7. Cognition and neuropsychiatric symptoms

This section reviews scales that evaluate cognitive dysfunction and neuropsychiatric symptoms such as behavioural problems, psychotic complications, depression, and apathy. Behavioural problems and psychotic complications (eg, psychomotor agitation and hallucinations), are important sources of caregiver burden, and frequently constitute a reason for institutionalization. In Parkinson’s disease (PD), depression is very prevalent and is a significant determinant of both patient’s and caregiver’s quality of life.

### Scales for Outcomes in Parkinson’s Disease-Cognition (SCOPA-Cog) (Figure 7.1) [1]

#### Description of scale

| Overview | For evaluation of cognitive deficits in PD  
|          | Ten items, assessing visual and verbal memory, delayed recall, executive and visuospatial functions and attention. Maximum score is 43, reflecting good cognitive status  
|          | Time to complete the scale: 10 to 20 minutes  
|          | Rated by a health professional  
|          | Specific for PD |

#### Copyright?

Owned by SCOPA-Propark Study

#### How can the scale be obtained?

The scale is available free of charge with permission of the authors in the website: www.scopa-propark.eu

#### Clinimetric properties of scale in patients with PD

| Feasibility | It has been applied to patients in all stages [1–3]  
|            | Lower scores in patients with more advanced PD [1]  
| Dimensionality | Items correspond to cognitive domains. Rasch analysis has proved its unidimensionality [4]  
| Acceptability | Full range of scores was not covered in Spanish and Brazilian validation studies [2,3]. Score distribution was close to a normal distribution [5]  
|              | Scoring system in some items should be modified [4]  
|              | Floor and ceiling effects present in some items and domains [2]  
|              | Skewness within acceptable limits [3,5] |

| Reliability | Person Separation Index, an estimate of reliability following Rasch analysis, reached 0.83 for SCOPA-Cog total score [4], indicating that at least 3 ability groups can be reliably distinguished  
|            | Internal consistency: satisfactory [1–3,5]  
|            | Inter-rater reliability: not tested  
|            | Test-retest reliability: satisfactory results for total score, although lower for some items [1,3] |
### Validity

Content validity: those items that best discriminated between patients and controls were selected [1]; however, content validity has been criticized [6].

Convergent: high correlation with Mini Mental State Examination (MMSE), MiniMental Parkinson (MMP), Cambridge Cognition Examination (CAMCOG), and Clinical Impression of Severity Index for Parkinson's Disease (CISI-PD) [1–3,5]. Lower with Hoehn & Yahr Staging Scale (HY), Short Portable Mental Status Questionnaire (SMPSQ) and other clinical scales.

Known-groups: SCOPA-Cog total score significantly decreased as HY stage, age and disease duration increased and MMSE scores decreased [1–3,5].

SCOPA-Cog distinguished between patients and controls [1] and between patients with PD with and without dementia [7].

Predictive: a cutoff of ≤19 points indicates dementia [2].

### Responsiveness & Interpretability

Standard error of measurement (SEM) and smallest real difference have been estimated [2,3,5].

Men and women's scores are similar [1] but items one (immediate word recall) and ten (delayed word recall) displayed differential item functioning (DIF) by age, and item two (digits backward) DIF by sex and age [4].

### Cross-cultural Adaptations & Others


### Overall impression

**Advantages**

- Short; acceptable, reliable and valid scale; specific for PD cognitive deficits [6]; full validation studies [1–3], including Rasch analysis [4].

**Disadvantages**

- Mainly assesses frontal-subcortical cognitive defects; content validity and responsiveness may be questioned [6].

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### Parkinson's Disease Cognitive Rating Scale (PD-CRS) [8]

#### Description of scale

**Overview**

For assessment of whole spectrum of cognitive functions over the course of PD [8].

- Includes seven tasks assessing frontal-subcortical functions (score range: 0 to 114) and two tasks assessing instrumental-cortical functions (0 to 20).
- Total score range is 0 to 134. Higher scores reflect better cognitive functioning.
- Time to complete the scale: mean of 17 minutes [6].
- Rater: care professional.

**Copyright?**

Public domain.

**How can the scale be obtained?**

It can be obtained through the original publication [8].

**Clinimetric properties of scale in patients with PD**

**Feasibility**

Specifically designed for PD.

- The scale has been applied to patients with PD of all levels of severity [9] and can significantly distinguish between cognitively intact patients with PD and patients with PD with mild cognitive impairment (MCI) or dementia (PDD) [6].