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### Could central fatigue in Parkinson's disease be related to an energization deficit? Evidence from the Frontal Assessment Battery

*Andrea Maffucci*<sup>1</sup>, C. Pauletti<sup>1</sup>, D. Mannarelli<sup>1</sup>, N. Locuratolo<sup>1</sup>, A. Petritis<sup>1</sup>, C. Minelli<sup>2</sup>, F. Fattapposta<sup>1</sup>

<sup>1</sup>Department of Human Neuroscience Sapienza University of Rome, Rome, Italy

<sup>2</sup> Radiology, University of Padova, Padova, Italy

*Introduction:* Central fatigue is defined as difficulty in initiating or enduring physical and mental tasks, especially those requiring conspicuous self-motivation. Pathological central fatigue in Parkinson's disease (PD) may be related to a deficit in striato-thalamo-prefrontal loops, responsible for complex cognitive elaboration, such as costs/benefits analysis and decision making [1].

*Objective:* To verify whether central fatigue in PD is associated with a deficit in executive functions, given its relationship with higher-level cognitive processes critically dependent on executive control.

*Methods:* 31 PD patients without fatigue-PDnF, 29 with fatigue-PDF and 31 controls underwent an evaluation with the Frontal Assessment Battery (FAB). All subjects were also evaluated with MMSE, PSQI, BDI, STAI Y1-2, PDQ-39. Differences between groups were analyzed by means of Kruskal-Wallis test.

*Results:* A significant difference between groups emerged in FAB total score ( $p < 0.001$ ) and in most of the subitems partial scores (conceptualization:  $p = 0.008$ , verbal fluency:  $p = 0.006$ , motor programming:  $p = 0.023$ , sensitivity to interference:  $p = 0.006$ , inhibitory control:  $p = 0.004$ ). After Dunn-Bonferroni corrections, while most of the aforementioned items were significantly different between controls and PD population regardless the presence of fatigue, a significant difference between PDF and PDnF emerged for verbal fluency alone ( $p = 0.002$ ). No difference emerged in environmental autonomy ( $p = 0.14$ ).

*Conclusions:* Our data demonstrated that central fatigue is associated to a specific impairment in phonemic verbal fluency. Fluency tasks require the generation of novel rather than learned responses, as well as ignoring distractions and efficient attentional control [2]. Both these processes rests on energization, which enables cognitive operations strictly related to internal drive mechanisms[3], whose dysfunction is believed to be crucial also in the genesis of pathological central fatigue. We argue that the alteration of the internally cued behavior could be regarded as a common phenomenon that can account for both verbal fluency lower scores and the occurrence of pathological central fatigue in PD.

#### References:

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