To what extent does frontal type executive impairment affect coping strategies in Parkinson’s disease?

S. Montel and C. Bungener
Laboratory of Clinical Psychopathology and Neuropsychology (EA 4057), Paris Descartes University, Paris, France

Keywords: coping strategies, depression, frontal type executive impairment, Parkinson’s disease

Background and purpose: Given the frequency of executive dysfunction in Parkinson’s disease (PD), we wonder to what extent this fact might influence the coping strategies which are used. Methods: A total of 135 PD patients with no dementia were divided into two groups according to their cognitive status (‘with frontal type executive impairment’ or ‘without frontal type executive impairment’). All patients were seen for a semi-structured interview to collect sociodemographic and clinical information and to assess their cognitive and mental states (DSM-IV-TR, frontal assessment battery and Montgomery and Asberg Depression Rating Scale). Then, all patients completed two self-report questionnaires concerning their coping strategies (Ways of Coping Checklist and Coping with Health, Injuries and Problems Scale). Results: After controlling the depression, we noticed a significant effect of cognitive status on positive re-evaluation \( (P = 0.02) \). Interestingly, except for instrumental strategies, patients with frontal type executive impairment used significantly more coping strategies than did patients without frontal type executive impairment. Conclusion: Our results suggest that neither executive impairment nor depression prevents patients from using coping strategies extensively.

Introduction

Ninety percent of Parkinson’s disease (PD) patients develop cognitive disorders even at early stages of the disease [1]. Cognitive disorders in PD principally involve executive functions [2,3], and in particular, cognitive planning [4]. The assessment and rehabilitation of such deficits are essential because otherwise, they may induce substantial social and professional impairment.

No study has yet investigated the effect of executive dysfunction on coping strategies in PD. Nonetheless, it is a question of great importance, as the role of coping strategies is to reduce or modulate the emotional impact of stressful situations like chronic disease [5]. However, as it is known that some coping strategies require more mental flexibility than others, we can hypothesize that such strategies could be affected by executive dysfunction.

Studies of other medical conditions have confirmed this intuition [6,7]. Cognitive impairment has predicted greater reliance on passive avoidant strategies and less reliance on active problem-solving [7]. The aim of this study was to investigate the coping strategies used in relation to the degree of frontal type executive impairment (PWFTEI) in PD patients with no dementia.

Given the influence of depression on coping strategies, this factor was controlled.

We expected to find different coping strategies as a function of cognitive status. Indeed, as suggested in the studies cited above [6,7], we thought that patients with PWFTEI would use passive emotional coping strategies extensively and would use active problem-solving coping strategies less often than did those without executive impairment. Moreover, we thought that some coping strategies like positive re-evaluation, which theoretically require more cognitive resources, would be used less often by PWFTEI.

Methods

Between 2004 and 2006, all male and female PD patients without dementia consulting for the follow-up of their disease in the department of neurology of the Salpêtrière Hospital were invited to participate in this study. One hundred and thirty-five patients were finally included. All were between 18 and 85 years of age. The exclusion criteria consisted of severe cognitive disorders (MMSE < 24 and DSM-IV-TR criteria for dementia related to PD) [8,9] and/or a mental disorder except depression (DSM-IV-TR) [9]. All patients gave their written informed consent. The research protocol was approved by the institutional review board of the Salpêtrière Hospital.

Patients were divided into two groups on the basis of their score on the frontal assessment battery (FAB) [10].
In the original validation of the FAB [10], the mean score of PD was 15.9. Therefore, we divided the study group into those with an FAB score < 15 and those with an FAB score ≥15.

The neurological data which reflected the current neurological status of patients was collected by a neurologist. Then, all the patients were interviewed by a psychologist to collect sociodemographic and psychological information. Their cognitive functions were evaluated with the Diagnostic and Statistical Manual of Mental Disorders, 4th Ed (Revised; DSM IV-TR) criteria for dementia related to PD [9], the MMSE [8] and the FAB [10].

The FAB proved to be sensitive to frontal lobe impairment. It has been used with patients with subcortical diseases including PD [10]. This instrument consists of six subtests, each exploring one of the functions related to the frontal lobes: conceptualization and abstract reasoning, mental flexibility, motor programming and executive control of action, resistance to interference, self-regulation, inhibitory control and environmental autonomy. The total score varies from 0 to 18 with lower scores reflecting executive impairment. Depression was evaluated using the Montgomery and Asberg Depression Rating Scale (MADRS) [11].

At the end of the interview, each patient completed two self-report questionnaires of coping: the French version of The Ways of Coping Checklist (WCC) [12] and Coping with Health, Injuries and Problems Scale (CHIP) [13]. The WCC [12] is a 29-item self-questionnaire which assesses five different coping responses: problem solving, avoidance with wishful thinking, seeking of social support, positive re-evaluation and self-blame. These five strategies are summarized in two broad categories: problem-focused coping and emotion-focused coping. Respondents were asked to report on the coping behaviours they typically used when encountering ‘a stressful situation’. The CHIP [13] is specific to subjects suffering from somatic diseases. This 32-item questionnaire identifies four strategies: diversion, palliative, instrumental and emotional preoccupation. The higher the score, the more the strategy is used.

A MANOVA was carried out to determine the effect of the neurological status on coping strategies and other clinical variables. The potential co-effect of depression on coping strategies was controlled by a MANCOVA. A chi-squared test was used when qualitative data were involved. The significant level used for each of these measures was set at $P < 0.05$. The Statistica software Release 5.1, 1997 version (Statsoft, France) was used to perform the analysis.

## Results

On the basis of their respective scores: on the FAB, 42 (31.1%) patients were labelled ‘with PWFTEI’ whilst the other 93 (68.9%) patients were labelled ‘without PWFTEI’. We observed (Table 1) that PWFTEI were older, had longer disease duration, more motor signs and higher doses of antiparkinsonian treatments than did other PD patients, even though no statistically significant differences were observed. Women were more numerous than men in the PWFTEI group ($25 > 17$, $P = 0.13$) whilst it was not the case for the other patients as we found more men than women amongst them ($50 > 43$, $P = 0.44$). However, neither age, gender, disease duration, motor signs or treatment’s doses had a significant effect on our results.

Concerning their professional status, 75% of PWFTEI were retired whilst the other 25% had been declared disabled by Social Security. In the group without executive dysfunction, 52% were retired, 19% were declared disabled, 11% worked full-time, 7% were employed part-time, 9% had to stop their activity for a whilst and 2% were unemployed. The difference between the two groups was not significant (chi-squared; $P = 0.30$).

<table>
<thead>
<tr>
<th>Table 1 Demographic and clinical data</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PD patients with frontal type executive impairment</strong> (n = 42) Mean (SD)</td>
</tr>
<tr>
<td>Age (years)</td>
</tr>
<tr>
<td>Disease duration (years)</td>
</tr>
<tr>
<td>H &amp; Y ‘on’ state</td>
</tr>
<tr>
<td>H &amp; Y ‘off’ state</td>
</tr>
<tr>
<td>UPDRS ‘on’ state</td>
</tr>
<tr>
<td>UPDRS ‘off’ state</td>
</tr>
<tr>
<td>Dose of treatment (mg)</td>
</tr>
<tr>
<td>MADRS</td>
</tr>
</tbody>
</table>

MADRS, Montgomery and Asberg Depression Rating Scale; PD, Parkinson’s disease; UPDRS, Unified Parkinson’s Disease Rating Scale; H & Y, Hoehn and Yahr stages.
The mean MMSE scores in relation to cognitive status were 26.5 (±1) for PWFTEI and 28 (±0.5) for patients without executive impairment (no significant). The mean FAB score was 10.5 (±1.7) for PWFTEI and 15.9 (±1.4) for other patients (P < 0.01). The MMSE and FAB scores were not correlated. On the MADRS, PWFTEI were significantly more depressed, even though in both groups the scores remained moderate.

In PWFTEI, 15 (37.5%) patients were taking antidepressants whilst 37 (38.9%) patients without PWFTEI (P = .91) were doing so. Given the difference between the two groups regarding depression, the effect of depression was controlled when we compared coping strategies as related to cognitive status.

The MANCOVA revealed a significant effect of cognitive status on one strategy measured by the WCC: positive re-evaluation (P = 0.02) (Table 2). Two tendencies emerged concerning the search for social support and self-blame. Indeed, PWFTEI used more of these three coping strategies than did other patients. No significant differences were noticed in the CHIP. Considering all coping strategies (except instrumental ones in the CHIP), PWFTEI tended to use more strategies overall than did patients without executive impairment.

Discussion

Among our sample of PD patients without dementia, 31% presented executive impairment. These patients tended to be older and their disease duration was longer than that of patients without executive impairment, which suggest that age and disease duration could have an additional contribution to patients’ risk for cognitive impairment and dementia [14]. Women were also more in number than men in PWFTEI even though this variable did not influence our results. This data is not found elsewhere in the literature and could be specific to our sample. PWFTEI were also more depressed and tended (although it was not significant) to use more coping strategies. However, contrary to our hypothesis, positive re-evaluation, which requires more cognitive resources, was used significantly more often by PWFTEI. This might be explained by the longer disease duration observed in PWFTEI, which gave them time to develop different coping responses. In this perspective, the cognitive resources needed to develop and maintain such a strategy would be less important. These patients also tended to use more social support and self-blame strategies.

Contrary to what was demonstrated in the literature on mental disorders [6, 7] in PD, cognitive status did not influence the coping style whether it be passive or active, problem focused or emotional-focused. These results are definitely positive as they suggest that PWFTEI are able to use various coping strategies which can help them deal with their mild cognitive impairment.

All these results were obtained after having controlled for depression whose level differed as a function of the group. Indeed, PWFTEI were significantly more depressed than the other patients. This could be because of several things. First, neurological lesions involved in executive impairment are also involved in depression. Thus, a study by Costa et al. [15] indicated that depression in PD was associated with a qualitatively specific neuropsychological profile that may be related to an alteration of prefrontal and limbic cortical areas. Moreover, the same study suggested that in these patients, minor and major depression may represent a gradual continuum associated with increasing cognitive deficits. Such was the case in our population where patients presented mild depression and moderate executive impairment.

The second explanation could be that our patients were not suffering from dementia and were thus aware
of their cognitive difficulties. The awareness of their cognitive impairment and its consequences in their lives could be an additional factor for the appearance and duration of depression. However, our results suggested that depression did not keep these patients from using coping strategies extensively.

Other investigations would be necessary to control the effects of other important factors (e.g. apathy) involved in this relation between emotion-focused coping strategies and cognitive status. However, mild PWFTIE does not impair the ability of patients to cope with the stressful consequences of their disease.

References