**Supplementary**

**1. Supplementary methods**

<u>**PARTICIPANTS**</u>

The successful aging group included 14 males and 12 females aged 59 years to 80 years, with an average age of 68.35 ± 5.528 years. The successful aging group inclusion criteria contained four dimensions, cognitive function, ability to perform activities of daily living, psychological status, and physical disability, according to the research of Li *et al*[1] in Shanghai. The details are as follows: (1) Mini mental state examination (MMSE) score ≥ 29 (total score 30); memory score + recall score on the MMSE ≥ 5 (total score 6); (2) Total ADL score ≤ 15[2]; (3) No self-reported mental and psychological problems; and (4) No physical disability. Meanwhile, 47 individuals in the usual aging group, including 16 males and 31 females aged 59 years to 83 years old, with an average age of 69.51 ± 6.695 years, were recruited as controls. The inclusion criteria were as follows: (1) 25 ≤ MMSE score ≤ 28; (2) Total ADL score ≤ 15; (3) No self-reported mental and psychological problems; and (4) No physical disability. Exclusion criteria in two groups were: (1) Diseases that may lead to cognitive impairment (except mild cognitive impairment), such as cerebrovascular diseases, Parkinson's disease, brain trauma and other neurological diseases; (2) Severe depression, schizophrenia, substance abuse and other mental diseases; (3) Cardiovascular diseases, such as severe hypertension and arrhythmia, and metabolic diseases, such as severe diabetes and thyroid dysfunction; and (4) Contraindications to magnetic resonance imaging (MRI).

<u>**MRI SCAN**</u>

In this study, all the subjects underwent MRI scans, with 3.0 T MR750 manufactured by GE Co. (United States), including 3D T1-weighted imaging and resting-state fMRI (rs-fMRI) data. Brain structural MRI data were collected with a 3D magnetization-prepared rapid gradient echo squeeze with

the following parameters: Repetition time = 7.7 seconds; echo time with the minimum value; field of view, 256 mm× 256 mm; acquisition matrix, 256 × 256; flip angle: 11°; and slice thickness, 1.2 mm with 186 slices[3]. Resting-state fMRI data were collected while participants laid down with their eyes closed but remained awake. No participants reported falling asleep during the scanning session. We used a prototype quadrature birdcage head coil fitted with foam padding to minimize head movement. fMRI data were collected using the following parameters: Repetition time: 2000 minutes; time to echo: 30 minutes; time for inversion: 100 minutes; flip angle: 90°; field of view: 224 mm × 224 mm; matrix size: 64 × 64; slice thickness: 3.5 mm; voxel size: 3.5 $mm^3$ × 3.5 $mm^3$ × 3.5 $mm^3$; and 240 volumes in total[3]. None of the participants had structural abnormalities upon visual inspection of the scans.

[1] **Lu Z**, Li CB, Zhang MY. [The analysis of stability for discriminating standard on successful aging]. *Shanghai Jingshen Yixue* 2000; **12**: 187-189 [DOI: 10.3969/j.issn.1002-0829.2000.04.001]

[2] **Dong L**, Shen Y, Lei X, Luo C, Li QW, Wu WY, Yao DZ, Li CB. The heterogeneity of aging brain: altered functional connectivity in default mode network in older adults during verbal fluency tests. *Chin Med J (Engl)*. 2012; **125**: 604-10 [PMID: 22490482]

[3] **Cao Y**, Yang H, Zhou Z, Cheng Z, Zhao X. Abnormal Default-Mode Network Homogeneity in Patients With Mild Cognitive Impairment in Chinese Communities. *Front Neurol* 2021; **11**: 569806 [PMID: 33643176 DOI: 10.3389/fneur.2020.569806]

**2. Demographic data and cognitive function data**

**Supplementary Table1 Demographic data and cognitive function data of two groups, mean ± SD**

| Characteristics | SA (*n* = 26) | UA (*n* = 47) | $t/\chi^2$ | *P* value |
|---|---|---|---|---|
| Male/female | 12/14 | 16/31 | 1.038 | 0.308 |
| Age (years) | 68.35 ± 5.53 | 69.51 ± 6.70 | -0.755 | 0.453 |
| Education years | 11.23 ± 3.54 | 10.00 ± 2.72 | 1.540 | 0.131 |
| Total MMSE score | 29.85 ± 0.63 | 26.17 ± 1.96 | 9.287 | 0.000[a] |
| Memory + recall score | 5.73 ± 0.45 | 4.81 ± 1.04 | 5.367 | 0.000[a] |

[a]$P < 0.05$.

SA: Successful aging; UA: Usual aging; MMSE: Mini mental state examination.