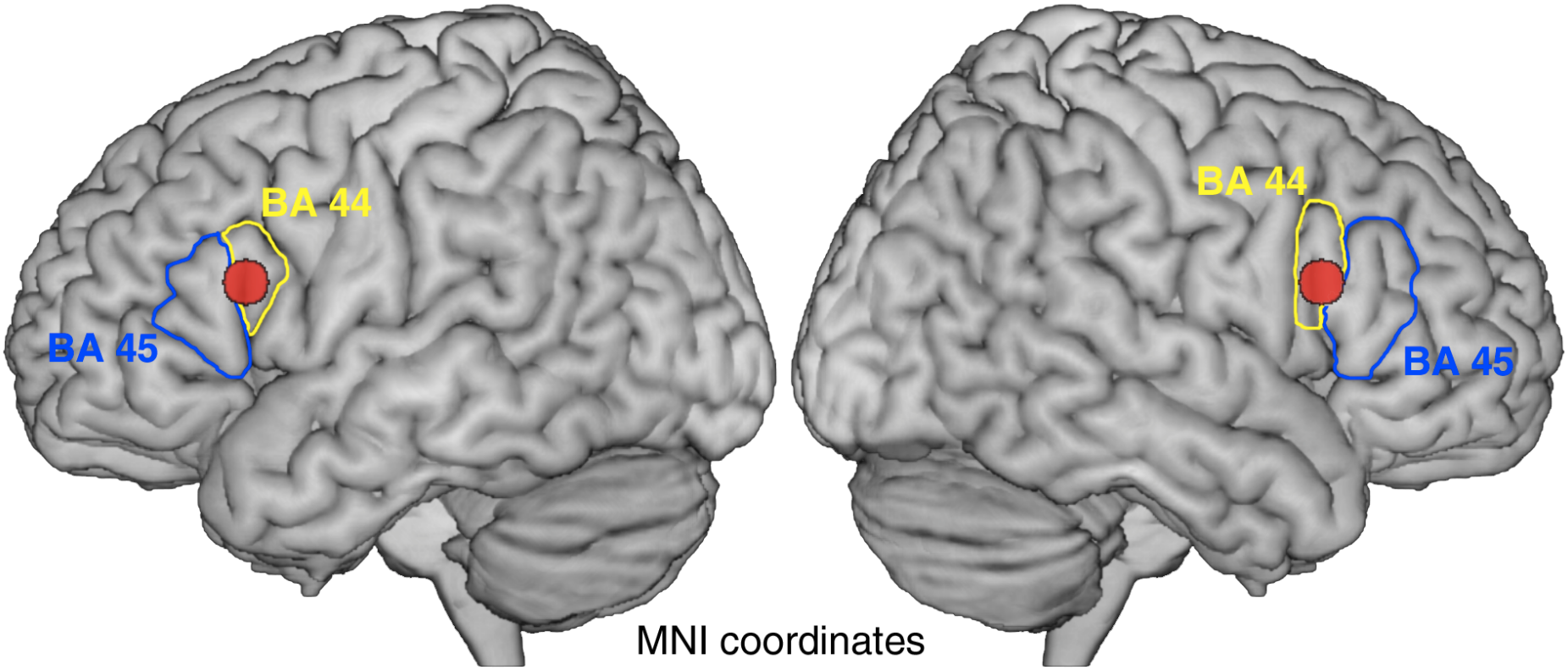
Please Get to the Point! A Cortical Correlate of Linguistic Informativeness

Andrea Marini[1,2] and Cosimo Urgesi[1,2]

- Type of study → rTMS
- Subjects → 12 healthy native Italian speaking participants (5 women, age: mean=21.9; SD= 2.7)
- Tasks
  - Phonemic fluency test
  - Picture-stories arrangement
  - Single-picture and cartoon-story description task

Journal of Cognitive Neuroscience 24:11, pp. 2211–2222

Stimulation sites

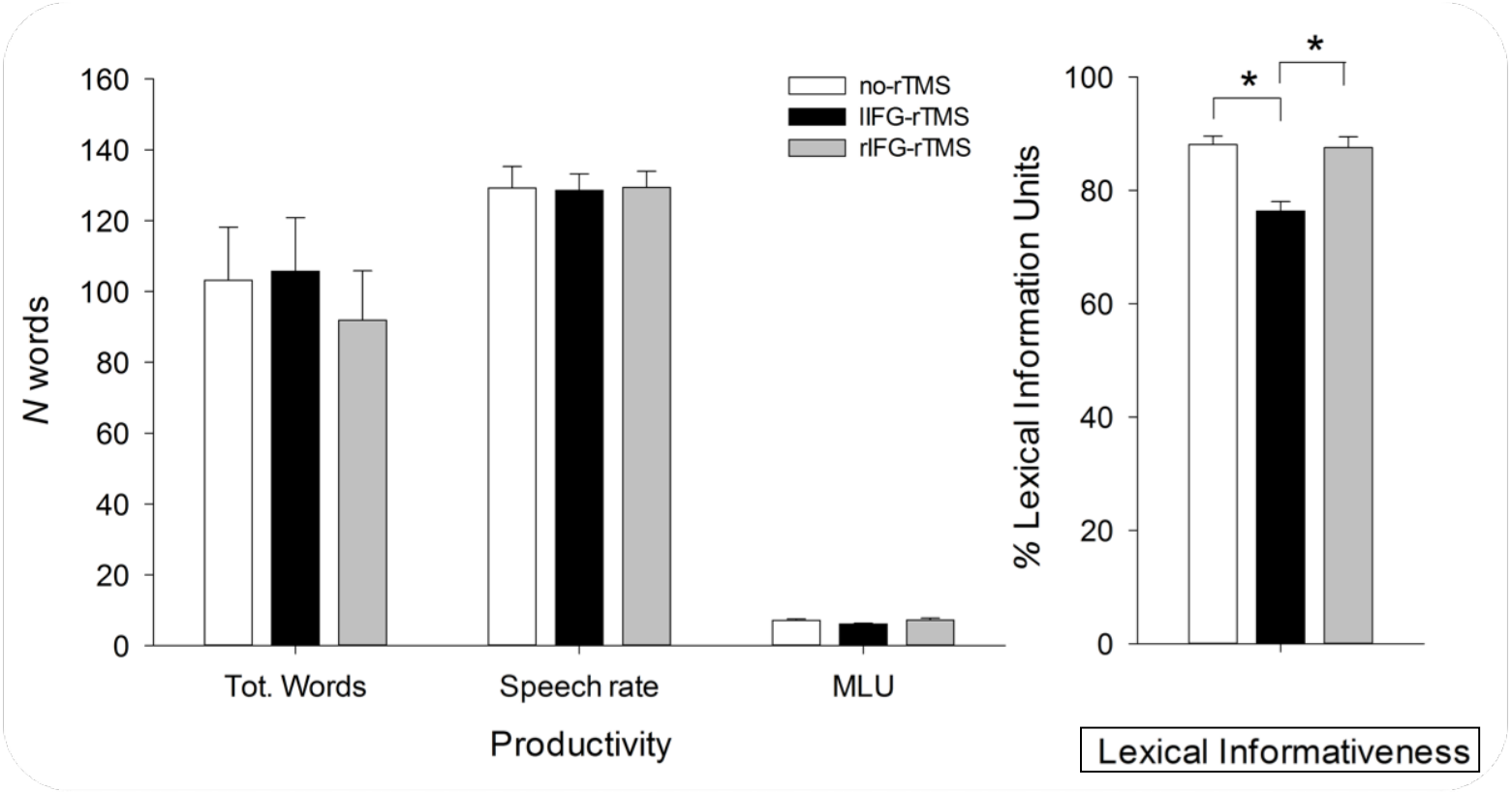


MNI coordinates

LIFG: x = -54, y = 18, z = 20

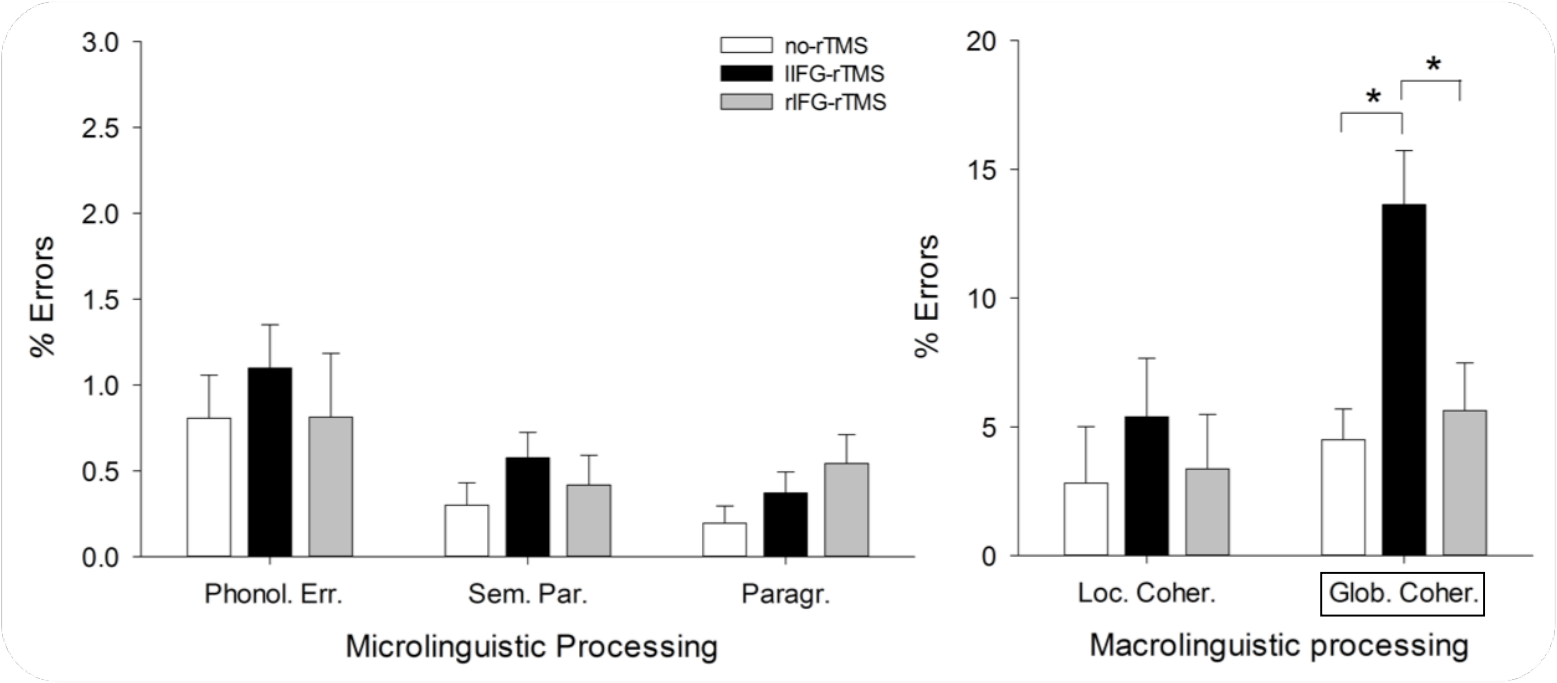
RIFG: x = 54, y = 18, z = 20

Narrative analysis 1/2



$(F_{2,22} = 17.8,\ P = 0.000,\ \eta_p^2 = 0.618)$

Narrative analysis 2/2



$(F_{2,22} = 11.97,\ P < 0.001,\ \eta_p{}^2 = 0.521)$

Can all this be of any help for rehabilitation?

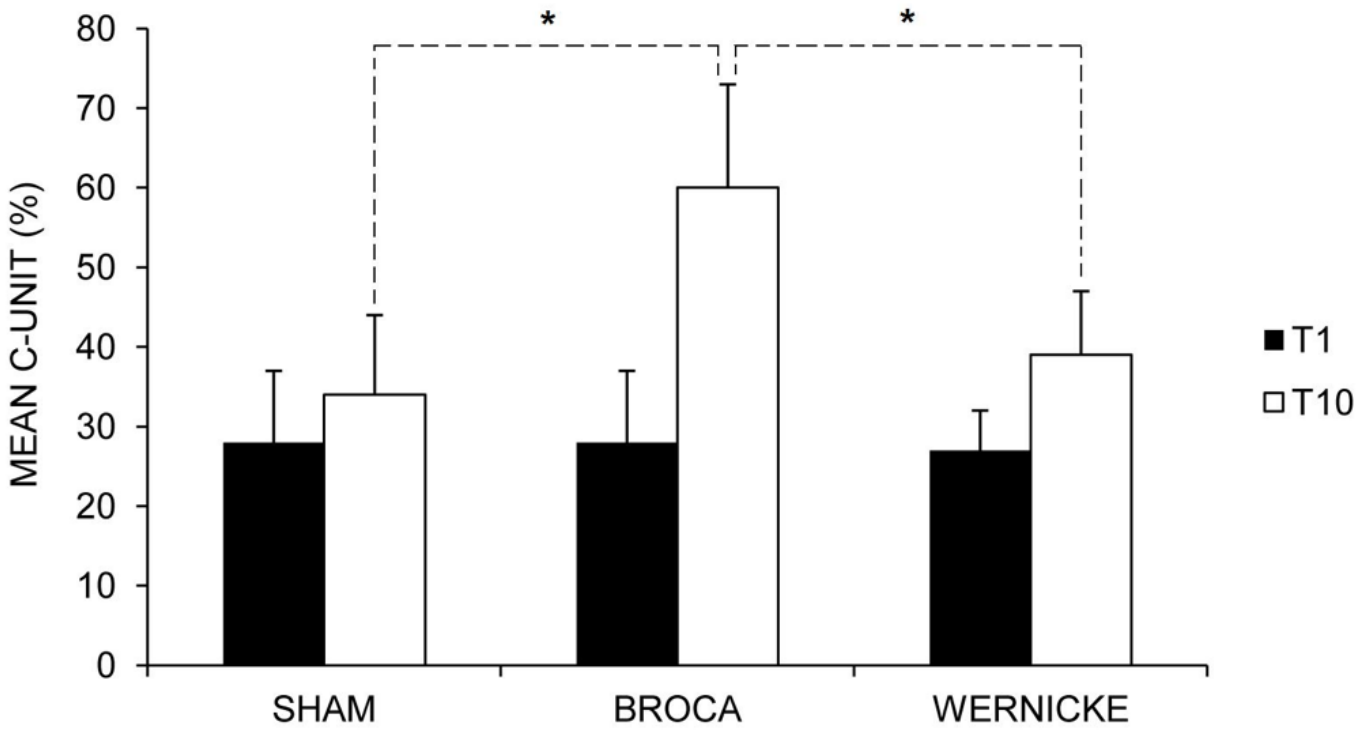
frontiers in
HUMAN NEUROSCIENCE

ORIGINAL RESEARCH ARTICLE
published: 06 September 2013
doi: 10.3389/fnhum.2013.00539

tDCS over the left inferior frontal cortex improves speech production in aphasia

Paola Marangolo[1,2], Valentina Fiori[2], Maria A. Calpagnano[2], Serena Campana[2], Carmelina Razzano[2], Carlo Caltagirone[2,3] and Andrea Marini[2,4]*

- Type of study → Behavioural treatment, Transcranial anodic Direct Current Stimulation (tDCS)
- Subjects → 8 non-fluent chronic aphasics with ischemic lesion affecting the left hemisphere
- Type of therapy → conversational therapy treatment


MEAN C-UNIT (%)
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SHAM
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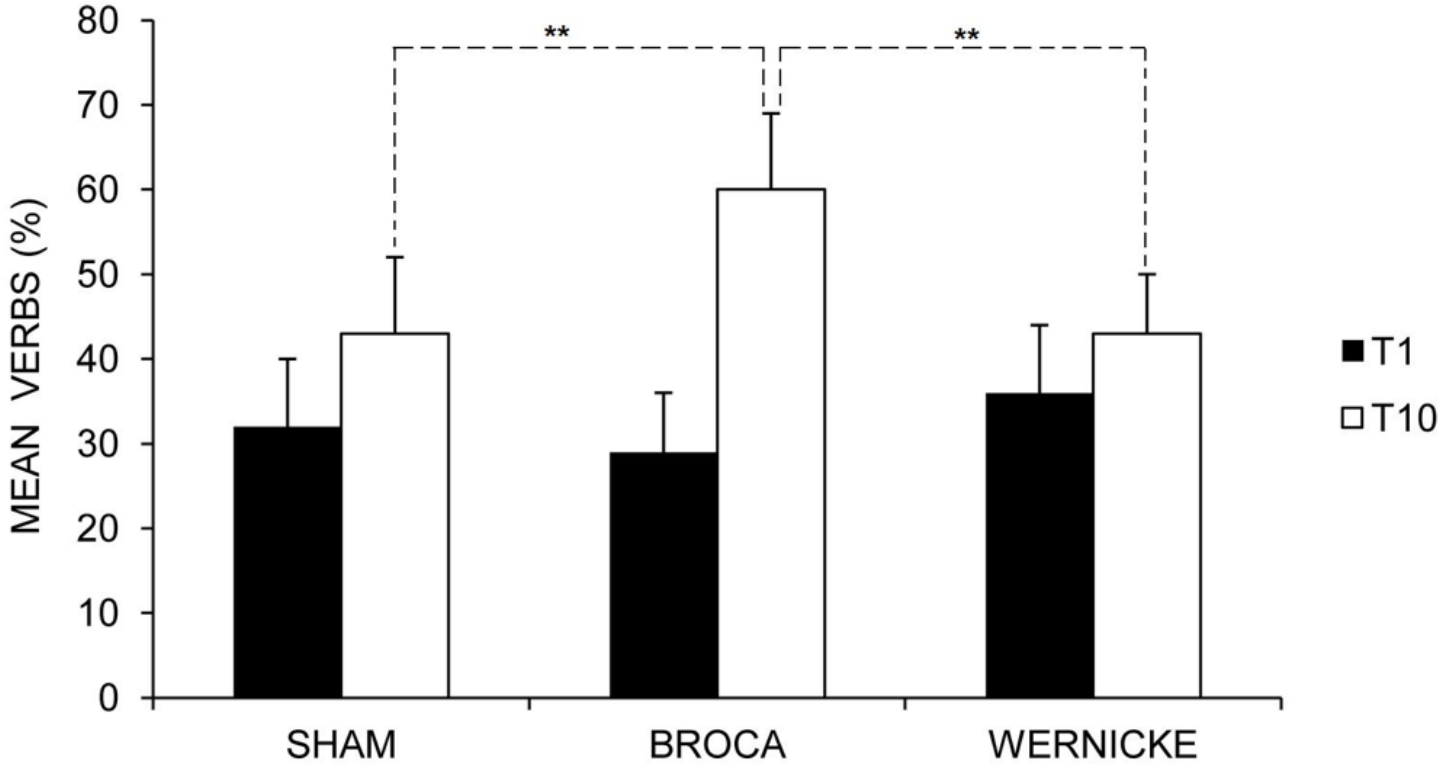
T10


80
70
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MEAN VERBS (%)
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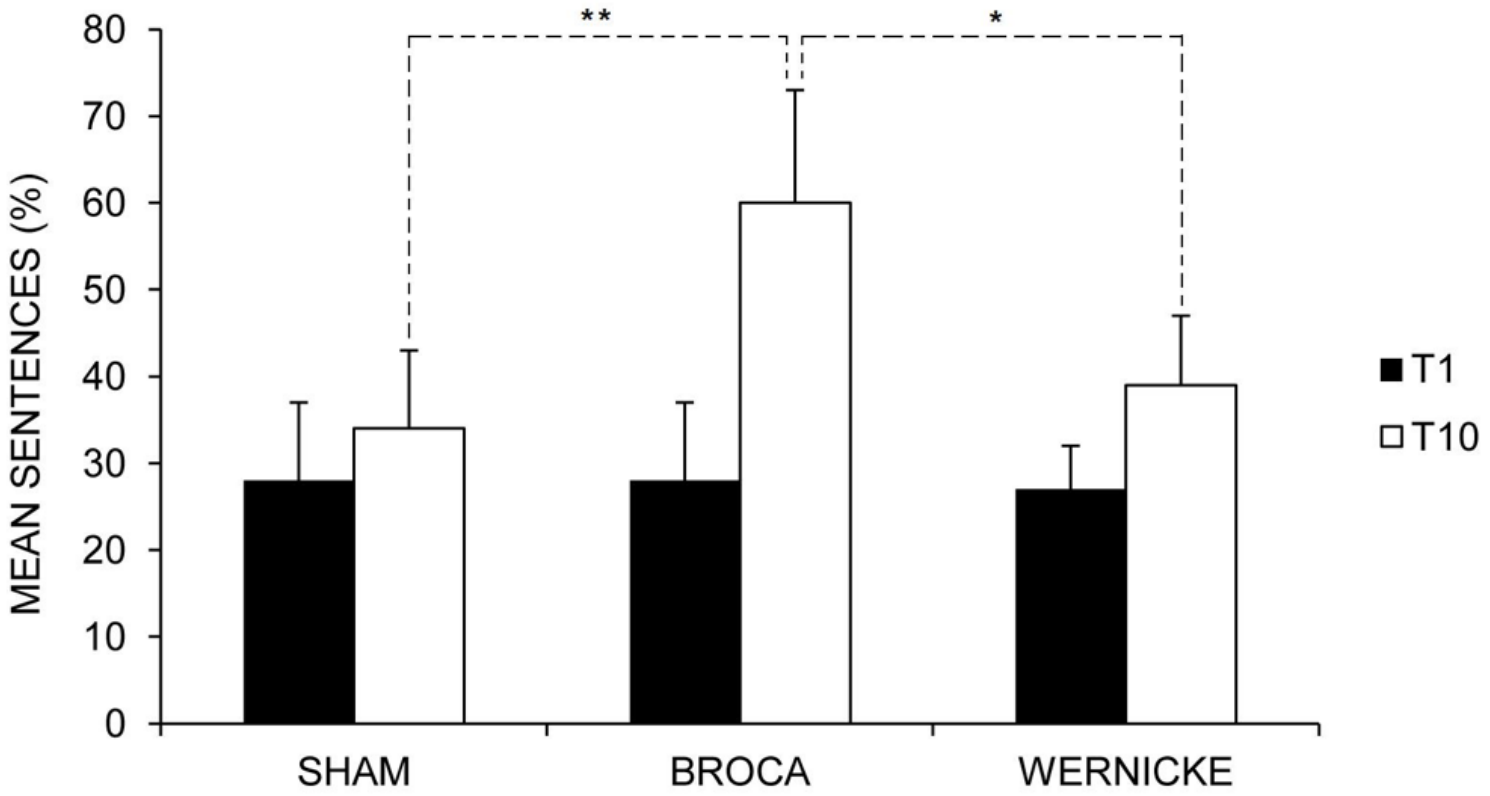
SHAM
BROCA
WERNICKE
T1
T10


**
*
80
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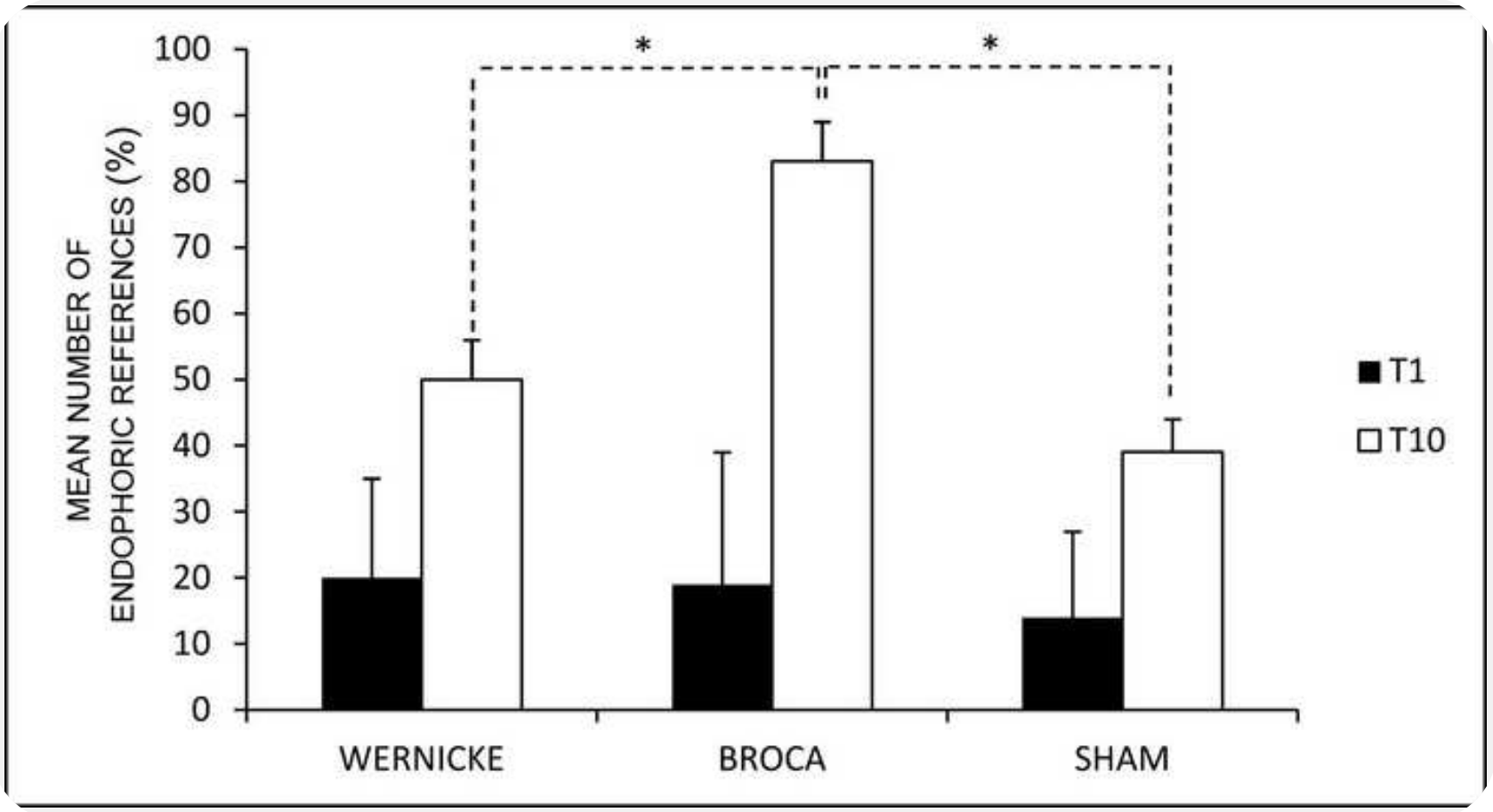
10
0
MEAN SENTENCES (%)
SHAM
BROCA
WERNICKE
T1
T10

Something to talk about: enhancement of linguistic cohesion through tdCS in chronic aphasia

Paola Marangolo[1,2], Valentina Fiori[2], Maria Antonietta Calpagnano[2], Carlo Caltagirone[2,3], Andrea Marini [2,4]

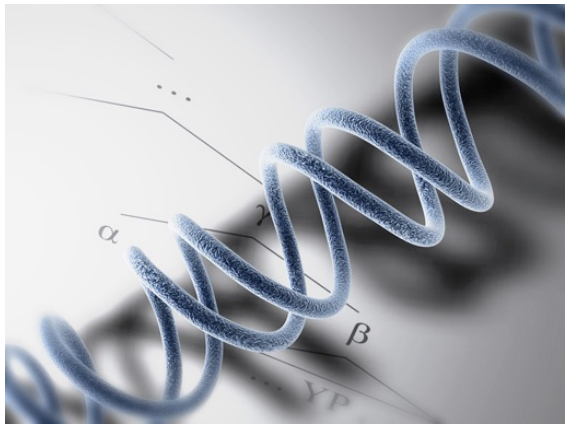


Neuropsychologia, in press

Present and future directions …

- An analysis of genetic and environmental factors affecting language development in typically developing children and children with Specific Language Impairment

- *Neuroimaging* & Electrophysiologic studies



- Awake neurosurgery
- Crosslinguistic issues
- BVL_4-12
- What about language origins?
- But this is another story …

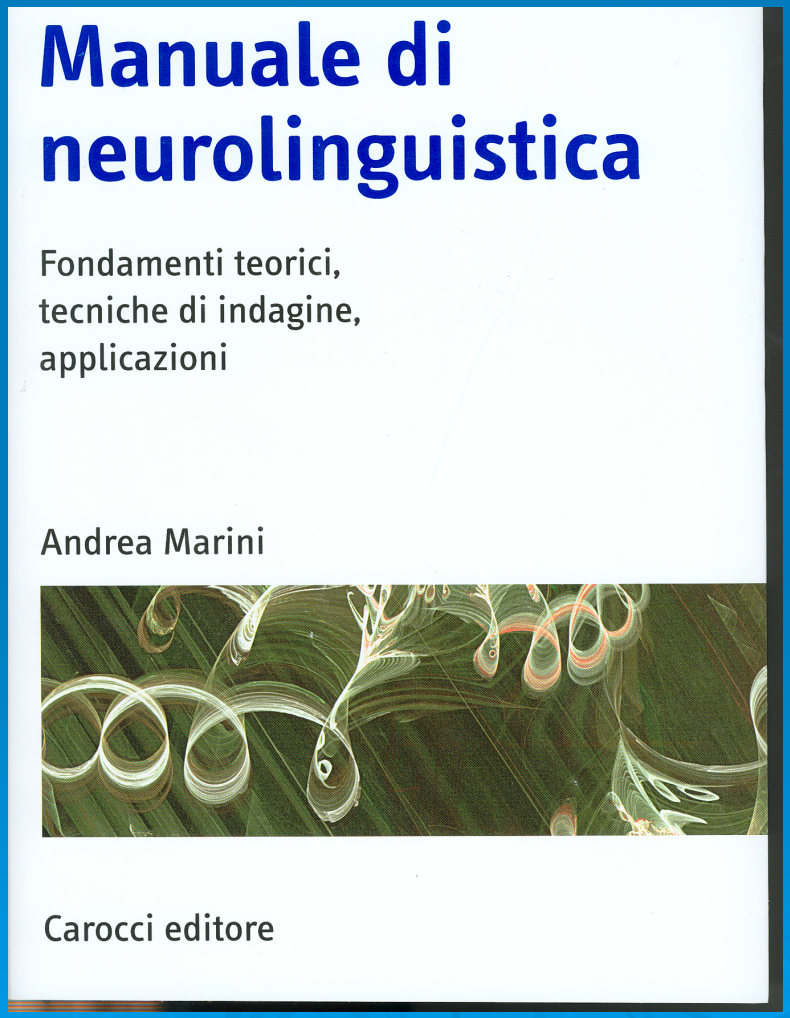
Theoretical article

Keeping the route and speaking coherently: The hidden link between spatial navigation and discourse processing

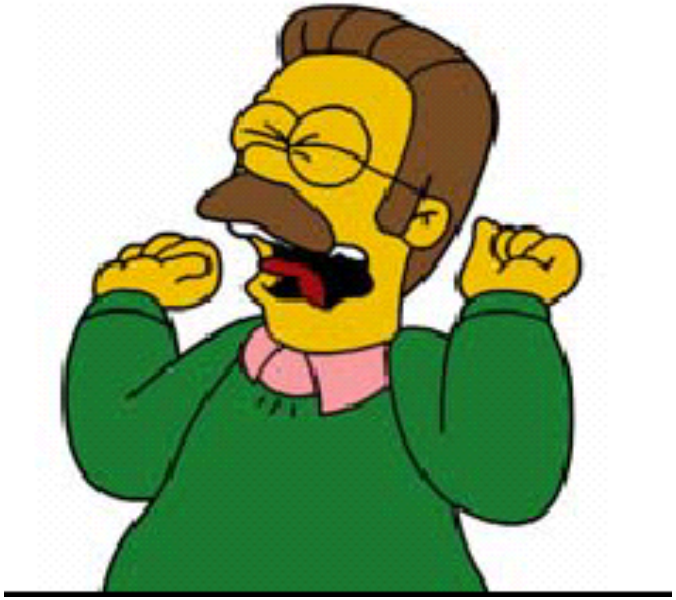
Francesco Ferretti [a,*], Ines Adornetti [b], Erica Cosentino [c], Andrea Marini [d]

Journal of Neurolinguistics 26 (2013) 327–334

Ne volete sapere di più?



2008



Thanks for your attention !!!

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