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► **To cite this version:**

Caterina Petrone, Elisa Sneed, Simona Schiattarella, Giovanna de Bellis, Tim Mahrt, et al.. Cognitive disorders as sources of variation in dialogues. AISV 2017, Jan 2017, Pisa, Italy. halshs-01459699

HAL Id: halshs-01459699

<https://shs.hal.science/halshs-01459699v1>

Submitted on 7 Feb 2017

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Cognitive disorders as sources of variation in dialogues



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INTRODUCTION

Multiple Sclerosis (MS)

- Neurodegenerative disorder including physiological, motor, cognitive and psychological impairments [1]

Cognitive impairment (CI) in up to 65% patients with MS : deficits in planning and decision making, working memory, attention and speed of processing [2]

Read speech and CI :

- Articulation rate slower with low working memory capacity and slower processing speed [3, 4]

- Planning strategy -> longer time needed to plan the upcoming speech material

Comparison of healthy vs MS

populations to get insight into cognitive constraints on speech planning

Interpersonal coordination

- Turn-taking is quick, but latencies in planning language production are longer [5]

- Question-answer (Q-A) pairs interesting for turn-taking coordination, because questions make a floor transfer relevant [6]

- Prosodic adaptation: similar prosodic patterns [7]

Research questions

(1) Is turn-taking timing differently adjusted in MS patients with/without cognitive deficits?

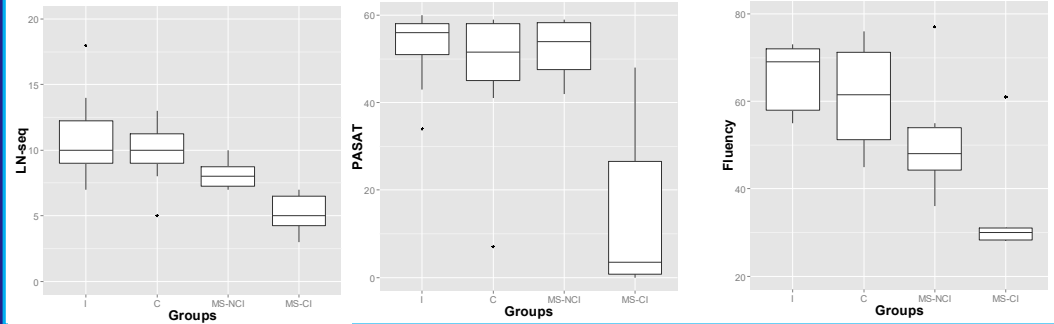
(2) Is prosodic adaptation related to cognitive deficits in MS?

PARTICIPANTS

	MS-CI*	MS-NCI*	Controls (C)**	Interlocutors (I)***
N	6	6	12	12
Age	50.6 (6.3)	44 (11.4)	36.9 (16.1)	23.4 (3.4)
Gender	5F/1M	5F/1M	10F/2M	10F/2M
EDSS	5 (1.18)	3.2 (1.25)	--	--

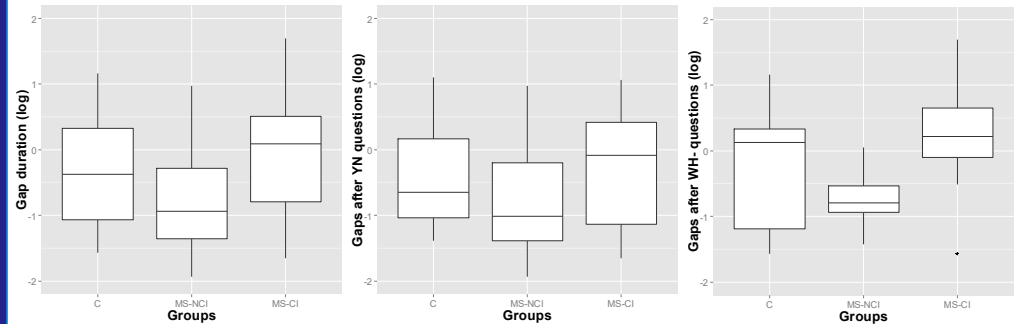
*Relapsing remitting form; Exclusion criteria: therapy with antidepressant; dyslexia; dysarthria; history of alcohol or drug abuse; history of psychiatric disorder; hearing disorders; ** Matched in gender and education level with MS; *** Speech therapists or neuropsychologists;

Neurocognitive scores

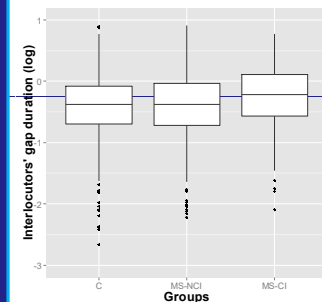


RESULTS & DISCUSSION

Speakers' Gaps



Interlocutors' adaptation



• Strategies in interpersonal coordination depend on cognitive abilities: MS-CI vs. MS-NCI [$\beta = 0.85$, $SD = 0.23$, $t = 3.6$]; MS-NCI = C

• Longer gaps in Q-A -> more time preparation for MS-CI

• Wh-questions slower than polar questions -> greater cognitive complexity of response involved [9]

• Interlocutors adapt their gaps to MS-CI [$\beta = 0.38$, $SD = 0.13$, $t = 2.8$]

METHODS

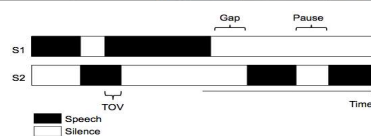
Neurocognitive tests [3,4]

- Working memory : Letters and number sequencing task; SDMT
- Speed of processing : PASAT-3s
- Phonemic and Semantic fluency tests

➔ Extreme group approach: MS-CI vs. MS-NCI [4]

Linguistic task

- Shipwreck scenario game [8]
- Dyads : MS vs. C / C vs. I (see table)
- Labeling of Interpausal Units and gaps in Q-A pairs (PRAAT)
- Adaptation by interlocutors



Statistics: Mixed models ($p < .05$)

CONCLUSION

- Cognitive constraints as source of variability in dialogues -> speech planning as flexible? [10]
- Speech-based technologies to complement CI screening and monitoring + training therapists
- Future work: finer-grained analysis of different question types.

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