

Supplementary Materials

Global left frontal cortex connectivity attenuates the adverse effect of brain atrophy on global cognition in non-dementia participants

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Supplementary Table 1. summary of linear models accounting for age, sex, education, diagnosis based on amyloidosis

| | β | SE | t | P | 95%CI lower | 95%CI upper |
|--|---------|------|-------|--------------|-------------|-------------|
| Reserve effect of gLFC connectivity | | | | | | |
| HpVR * gLFC connectivity | -0.22 | 0.08 | -2.89 | 0.005 | -0.38 | -0.07 |
| HpVR | 0.17 | 0.09 | 1.98 | 0.049 | 0.00 | 0.35 |
| gLFC connectivity | -0.05 | 0.07 | -0.80 | 0.427 | -0.18 | 0.08 |
| Reserve effect of gLFC connectivity | | | | | | |
| PhgVR * gLFC connectivity | -0.21 | 0.07 | -2.90 | 0.004 | -0.35 | -0.07 |
| PhgVR | 0.16 | 0.07 | 2.24 | 0.027 | 0.02 | 0.30 |
| gLFC connectivity | -0.03 | 0.07 | -0.51 | 0.609 | -0.17 | 0.10 |
| Reserve effect of gLFC connectivity | | | | | | |
| AmyVR * gLFC connectivity | -0.18 | 0.07 | -2.40 | 0.018 | -0.33 | -0.03 |
| AmyVR | 0.25 | 0.08 | 3.12 | 0.002 | 0.09 | 0.41 |
| gLFC connectivity | -0.06 | 0.06 | -0.93 | 0.352 | -0.19 | 0.07 |
| No reserve effect for control ROI, M1, and occipital pole | | | | | | |
| HpVR * M1 connectivity | -0.08 | 0.07 | -1.17 | 0.244 | -0.21 | 0.05 |
| PhgVR * M1 connectivity | -0.08 | 0.06 | -1.37 | 0.173 | -0.21 | 0.04 |
| AmyVR * M1 connectivity | -0.04 | 0.06 | -0.71 | 0.478 | -0.16 | 0.08 |
| HpVR * occipital connectivity | -0.10 | 0.09 | -1.01 | 0.316 | -0.28 | 0.09 |
| PhgVR * occipital connectivity | -0.10 | 0.08 | -1.37 | 0.172 | -0.25 | 0.05 |
| AmyVR * occipital connectivity | -0.08 | 0.08 | -0.98 | 0.328 | -0.24 | 0.08 |

Abbreviations: HpVR: hippocampus volume/ intracranial volume ratio; PhgVR: parahippocampal gyrus volume/ intracranial volume ratio; AmyVR: amygdala volume / intracranial volume ratio; gLFC: global left frontal cortex; M1: primary motor cortex; ROI: region of interest.

Dependent variable: total score of Montreal Cognitive Assessment-Basic Test.

Supplementary Table 2. summary of linear models accounting for age, sex, education, diagnosis and APOE4 carrying status

| | β | SE | <i>t</i> | <i>P</i> | 95%CI lower | 95%CI upper |
|--|---------|------|----------|--------------|----------------|----------------|
| Reserve effect of gLFC connectivity | | | | | | |
| HpVR * gLFC connectivity | -0.17 | 0.08 | -2.15 | 0.034 | -0.33 | -0.01 |
| HpVR | 0.24 | 0.09 | 2.73 | 0.007 | 0.07 | 0.42 |
| gLFC connectivity | -0.01 | 0.07 | -0.10 | 0.920 | -0.14 | 0.13 |
| Reserve effect of gLFC connectivity | | | | | | |
| PhgVR * gLFC connectivity | -0.20 | 0.07 | -2.75 | 0.007 | -0.35 | -0.06 |
| PhgVR | 0.19 | 0.07 | 2.62 | 0.010 | 0.05 | 0.34 |
| gLFC connectivity | -0.20 | 0.07 | -2.75 | 0.007 | -0.35 | -0.06 |
| Reserve effect of gLFC connectivity | | | | | | |
| AmyVR * gLFC connectivity | -0.13 | 0.08 | -1.68 | 0.095 | -0.29 | 0.02 |
| AmyVR | 0.31 | 0.08 | 3.77 | 0.000 | 0.15 | 0.47 |
| gLFC connectivity | -0.01 | 0.07 | -0.16 | 0.875 | -0.14 | 0.12 |
| No reserve effect for control ROI, M1, and occipital pole | | | | | | |
| HpVR * M1 connectivity | -0.06 | 0.07 | -0.86 | 0.389 | -0.19 | 0.07 |
| PhgVR * M1 connectivity | -0.07 | 0.06 | -1.08 | 0.281 | -0.19 | 0.06 |
| AmyVR * M1 connectivity | -0.03 | 0.06 | -0.51 | 0.613 | -0.15 | 0.09 |
| HpVR * occipital connectivity | -0.08 | 0.10 | -0.84 | 0.400 | -0.28 | 0.11 |
| PhgVR * occipital connectivity | -0.11 | 0.08 | -1.43 | 0.156 | -0.27 | 0.04 |
| AmyVR * occipital connectivity | -0.08 | 0.08 | -0.90 | 0.368 | -0.24 | 0.09 |

Abbreviations: HpVR: hippocampus volume/ intracranial volume ratio; PhgVR: parahippocampal gyrus volume/intracranial volume ratio; AmyVR: amygdala volume/intracranial volume ratio; gLFC: global left frontal cortex; M1: primary motor cortex; ROI: region of interest.

Dependent variable: total score of Montreal Cognitive Assessment-Basic Test.

Supplementary Table 3. Demographic and neuropsychological characteristics of gender subgroups

| | Men | Women | P |
|-------------------------------------|---------------|---------------|--------------|
| sample size, n | 53 | 83 | / |
| age, y | 66.83(6.70) | 66.57(5.24) | 0.810 |
| Diagnosis, NC (SCD, MCI) | 18(17,18) | 25(46,12) | / |
| education | 13.16(2.86) | 11.87(3.14) | 0.017 |
| SCD9 | 4.26(2.38) | 4.67(2.20) | 0.306 |
| Hamilton Depression Scale | 3.16(3.62) | 3.48(3.49) | 0.617 |
| Hamilton Anxiety Scale | 3.69(3.60) | 4.12(3.91) | 0.528 |
| AVLT-long-term delayed recall | 5.51(3.08) | 7.02(2.78) | 0.004 |
| AVLT-recognition | 20.86(2.66) | 21.63(2.65) | 0.101 |
| Shape trails test -A | 67.08(28.64) | 63.37(25.03) | 0.427 |
| Shape trails test -B | 159.01(53.58) | 141.32(51.82) | 0.060 |
| Animal Fluency Test | 17.51(4.82) | 18.68(5.27) | 0.192 |
| Boston Naming Test | 25.39(3.15) | 24.49(3.63) | 0.140 |
| Montreal Cognitive Assessment-Basic | 24.08(3.24) | 25.26(3.67) | 0.090 |

Abbreviations: AVLT: auditory verbal learning test; NC: normal control; SCD: subjective cognitive decline; MCI: mild cognitive impairment.

Values are mean (SD) unless otherwise specified. p values were calculated by two sample test was used for continuous variables.