



SOCIAL COGNITIVE IMPAIRMENT IN VCI: A ANALYTICAL CROSS SECTIONAL STUDY FROM TERTIARY CARE CENTRE IN EASTERN INDIA

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BACKGROUND

Vascular Cognitive Impairment (VCI) represents a spectrum of cognitive disorders resulting from cerebrovascular disease and is a major cause of cognitive decline worldwide. Although executive dysfunction, attention deficits, and memory impairment have been extensively investigated, social cognition remains an under-recognized domain in VCI. Social cognition encompasses Theory of Mind (ToM), emotion recognition, empathy, and social judgment. These functions depend on distributed fronto-temporal, limbic, and subcortical networks that are particularly vulnerable to vascular injury and white-matter disconnection. Impairments in social cognition adversely affect interpersonal relationships, functional independence, caregiver burden, and quality of life.

METHODOLOGY

Study Design
Cross-sectional observational case-control study conducted at a tertiary neuroscience centre in Eastern India (January 2025-June 2026).

Participants
VCI patients: n = 27 (19 males, 8 females)
Healthy controls: n = 27 (age-, sex-, and education-matched)

Inclusion Criteria
Age ≥18 years
MRI-confirmed vascular brain injury
Bengali speakers with ≥10 years of education
Adequate sensory and language function for testing

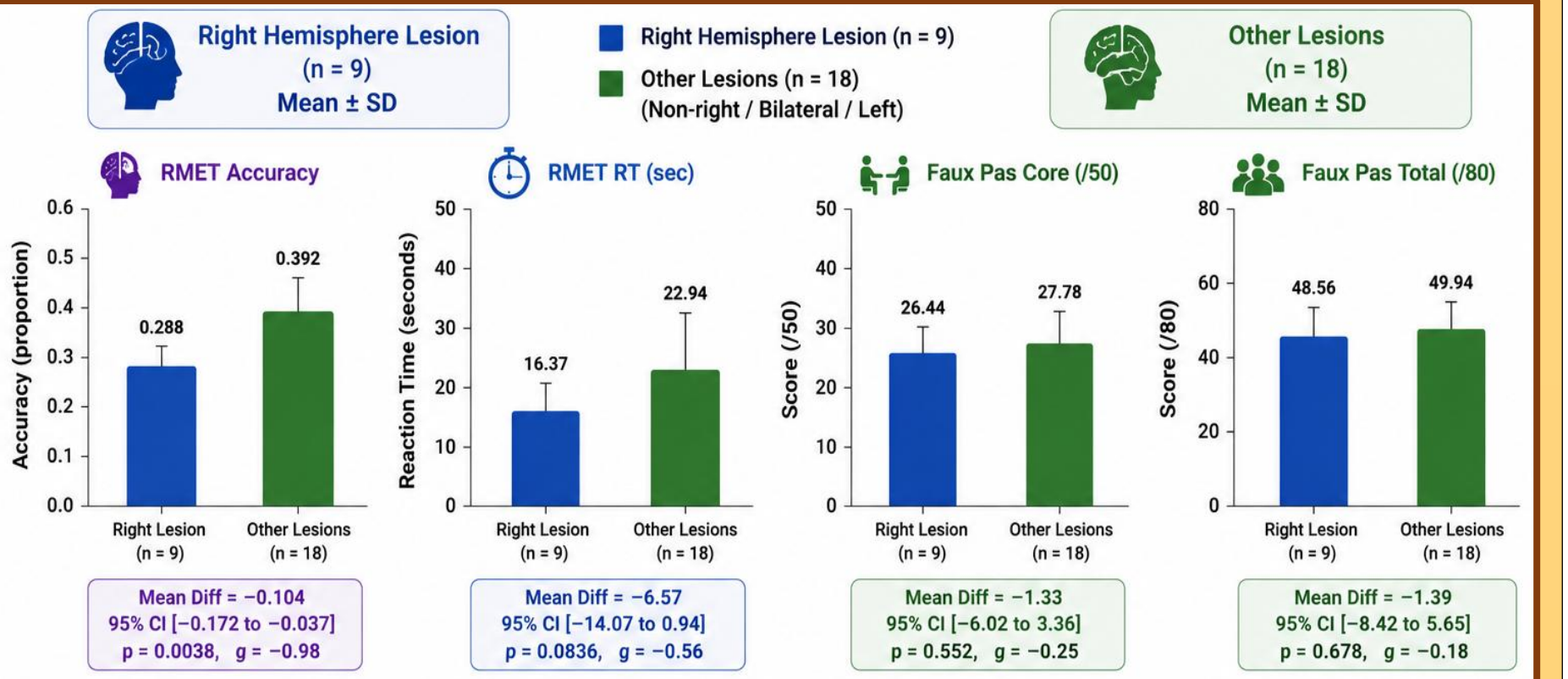
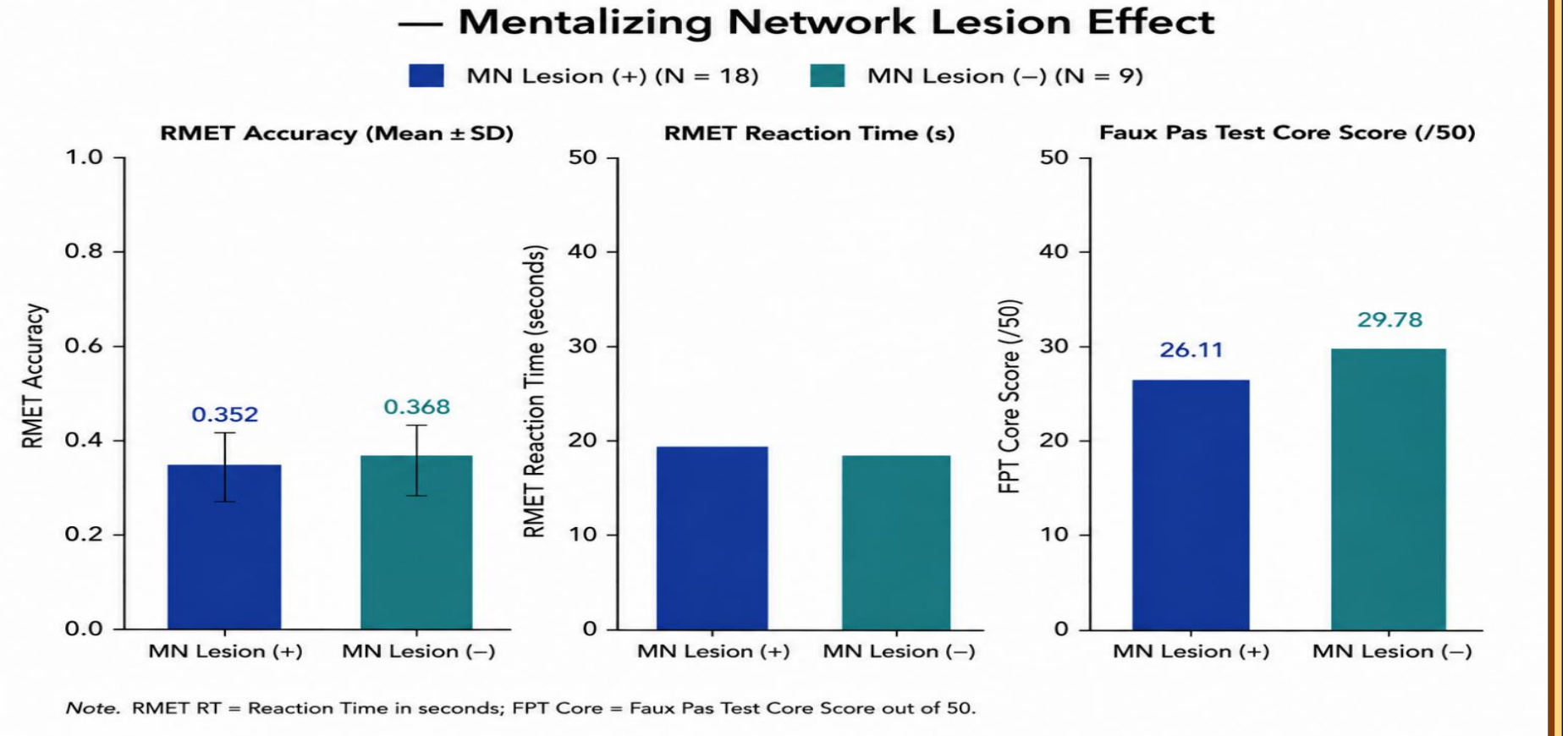
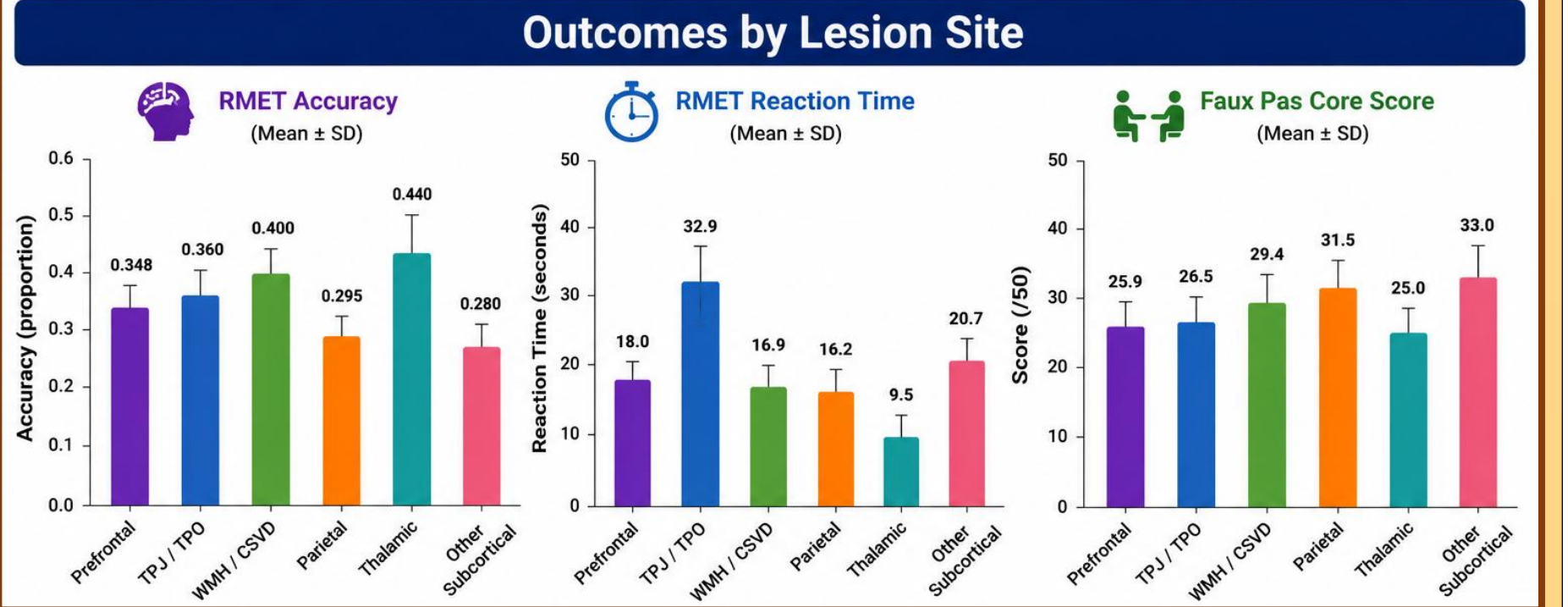
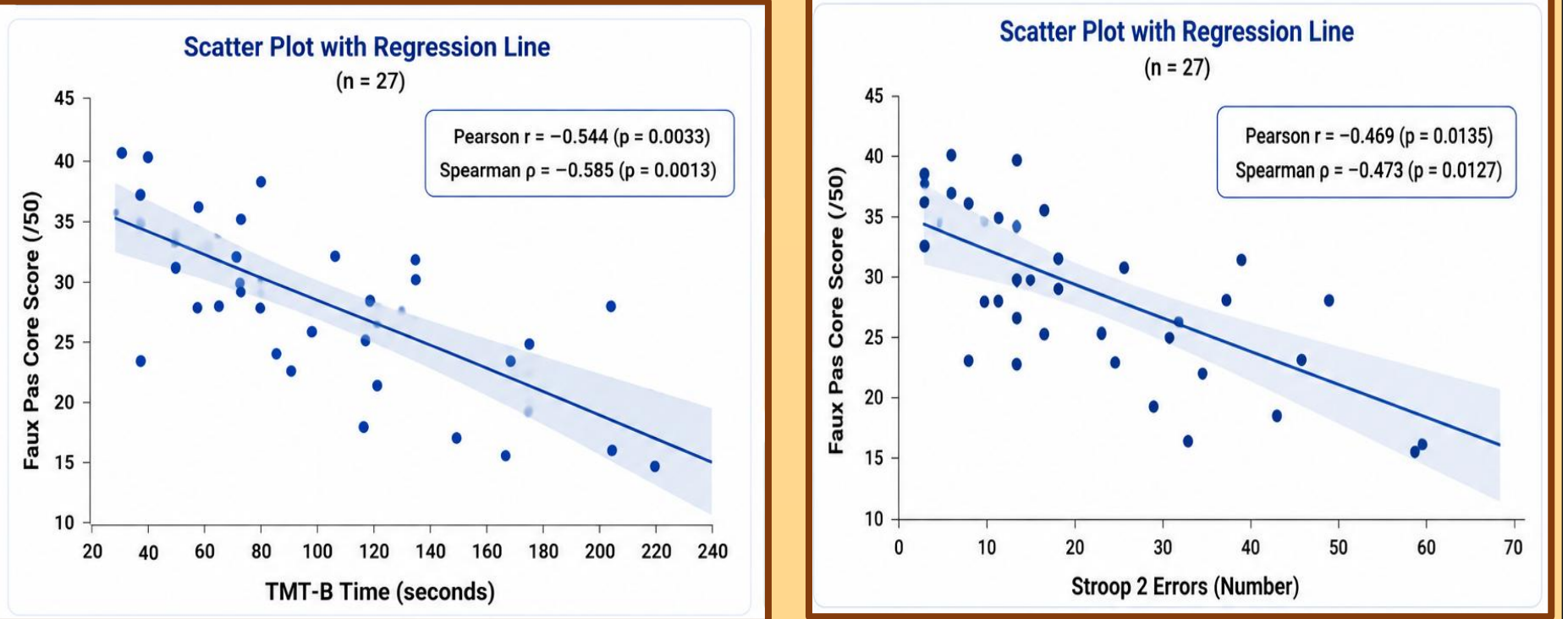
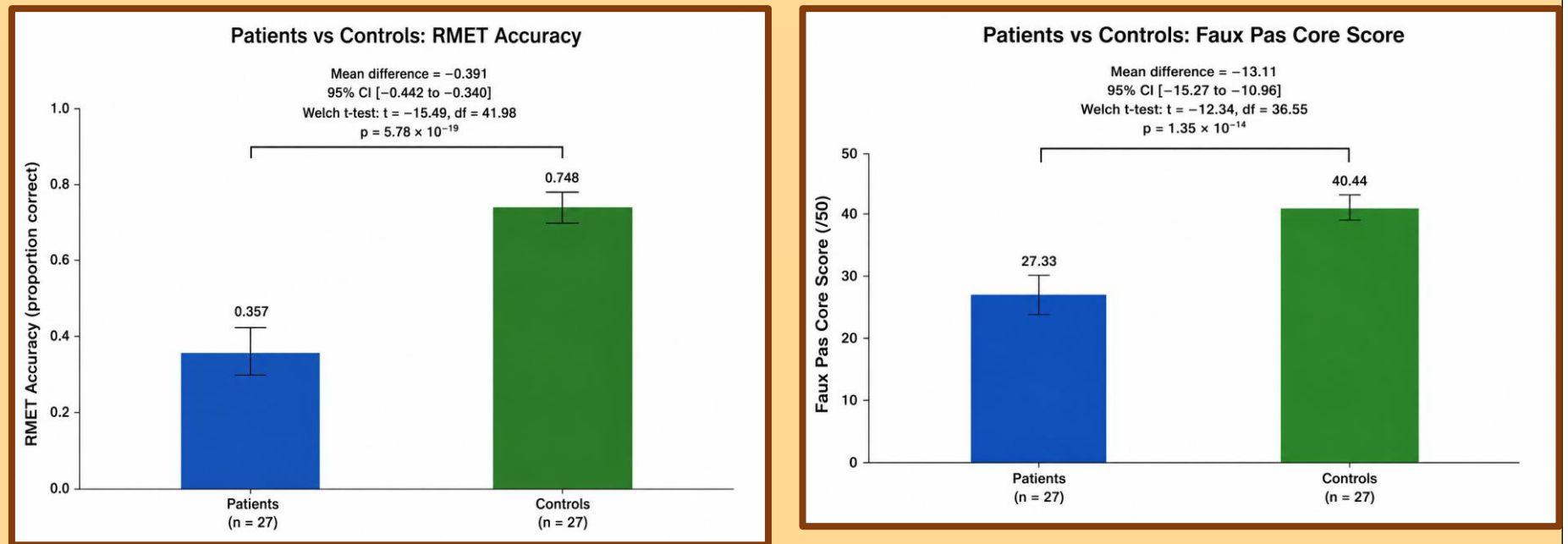
Social Cognition Measures
Reading the Mind in the Eyes Test (RMET)
Faux Pas Recognition Test

Cognitive & Executive Measures
ACE-III
Frontal Assessment Battery (FAB)
Stroop Test
Go/No-Go
Trail Making Test (A & B)
Verbal Learning Test (VLT)
HAM-A and HAM-D scales

Neuroimaging Variables
Lesions were classified according to:
Hemisphere
Cortical vs subcortical involvement
Prefrontal involvement
Mentalizing-network involvement
White-matter hyperintensity burden



A. Group Comparisons of Outcomes							
Domain	Outcome	Patient Mean ± SD	Control Mean ± SD	Mean Difference (95% CI)	P	Hedges g	FDR q
Social Cognition	RMET accuracy	0.36 ± 0.11	0.75 ± 0.07	-0.391 (-0.442 to -0.34)	5.78e-19	-4.155	9.83e-18
	RMET RT, sec	20.75 ± 11.68	10.03 ± 5.24	10.72 (5.722 to 15.71)	1.07e-04	1.167	1.21e-04
	Log RMET RT	2.91 ± 0.48	2.18 ± 0.53	0.738 (0.464 to 1.013)	1.76e-06	1.447	2.13e-06
	Faux Pas Core /50	27.33 ± 5.02	40.44 ± 2.31	-13.11 (-15.27 to -10.96)	1.35e-14	-3.309	3.97e-14
	Faux Pas Total /80	49.48 ± 7.37	65.11 ± 3.13	-15.63 (-18.76 to -12.50)	5.61e-12	-2.722	9.63e-12
Global Cognition	ACE-III	0.62 ± 0.09	0.81 ± 0.04	-0.195 (-0.235 to -0.156)	5.67e-12	-2.719	9.63e-12
	FAB	78.33 ± 8.25	92.59 ± 3.32	-14.26 (-17.74 to -10.78)	9.58e-10	-2.235	1.48e-09
Executive Function	Stroop 2 errors	22.67 ± 7.21	3.96 ± 1.79	18.70 (15.78 to 21.62)	9.61e-14	3.511	2.04e-13
	Go/No-Go	2.00 ± 0.96	3.41 ± 0.50	-1.407 (-1.829 to -0.986)	4.64e-08	-1.811	6.58e-08
Memory	TMT-A, sec	69.98 ± 13.59	26.50 ± 3.99	43.48 (37.92 to 49.04)	2.47e-16	4.279	1.40e-15
	TMT-B, sec	182.97 ± 46.68	48.76 ± 8.07	134.2 (115.5 to 152.9)	1.40e-14	3.948	3.97e-14
	TMT-B minus A, sec	112.99 ± 34.02	22.26 ± 6.46	90.73 (77.07 to 104.4)	7.71e-14	3.652	1.87e-13
Mood	VLT Total /50	28.35 ± 6.22	46.34 ± 2.99	-17.99 (-20.68 to -15.30)	5.35e-16	-3.632	2.27e-15
	VLT Delayed /15	5.99 ± 2.19	13.45 ± 1.03	-7.459 (-8.405 to -6.514)	3.37e-18	-4.287	2.86e-17
	HAM-A	6.56 ± 2.55	4.52 ± 2.34	2.037 (0.700 to 3.374)	0.004	0.820	0.004
	HAM-D	6.78 ± 2.36	3.11 ± 2.01	3.667 (2.470 to 4.863)	1.21e-07	1.650	1.58e-07



KEY FINDINGS

VCI patients demonstrated substantial impairment in social cognition compared with healthy controls. VCI patients showed significantly reduced accuracy and prolonged processing times when interpreting social-emotional cues.

Higher-Order Social Reasoning
Faux Pas Core and Total scores were markedly reduced, indicating impairment in contextual social understanding and mental-state attribution.

Executive Correlates
Poorer RMET and Faux Pas performance was associated with deficits in:
Inhibitory control (Stroop)
Cognitive flexibility (TMT-B)
Frontal executive function (FAB)
Verbal learning and memory (VLT)

Lesion-Based Findings
Social cognition deficits were greatest in patients with involvement of:
Frontal networks
Temporoparietal regions
White-matter disconnection pathways
Mentalizing-network structures

CONCLUSIONS

Social cognition constitutes a clinically important yet under-recognized domain of impairment in VCI. Deficits extend beyond conventional executive dysfunction and involve Theory of Mind, emotion recognition, empathy, and social judgment.

The findings support a network-based model in which vascular injury disrupts fronto-subcortical and fronto-limbic pathways critical for social cognition. White-matter disconnection may be as important as focal cortical lesions in producing these deficits.

Routine assessment of social cognition may improve diagnostic accuracy, prognostication, caregiver counselling, and rehabilitation planning in patients with VCI.

TAKE HOME MESSAGE

Social cognition is a missing dimension of vascular cognitive assessment.

✓ Nearly half of VCI patients demonstrate clinically meaningful impairment in Theory of Mind and social reasoning.

✓ RMET and Faux Pas tests provide rapid, culturally adaptable assessment tools.

✓ White-matter and network disconnection mechanisms are central to social cognitive dysfunction.

✓ Incorporating social cognition into routine VCI evaluation may improve patient-centred care and rehabilitation outcomes.

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