Supplementary Material

Salience Network Functional Connectivity Mediates Association Between Social Engagement and Cognition in Non-Demented Older Adults: Exploratory Investigation

Supplementary Table 1. Diagnostic group difference in cognition, functional connectivity, and cognitive performance. Participants with mild cognitive impairment perform significantly more poorly than cognitively unimpaired participants on global cognition, executive function, memory, language, and attention.

	CI (n=62)	MCI (n=50)	t (df=110)	p	Cohen's d
LSNS-6 (total)	20.35±4.61	18.86±4.84	1.66	0.1	0.32
LSNS-6 Active Engagement (Z)	0.11±0.97	-0.13±1.03	1.26	0.21	0.24
LSNS-6 Intimate Engagement (Z)	0.14±1.02	-0.17±0.95	1.62	0.11	0.31
DMN FC	0.60±0.25	0.52±0.27	1.65	0.1	0.31
SAL FC	0.74±0.30	0.62±0.36	1.97	0.05	0.38
SMN FC*	0.79±0.41	0.74±0.43	0.62	0.53	0.12
UDS-3 Global	0.11±0.43	-0.50±0.57	6.28	<0.001	1.23
UDS-3 Executive	-0.03±0.67	-0.78±0.97	4.83	<0.001	0.92
UDS-3 Memory	0.29±0.60	-0.76±.077	8.16	<0.001	1.55
UDS-3 Language	0.06±0.48	-0.62±0.83	5.44	<0.001	1.03
UDS-3 Attention	-0.04±0.79	-0.45±0.77	2.79	0.01	0.53
UDS-3 Visuospatial	0.28±.081	0.11±0.96	0.98	0.34	0.19

CI, cognitively unimpaired; MCI, mild cognitive impairment; LSNS-6, six-item Lubben Social Network Scale; DMN, default mode network; SAL, salience network; SMN, sensorimotor network; FC, functional connectivity; UDS-3, Uniform Dataset version 3.

*Note: For sensorimotor network, analysis included 61 CI participants and 43 MCI participants.

Diagnostic group: Associations between social engagement and cognition

As an additional exploratory post-hoc analysis, we examined these associations separately for our cognitively unimpaired participants and participants with MCI. In cognitively unimpaired participants, we found a moderate correlation between LSNS-6 total score and executive function UDS-3 composite score ($r = 0.302$, $p = 0.017$). This correlation was not significant in participants with MCI; however, the effect was not significantly stronger in cognitively unimpaired than MCI participants (Fisher's $Z = 0.57$, $p = 0.569$). Associations of LSNS-6 total score with global UDS-3 composite score and other domain composite scores were not statistically significant in participants with MCI or unimpaired cognition.

Diagnostic group: Associations between social engagement and network functional connectivity

As an additional exploratory post-hoc analysis, we examined these associations separately for our cognitively unimpaired participants and participants with MCI. In participants with MCI, LSNS-6 total score had a statistically significant positive correlation with salience network connectivity ($r = 0.286$, $p = 0.044$). Intimate engagement sub-score also had a statistically significant positive correlation with salience network connectivity ($r = 0.338$, $p = 0.017$). These correlations were not significant in cognitively unimpaired participants. However, effects in participants with MCI were not significantly stronger than those in cognitively unimpaired participants for LSNS-6 total (Fisher's $Z = 0.80$, $p = 0.424$) or intimate engagement sub-score (Fisher's $Z = 1.09$, $p = 0.276$). All other associations between network connectivity and social engagement total and sub-scores were not statistically significant.

Education and race: Mediation models of social engagement/cognitive performance association

Mediation models were re-run to account for the potential confounding influence of education and race. Age, sex, years of education, and race were included as nuisance covariates. Race data was not available for one participant, so the sample size for these models was 111.

In the first model, we tested salience network FC as a mediator of the association between LSNS-6 total score and UDS-3 global composite score. The bootstrapped unstandardized indirect effect was 0.0047 (95% CI: 0.0000 – 0.0119), and salience network functional connectivity mediated 30.5% of the total effect.

In the second model, we tested salience network FC as a mediator of the association between LSNS-6 total score and UDS-3 executive function composite score. The unstandardized indirect effect was 0.0028 (95% CI: -0.0024 – 0.0110), and salience network functional connectivity mediated 7.7% of the total effect.

In the third model, we tested salience network FC as a mediator of the association between LSNS-6 intimate social engagement sub-score and UDS-3 global composite score. The unstandardized indirect effect was 0.0256 (95% CI: 0.0022 – 0.0622), and salience network functional connectivity mediated 39.1% of the total effect.