Cognitive disorders as sources of variation in dialogues
Caterina Petrone, Elisa Sneed, Simona Schiattarella, Giovanna De Bellis, Tim Mahrt, Noémie Moreau, Laurent Renié

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://halshs.archives-ouvertes.fr/halshs-01459699
Submitted on 7 Feb 2017

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L’archive ouverte pluridisciplinaire HAL, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d’enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.
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: 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?

Neurocognitive tests [3, 4]
- Working memory: Letters and number sequencing task, SDMT
- Speed of processing: PASAT-3s
- Phonemic and Semantic fluency tests

METHODS

PARTICIPANTS

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

*Relaying remitting form; Exclusion criteria: therapy with antidepressants; 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

RESULTS & DISCUSSION

Speakers’ Gaps
- Strategies in interpersonal coordination depend on cognitive abilities: MS-CI vs. MS-NCI [β = 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 [β = 0.38, SD = 0.13 t = 2.8]

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.

REFERENCES


Neurocognitive scores
- Analysis of neurocognitive tests, including attention and speed of processing, working memory capacity and slower processing speed [3, 4]

Neurocognitive tests [3, 4]
- Letters and number sequencing task; SDMT
- PASAT-3s
- Phonemic and Semantic fluency tests

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

Statistics: Mixed models (p < .05)