

Performance of the Neuropsychiatric Inventory-Clinician Apathy Domain for Apathy Screening in Neurocognitive Disorders

Krushnaa Sankhe^{a,b}, Valeria Manera^a, Julia Castela^a, Rajbir Singh^b, Dov Gandell^b, Giovanni Marotta^{a,d,e}, Damien Gallagher^{a,d,e}, Mark Rapoport^{d,e}, David S. Miller^f, Kaitleen K. Bawa^a, Jeffrey L. Cummings^g, Larry Ereshefsky^h, Masud Husainⁱ, Zahinoor Ismail^j, Jacobo Mintzer^k, Hans J. Moebius^l, Moyra E. Mortby^m, Anton P. Porsteinssonⁿ, Philippe Robert^o, Carla Zucchero Sarrafini^a, Danielle Vieira^a, Krista L. Lancôt^{a,b,e}

^aSunnybrook Research Institute, Toronto, ON, Canada; ^bDepartment of Pharmacology and Toxicology, University of Toronto, Toronto, ON, Canada; ^cDepartment of Geriatric Medicine, Sunnybrook Health Sciences Centre, Toronto, ON, Canada; ^dDepartment of Psychiatry, University of Toronto, Toronto, ON, Canada; ^eSunnybrook Health Sciences Centre, Sunnybrook Health Sciences Centre, Toronto, ON, Canada; ^fDepartment of Geriatric Medicine, Sunnybrook Health Sciences Centre, Toronto, ON, Canada; ^gDepartment of Geriatric Medicine, Sunnybrook Health Sciences Centre, Toronto, ON, Canada; ^hDepartment of Geriatric Medicine, Sunnybrook Health Sciences Centre, Toronto, ON, Canada; ⁱDepartment of Geriatric Medicine, Sunnybrook Health Sciences Centre, Toronto, ON, Canada; ^jDepartment of Geriatric Medicine, Sunnybrook Health Sciences Centre, Toronto, ON, Canada; ^kDepartment of Geriatric Medicine, Sunnybrook Health Sciences Centre, Toronto, ON, Canada; ^lDepartment of Geriatric Medicine, Sunnybrook Health Sciences Centre, Toronto, ON, Canada; ^mDepartment of Geriatric Medicine, Sunnybrook Health Sciences Centre, Toronto, ON, Canada; ⁿDepartment of Geriatric Medicine, Sunnybrook Health Sciences Centre, Toronto, ON, Canada; ^oDepartment of Geriatric Medicine, Sunnybrook Health Sciences Centre, Toronto, ON, Canada



Background

- The Diagnostic Criteria for Apathy in Neurocognitive Disorders (DCA-NCD) define apathy as diminished goal-directed activity across three dimensions: initiative, interest, and emotional expression
- The Neuropsychiatric Inventory-Clinician (NPI-C) apathy domain aligns strongly with the DCA-NCD and its three dimensions
- However, the ability of the NPI-C apathy domain to identify clinically significant apathy according to the DCA-NCD has not been established

Aim

To evaluate the ability of the NPI-C apathy domain to identify clinically significant apathy on the DCA-NCD and determine an optimal cutoff score

Methods

Participants:

- Persons with mild or major NCD were recruited (Sept 2023-Nov 2025) from geriatric psychiatry and memory clinics in Toronto, Canada and Nice, France.

Measures:

- NPI-C apathy domain: 11 items rated for severity (0-3), summed to generate a total apathy severity score
- DCA-NCD: Clinician-rated apathy status overall (DCA+ vs. DCA-) and across three dimensions (diminished initiative, interest, and emotional expression)

Statistical analysis:

- Primary: Receiver operating characteristic (ROC) analysis evaluated the NPI-C apathy total severity score for discriminating clinically significant apathy
- Area under the curve (AUC) quantified performance; the Youden Index determined the optimal cutoff.
- Secondary and exploratory: ROC analyses evaluated individual NPI-C item endorsement for clinically significant apathy overall and across the three DCA-NCD dimensions (AUC ≥ 0.80 indicated good discrimination)



Results

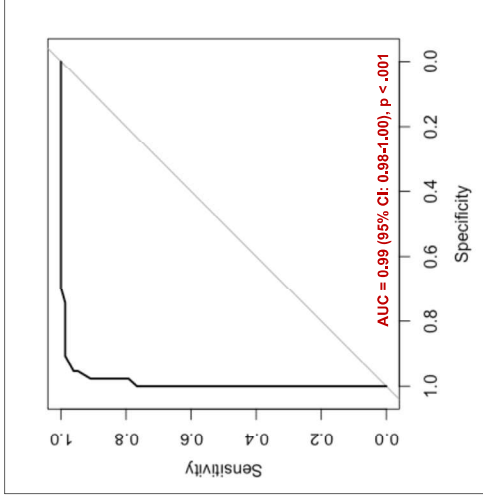
- 120 participants with mild or major NCD were included
- Of those, 77 (64.2%) were classified as DCA+ and 43 (35.8%) as DCA-

Table 1. Demographics and clinical characteristics of study sample.
Values reported as n (%) or mean (SD)

	Overall (n = 120)	DCA- (n = 43)	DCA+ (n = 77)
Age, mean (SD)	79.8 (9.0)	77.7 (8.5)	80.9 (9.1)
Female, n (%)	65 (54.2%)	27 (62.8%)	38 (49.4%)
NCD severity, n (%)			
Mild	43 (35.8%)	28 (65.1%)	15 (19.5%)
Major	77 (64.2%)	15 (34.9%)	62 (80.5%)
Type of NCDs, n (%)			
AD dementia	48 (40.0%)	15 (34.9%)	33 (42.9%)
Vascular dementia	23 (19.2%)	8 (18.6%)	15 (19.5%)
Mixed/non-AD	6 (5.0%)	1 (2.3%)	5 (6.5%)
Dementia unspecified	25 (20.8%)	7 (16.3%)	18 (23.4%)
MCI	18 (15.0%)	12 (27.9%)	6 (7.8%)
MMSE, mean (SD)	20.5 (6.6)	22.7 (5.5)	19.2 (6.9)
AD Medications, n (%)			
Cholinesterase inhibitors	25 (20.8%)	9 (20.9%)	16 (20.8%)
Memantine	11 (9.2%)	2 (4.7%)	9 (11.7%)
Medical conditions, n (%)			
Hypertension, n (%)	42 (35.0%)	15 (34.9%)	27 (35.1%)
Hyperlipidemia, n (%)	47 (39.2%)	17 (39.5%)	30 (39.0%)
Diabetes, n (%)	21 (17.5%)	6 (14.0%)	15 (19.5%)
NPI-C apathy total, mean (SD)	10.5 (9.2)	1.2 (2.1)	15.7 (7.4)

Abbreviations: NCD, Neurocognitive disorder; AD, Alzheimer's disease; MCI, mild cognitive impairment; MMSE, Mini Mental State Examination; NPI-C, Neuropsychiatric Inventory-Clinician rating.

Figure 1. ROC curve for the NPI-C apathy total severity score for identifying clinically significant apathy on the DCA-NCD



Results (Cont'd)

Table 2. Clinically relevant threshold values for NPI-C apathy total severity score for detecting clinically significant apathy on the DCA-NCD

ROC threshold	Score interpretation	Sensitivity	Specificity
0.5	≥ 1	100.0%	60.5%
1.5	≥ 2	100.0%	69.8%
2.5	≥ 3	98.7%	74.4%
3.5	≥ 4	98.7%	90.7%
4.5 (Youden index optimal)	≥ 5	96.1%	95.3%
5.5	≥ 6	94.8%	95.3%
6.5	≥ 7	90.9%	97.7%
7.5	≥ 8	89.6%	97.7%
8.5	≥ 9	81.8%	97.7%

Notes: Thresholds ≥ 5 demonstrated sensitivities below 0.80, indicating reduced screening utility, and were therefore omitted for clarity. Abbreviations: ROC, Receiver operating characteristic.

Secondary & Exploratory Analyses:

- Items 7 (usual interests), 9 (social participation), 10 (interest/curiosity), and 11 (emotional responses) showed good discrimination for clinically significant apathy across both sites (AUCs ≥ 0.80)
- Items with good discrimination across dimensions:
 - Diminished initiative: Items 7, 9, 10, 11
 - Diminished interest: Items 7, 9, 10
 - Diminished emotion: None (highest: items 3, 7, 11; AUCs 0.78-0.79)

Conclusions

- The NPI-C apathy domain demonstrated excellent discrimination for clinically significant apathy, with an optimal cutoff of ≥ 5
- Findings support its potential utility for identifying clinically significant apathy in patients with NCD; additional assessment may be needed to capture dimension-specific features
- Larger and more diverse cohorts are needed to confirm these findings

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