

Are language and cognitive deficits in Parkinson's disease linked?

WIOT Nathalie* (a,b), KAUX Jean-François (b), GARRAUX Gaëtan (c,d), PONCELET Martine (a), MAJERUS Steve (a).

a Psychology and Neuroscience of Cognition Research Unit, University of Liège, Liège, Belgium

b Physical and Rehabilitation Medicine and Sport Traumatology Department, University Hospital of Liège, University of Liège, Liège, Belgium

c GIGA-CRC In Vivo Imaging, University of Liège, Liège, Belgium

d Department of Neurology, University Hospital of Liège, Liège, Belgium

Introduction

Parkinson's disease (PD) leads to various cognitive impairments, but also to language disorders whose nature and relation to cognitive impairments is still poorly understood.

Objectives

This study provided a comprehensive assessment of performance in various language tasks and cognitive tasks involving attentional, memory and executive aspects and their level of association in patients with Parkinson's disease without dementia as well as healthy participants.

Methodology

Participants (n=38)

19 patients (PD) (6 females)

- Assessed « on » phase
- Hoehn and Yahr scale mean score: 1,7
- Mean age: 68,92
- Mean duration of disease: 6,3 years
- MMSE mean score: 28,7

19 healthy adults (HA)

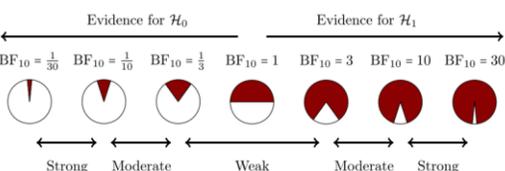
- Matched for age, gender and socio-economic level

Language tasks

- Noun and verb naming
- Noun and verb matching
- Verbal fluency
- Picture description**
- Sentence comprehension and repetition
- Comprehension of metaphor and **figurative language**
- Proverb & verb definition

Statistical analyses

Use of the Bayesian factor (BF)



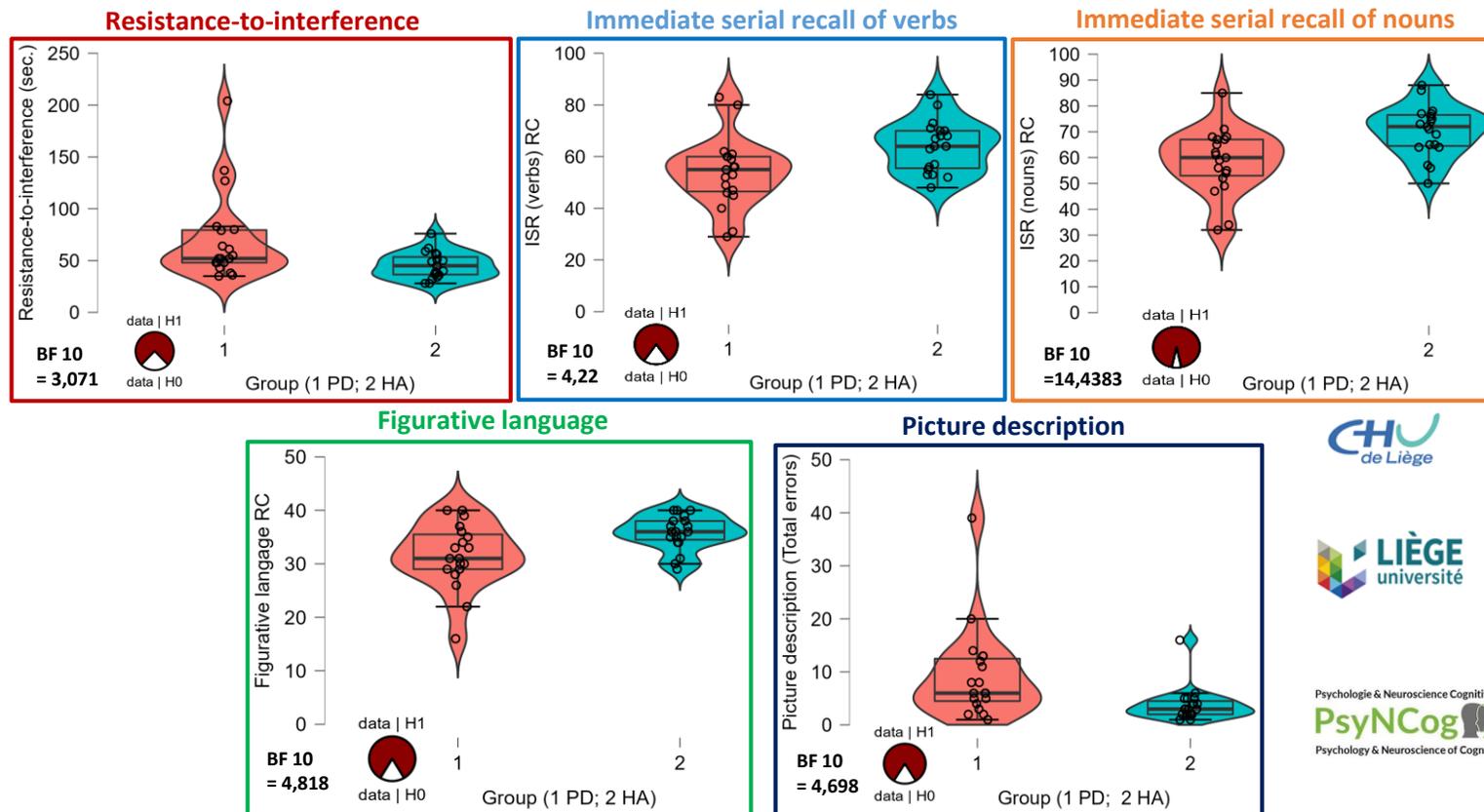
Graphical representation of a Bayes factor classification (van Doorn et al., 2021)

Cognitive tasks

- Immediate recall of nouns**
- Immediate recall of verbs**
- Serial order
- Visual memory
- Episodic memory
- Divided attention
- Inhibition**
- Flexibility
- Planning

Results

Bayesian statistical analyses provided moderate to strong evidence for reduced performance in the Parkinson disease group in verbal short-term memory (**nouns & verbs**) and **resistance-to-interference** tasks. At the language level, there was moderate evidence for reduced performance in **figurative language** comprehension and **picture description** tasks. The vast majority of correlation measures between language and cognitive deficit tasks showed a $BF_{10} < 0.333$, representing evidence for a lack of correlation.



Discussion

The present results indicate the presence of deficits in patients with Parkinson's disease in the most complex aspects of language processing. Although no correlation between language and cognitive tasks was supported with positive evidence, the sample size is, however, insufficient to support a possible independence of language disorders from cognitive-executive disorders.

Contact: Nathalie WIOT, PhD Student. Psychology and Neuroscience of cognition Research Unit. e-mail: nathalie.wiot@chuliege.be