

## Commentary

Parkinson's disease (PD) is a neurological disorder characterized by gait impairments and walking deficits. These deficits are exacerbated when walking is performed concurrent with another task, a circumstance commonly studied using the Dual-Task (DT) paradigm. Usually, the introduction of a secondary task is detrimental to the performance of the primary task, causing interference in its processing.

Although multiple factors may be responsible for this, the mechanisms underlying the interference during DT walking in PD remain unclear. Such interference may be produced by certain characteristics of the individual, such as by the type of concurrent tasks or by environmental conditions. Several studies have found interference of concurrent motor<sup>[1]</sup> and cognitive<sup>[2,3]</sup> tasks in DT walking, though it is unclear whether motor or cognitive tasks have a stronger impact on DT walking in people with PD.

This issue of *Journal of Neuroscience in Rural Practice* includes a study titled "Effect of Type of Secondary Task on Cued

*Gait on People with Idiopathic Parkinson's Disease*".<sup>[4]</sup> The research carried out in this study aimed to compare the differential effects of concurrent motor and cognitive tasks on DT walking in people with PD. The findings suggest that the interference produced by cognitive tasks is stronger than that by motor tasks, and also provide empirical evidence of the relevance of cognition in the movement disorders associated with PD. The relevance of these results lies in the empirical support these provide to the hypothesis that executive deficits characteristic of PD are caused by deficits in the ability to process information automatically, emphasizing that the control of walking is not automatic but, rather, appears to be mediated by cognitive functions.

Various hypotheses might explain the deficits in DT performance in PD patients. First, this difficulty could be caused by the motor requirements of each task. However, PD patients not only have difficulties when performing concurrent motor and cognitive tasks, but also while performing two cognitive tasks. For

example, PD patients have been found to have longer reaction times than controls when a Stroop task is executed simultaneously with a resource-demanding task, indicating that PD patients have limited attentional resources.<sup>[5]</sup> It was also suggested that multiple factors may be underlying DT interference in PD. First, the limited capacity of attentional resources is exceeded; second, PD patients perform such tasks less automatically than normal subjects; and third, central executive circuits may be affected in PD.<sup>[6]</sup> Accordingly, patients would appear to use more attentional resources for each of the simple tasks, which make it more difficult to simultaneously coordinate both tasks. While deficits in the simultaneous performance of two motor tasks could be caused by sensorimotor interference,<sup>[7]</sup> for cognitive tasks, such interference might be caused by deficits in the central executive component responsible for distributing attentional resources.<sup>[8]</sup>

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