

Everyday memory errors in Parkinson's disease: A study of prospective and retrospective memory errors using diary, questionnaire and laboratory methods

Andrew Laughland, Lia Kvavilashvili
University of Hertfordshire, Hatfield, UK

Introduction

- The cognitive impairments that accompany **Parkinson's Disease** are currently under-researched, perhaps due to the more overt physical impairments associated with the illness.
- There is growing evidence to show that PD patients perform worse than healthy controls not only on **Retrospective Memory (RM)** tasks (e.g., recognition, free recall) but also on **Prospective Memory (PM)** tasks which involve remembering to do things in future (Ramanan & Kumar, 2013; Whittington et al., 2006)
- These laboratory findings are supported by PD patients' anecdotal reports of memory impairment in everyday life, and their scores on self-reported **Prospective and Retrospective Memory Questionnaire (PRMQ)**: Foster et al., 2009)
- It is, however, unclear how these laboratory and self-reported memory impairments manifest in, and affect, the everyday lives of PD patients.

Aims

- To compare the frequency and types of memory failures in everyday life of PD patients and healthy controls
- Compare diary, questionnaire and laboratory methods

Method

- 18 healthy volunteers (14 female, 4 male)** - recruited from existing participant panel, and from university staff
- 18 PD patients (15 female 3 male)** - recruited from a panel who had responded to newsletter advertisements for PD support groups. All patients had a Hoehn and Yahr rating ≥ 1 (Hoehn & Yahr, 1998)
- Participants were assessed over the telephone by Telephone Interview of Cognitive Status (**TICS-M**; de Jager et al., 2003) and by the Cognitive Telephone Screening Instrument (**COGTEL**; Kliegel et al., 2007) providing a laboratory measure of PM and other cognitive tasks (Table 2)
- Participants were then posted and completed at home several questionnaires including the **Prospective and Retrospective Memory Questionnaire (PRMQ)**: Smith et al., 2000)
- Finally, **15 healthy** and **13 PD** participants kept a **paper-diary of everyday memory failures**, recording any memory errors or lapses as and when they occurred, for a period of 28 consecutive days

Table 1. Background characteristics in healthy controls and PD patients

	HC (N=18)	PD (N=18)	F	p	η^2
	M	M			
Age	59.67	60.89	.09	.77	.00
(SD)	(16.27)	(7.15)			
range	36 - 79	47 - 75			
Education (Years)	14.9	14.1	.93	.34	.03
(SD)	(2.5)	(2.7)			
range	9 - 18	11 - 18			
TICS-M	29.56	28.22	1.19	.28	.03
(SD)	(3.79)	(3.52)			
range	21 - 37	18 - 33			

Diary Compliance Rates

Self-reported compliance rates were high. Participants claimed to record on average 95% (HC) and 88% (PD) ($F=2.19$, $p=.15$) of their experienced memory errors.

Results

(1) Objective measures of performance (COGTEL)

Table 2. Mean Overall COGTEL Scores and COGTEL Sub Task Scores in Healthy Controls and PD Patients

	HC (N=18)	PD (N=18)	F	p	η^2
	Mean	Mean			
COGTEL					
Total Score	40.57	34.4	5.71	.02	.14
SD	(6.67)	(8.7)			
Range	29.5 - 51.2	17.8 - 48.7			
PM	.83	.56	3.40	.07	.09
SD	(.38)	(.51)			
Range	0 - 1	0 - 1			
Cued Recall-delayed	5.89	4.83	4.85	.04	.13
SD	(1.23)	(1.62)			
Range	4 - 8	2 - 8			
Working memory	8.44	7.06	3.53	.07	.09
SD	(2.26)	(2.18)			
Range	4 - 12	4 - 11			
Letter fluency	16.67	13.67	3.04	.09	.08
SD	(5.70)	(4.56)			
Range	7 - 25	7 - 22			
Category fluency	19.33	20.00	.13	.72	.00
SD	(3.26)	(7.07)			
Range	14 - 27	10 - 39			

(2) Self-reported memory performance (PRMQ)

Table 3. Mean raw PRMQ scores for PM and RM in Healthy Controls and PD Patients

	HC (N=18)	PD (N=18)	F	p	η^2
	M	M			
PRMQ					
Raw Total	35.47	40.65	4.18	.049	.12
(SD)	(6.19)	(8.41)			
range	25 - 46	23 - 53			
Raw PM	19.59	21.24	1.06	.31	.03
(SD)	(3.73)	(5.46)			
range	14 - 28	11 - 34			
Raw RM	15.88	19.41	5.95	.02	.16
(SD)	(4.21)	(4.20)			
range	10 - 27	12 - 27			

(3) Diary recorded memory failures

In total 489 memory failures were recorded (156 by PD and 333 by control participants)

- Memory lapses were classified by two raters as **absent-minded**, **prospective** or **retrospective** (see panel with examples). The agreement between raters was 95%.

The mean number of recorded absent-minded, PM and RM errors were entered into a 2 Group (PD, Control) x 3 Memory Error (AM, PM, RM) mixed ANOVA (Figure 1).

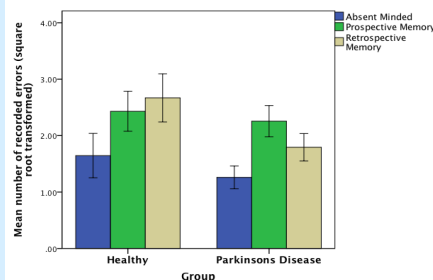


Figure 1: Mean number of recorded absent-minded, prospective and retrospective errors (square root transformed) as a function of participant group (Healthy vs. PD). Error bars: ± 1 SE

Main effect of memory error – $F(2,52)=4.36$, $p=.018$, $\eta^2=.14$, with fewer AM errors reported than either PM or RM errors ($p=.01$ and $p=.02$), which did not differ from each other ($p=.97$).

Main effect of group and interaction not significant – $F=2.80$, and $F=1.30$, respectively.

Examples of Recorded Memory Errors

Absent-minded (AM) errors

"Got out telephone book instead of address book"

"forgot what I went upstairs for"

Prospective Memory errors

"Forgot to charge mobile phone overnight"

"Forgot take my 3:15pm tablet"

"Forgot to tell brother something – rang later"

Retrospective Memory errors

"Forgot the name of a shop I regularly visit"

"Couldn't remember part of a dance I have done many times"

"I was not able to find papers I had stored safely"

Discussion

Main Findings:

Overall, PD patients performed worse in laboratory tasks, and rated themselves as worse in self-reported measures. However, there was no difference between groups in the number of recorded memory errors using the diary method.

Therefore, it is possible that PD patients misattribute failures to their condition, whereas these errors might be errors everyone commits normally in everyday life.

Unexpected Findings:

Beneficial effects of diary keeping: At the end of the study participants were also questioned as to how the diary-keeping made them feel about their memory on a five-point scale (1 much worse, 5 much better). Interestingly, the majority of people in both groups and especially PD (HC 58%, PD 77%) reported that keeping the diary made them feel better about their memory. This was also supported by informal feedback by many participants.

Participants often reported in the debriefing interview that the diary-keeping exercise made them more alert to errors and that they made fewer errors than they expected.

Conclusions

Not only is the Everyday Memory Failure diary method a useful way of understanding everyday memory in patients with PD, but it can also potentially be used as a therapeutic tool to alleviate PD patients' potentially unfounded worries about their memory functioning in everyday life.

References

- De Jager, C. A., Budge, M. M., & Clarke, R. (2003). Utility of TICS-M for the assessment of cognitive function in older adults. *International Journal of Geriatric Psychiatry, 18*(4), 318–324. doi:10.1002/gps.830
- Foster, E. R., McDaniel, M. A., Repovš, G., & Hershey, T. (2009). Prospective memory in Parkinson disease across laboratory and self-reported everyday performance. *Neuropsychology, 23*(3), 347–358. doi:10.1037/a0014692
- Hoehn, M. M., & Yahr, M. D. (1998). Parkinsonism: onset, progression, and mortality. *Neurology, 50*(2), 318–318.
- Kliegel, M., Martin, M., & Jäger, T. (2007). Development and validation of the Cognitive Telephone Screening Instrument (COGTe) for the assessment of cognitive function across adulthood. *The Journal of Psychology, 141*(2), 147–170.
- Ramanan, S., & Kumar, D. (2013). Prospective memory in Parkinson's Disease: a meta-analysis. *Journal of International Neuropsychological Society, 19*, 1109–1118.
- Smith, G., Del Sala, S., Logie, R. H., & Maylor, E. A. (2000). Prospective and retrospective memory in normal ageing and dementia: A questionnaire study. *Memory, 8*(5), 311–321. doi:10.1080/09658210050117735
- Whittington, C. J., Podd, J., & Stuart-Williams, S. (2006). Memory deficits in Parkinson's Disease. *Journal of Clinical and Experimental Neuropsychology, 28*, 738–754.

Poster Presented at the 4th International Conference on Prospective Memory, Naples, Italy, 26-30 May, 2014