

The retrograde procedural memory in people with Parkinson's disease with or without freezing of gait

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INTRODUCTION



Freezing of Gait (FOG), defined as a “brief, episodic absence or marked reduction of forward progression of the feet despite the intention to walk”, complicates everyday life of people with Parkinson's disease (PD).

4 IN 10

PEOPLE WITH PARKINSON'S DISEASE ARE AFFECTED BY FREEZING OF GAIT

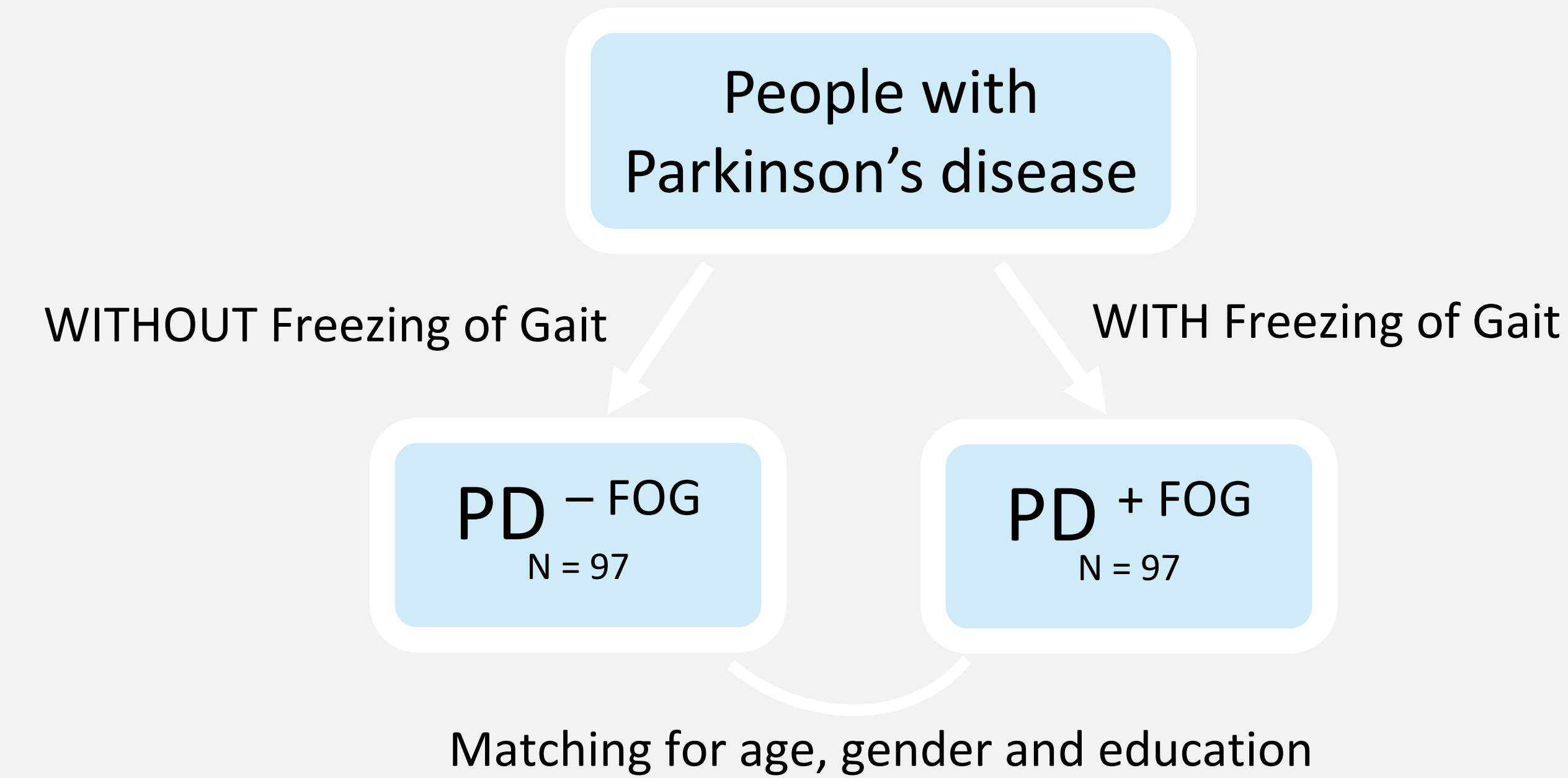
Given that cognitive functions, like executive control and automaticity, are crucial for mobility, it is of great importance to get a deeper knowledge of the cognitive impairment that may interfere with walking and causing gait disturbances in people with Parkinson's disease. The integrity of **retrograde procedural memory** is essential for a person's ability to complete routine and procedural activities like walking.

Retrograde procedural memory is the ability to execute skills that have been learned in earlier life stages

As Freezing of Gait is characterized as a de-automatization disorder, we hypothesized that the retrograde procedural memory is more severely impaired in patients with Freezing of Gait (FOG+) than in patients without Freezing of Gait (FOG-).

METHODS

A total of 194 patients from the Luxembourg Parkinson's study were included into the cross-sectional study. All patients were assigned to the FOG+ / FOG- groups based on a semi-structured interview conducted by a study physician. Excluded were people with PD having undergone brain surgery, atypical forms of parkinsonism, as well as other neurological diseases and severe psychiatric disorders.



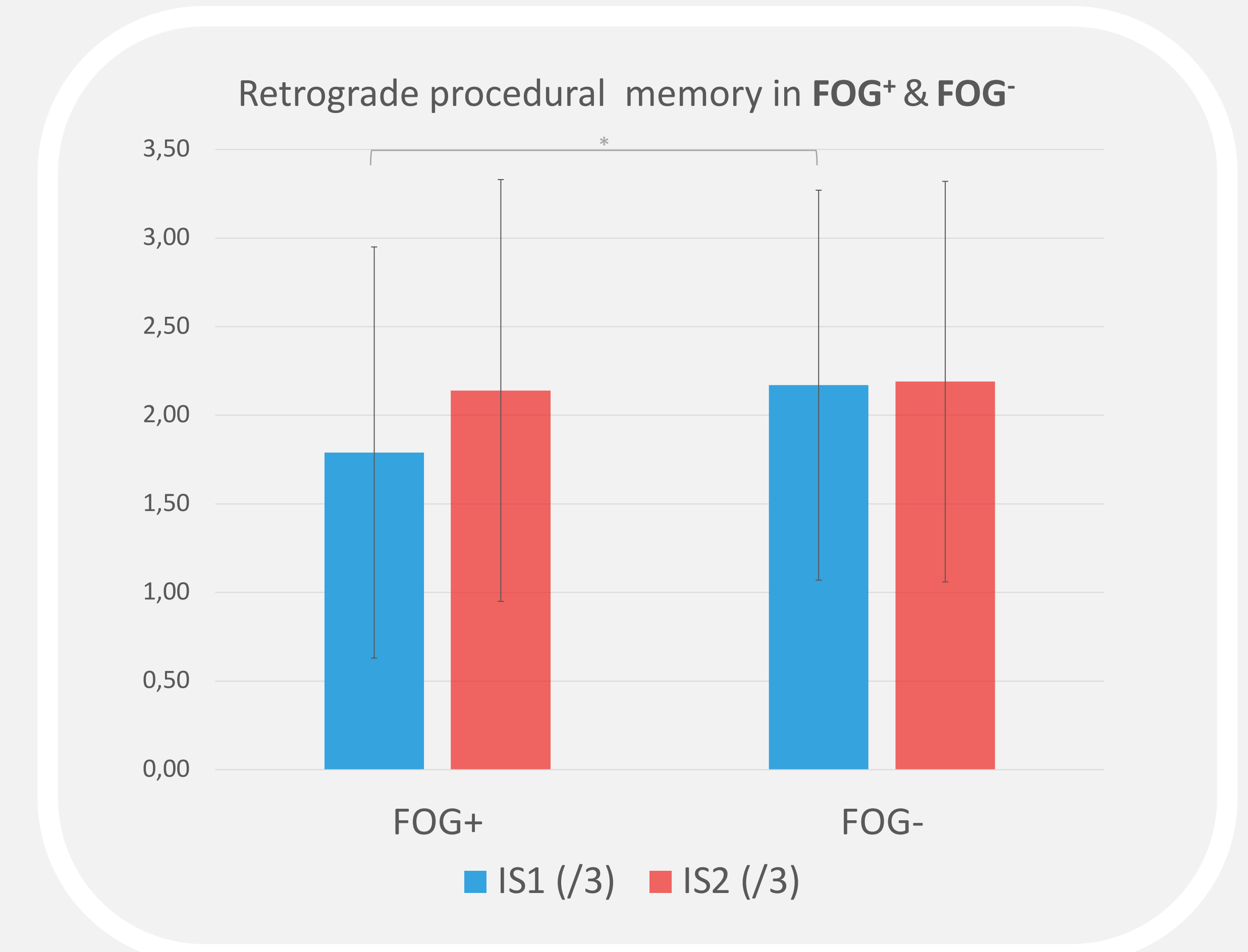
The extended evaluation system of the cube copying test (Figure 1) was applied to evaluate both the cube-drawing procedure, representing the retrograde procedural memory (IS₁), and the final result, representing the visuo-constructive abilities (IS₂) (Pauly et al., 2020, MDS abstract).

	YES	NO
RETROGRADE PROCEDURAL MEMORY - IS₁		
The subject starts with one of the squares / surfaces / with the 3 axes	1	0
The subject drew a second square (superposition)	1	0
The subject drew the side lines		
The subject drew a second face		
The subject drew the 3 axes and continued by drawing any other surface		
The subject fills in the connection lines correctly	1	0
INTERMEDIATE SCORE 1 IS ₁ /3		
VISUO-CONSTRUCTIVE FUNCTIONS - IS₂		
The drawing is 3D, the proportions are correct	1	0
The orientation of the drawing is correct (mirror image)	1	0
The final result is correct	1	0
INTERMEDIATE SCORE 2 IS ₂ /3		
TOTAL SCORE	/6	

Figure 1. Evaluation system of the cube copying test

RESULTS

FOG+ scored lower on the cube copying procedure compared to the FOG- ($p = 0.027$), which is suggestive of a more severely impaired retrograde procedural memory in FOG+. No significant differences in the visuo-constructive abilities were detected ($p = 0.945$).



CONCLUSION

In line with FOG being considered a de-automatization of walking, a skill acquired in earlier life stages, the present results suggest that the retrograde procedural memory of FOG+ is more severely impaired than in FOG-.

