

Visuospatial tests to screen for impaired cognition in Parkinson's

Cosgrove J^{1,2}, Jamieson DRS¹, Smith SL³, Alty JE^{1,2}

¹ Neurology Department, Leeds Teaching Hospitals NHS Trust, UK

² Hull York Medical School, University of York, UK

³ Electronics Department, University of York, UK

Objective:

To determine which test of visuospatial function – copying a wired cube ('cube') or interlocking pentagons ('pentagons') – is the best screening tool for detecting cognitive impairment in Parkinson's disease (PD), as defined by an abnormal Montreal Cognitive Assessment (MoCA) score.

Methods:

107 PD subjects completed the MoCA and copied pentagons from the Mini-Mental State Examination (MMSE). They were classified into two groups based on MoCA score: <26 = PD-cognitive impairment (PD-CI); ≥26 = PD-normal cognition (PD-NC). Cube and pentagons were scored using MoCA¹ and MMSE criteria².

Results:

The PD-CI group (n = 57) was significantly older but disease duration, stage and medication were not different between the groups (Table 1). 28% of PD-CI and 72% of PD-NC correctly copied the cube. 69% of PD-CI and 92% of PD-NC correctly copied the pentagons (Figures 1 & 2). Inability to correctly copy the cube (p <0.001) or pentagons (p 0.003) was associated with PD-CI. Age adjusted odds ratio for predicting cognitive impairment was 6.85 (95% CI 2.97 – 16.39, p 0.001) for incorrect cube and 4.61 (95% CI 1.41 – 14.93, p 0.011) for incorrect pentagons.

	PD-NC (n = 50)	PD-CI (n = 57)	p
Age, years	67.1 (9.0, 44-84)	70.6 (7.5, 47-85)	0.032
Gender, M : F	34 : 16	35 : 22	0.546
Handedness, R : L	43 : 7	48 : 9	1.000
Disease duration, years	5.3 (3.8, 0.5 – 16)	6.7 (4.8, 0.5 – 20)	0.128
H&Y stage	2.1	2.2	0.280
LEDD, mg/day	682 (536, 0 – 2836)	669 (474, 0 – 2210)	0.896
MoCA score	27.3 (1.2, 26 – 30)	21.5 (3.5, 12 – 25)	<0.001

H&Y = Hoehn and Yahr, LEDD = levodopa equivalent daily dose

Table 1: Demographic details

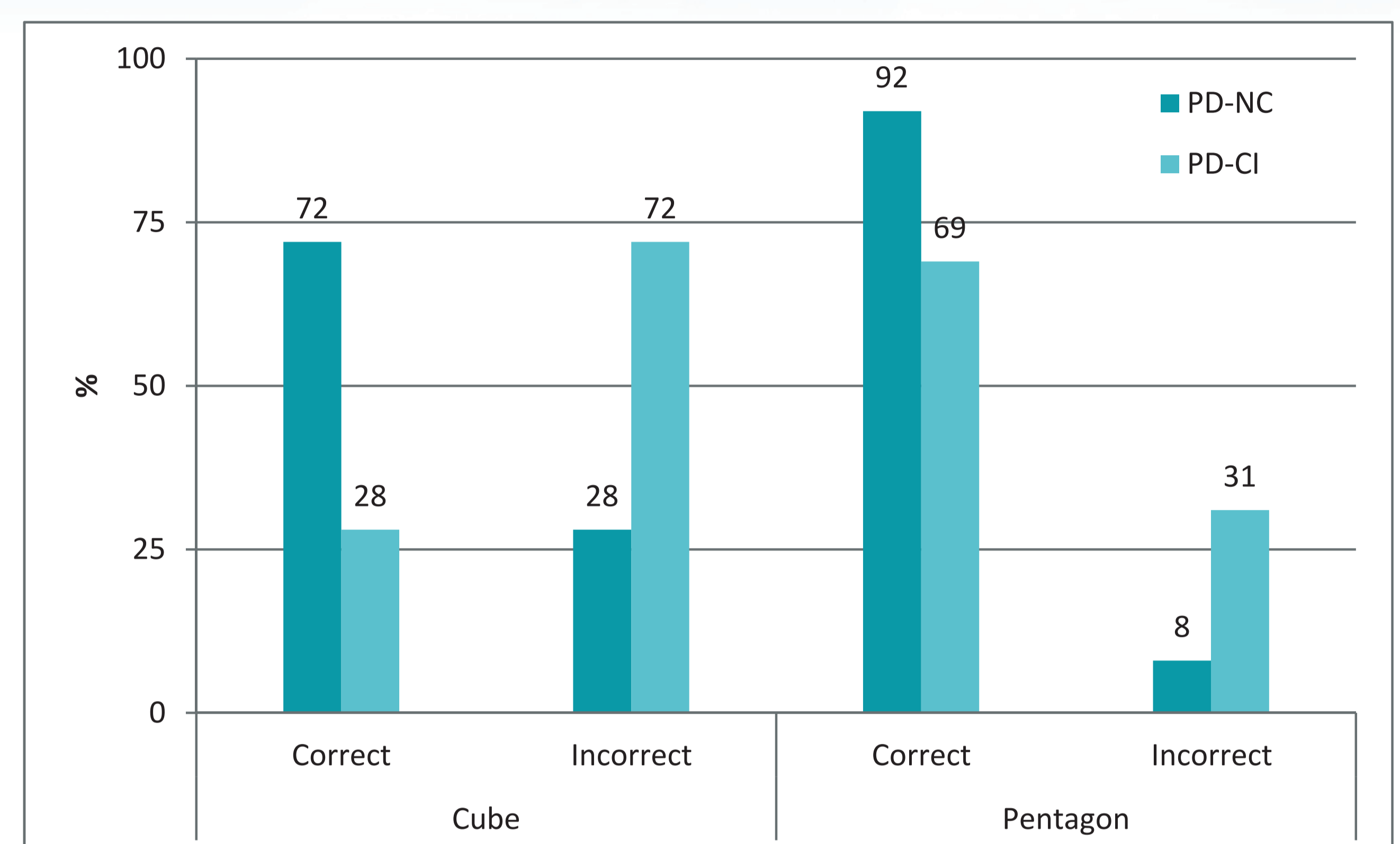


Figure 1: Percent of participants correctly copying cube and pentagons:

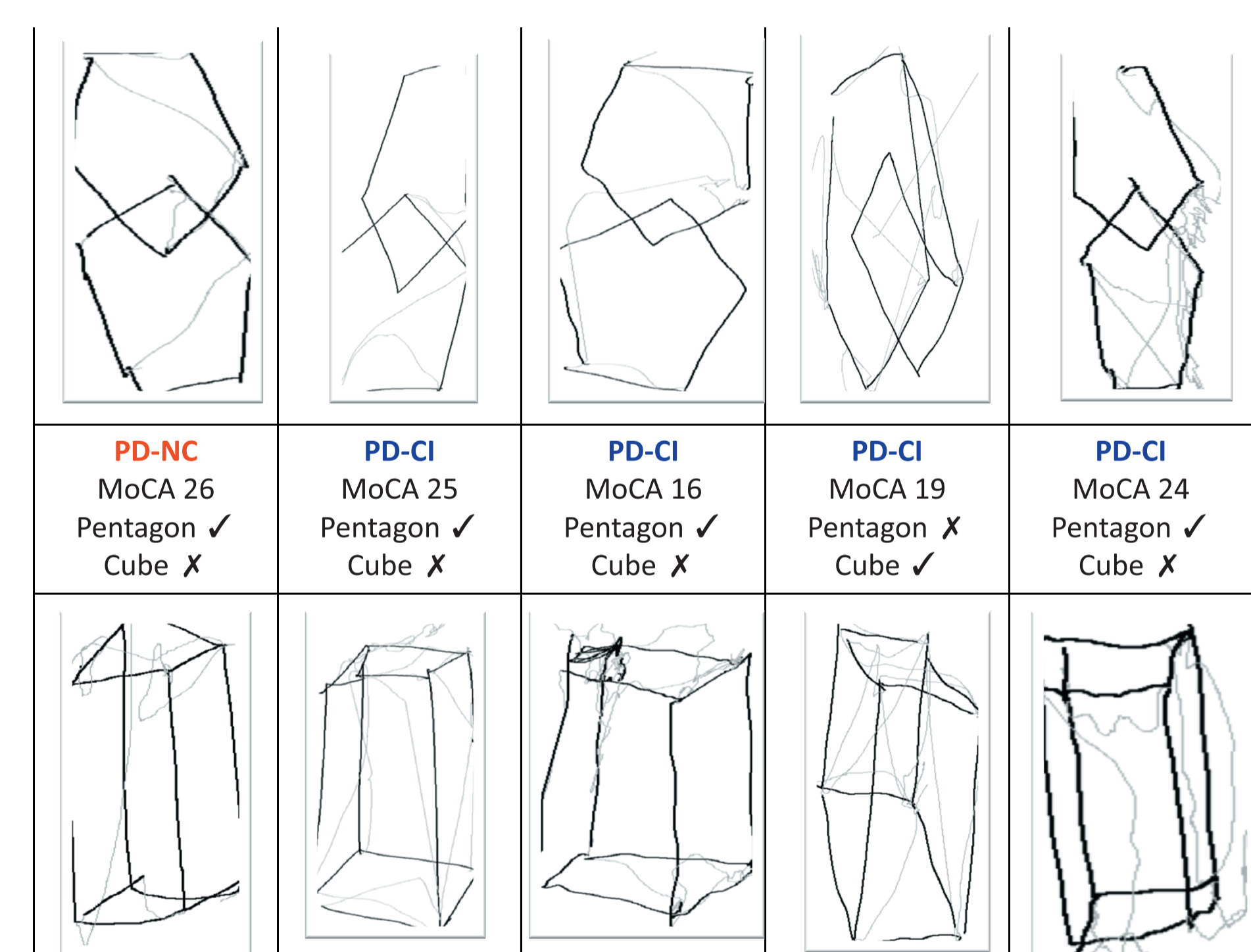


Figure 2: Examples of copied cube and pentagons:

Conclusions:

- **Incorrectly copying the cube was the most predictive visuospatial marker of cognitive impairment in PD.**
- **This finding is potentially useful when assessing cognitive function in a busy outpatient clinic, for example. However, larger numbers are required for validation.**

References:

1. Nasreddine ZS, Phillips NA, Bedirian V, et al. The Montreal Cognitive Assessment, MoCA: a brief screening tool for mild cognitive impairment. J Am Geriatr Soc 2005;**53**(4):695-9.
2. Folstein MF, Folstein SE, McHugh PR. "Mini-mental state". A practical method for grading the cognitive state of patients for the clinician. Journal of psychiatric research 1975;**12**(3):189-98.