

Supplementary Table 1: Prescreening procedure¹ to verify inclusion/exclusion criteria

PRESCREENING STEP 1		
Hospital-provided data check	Action Acquired & transmitted by the HUG & the CHUV	Data collection Clinical functional and structural MRI Behavioral data: Mini Mental State Examination (MMSE) [1], MoCA [2], Hospital Anxiety and Depression Scale (HADS) [3]
First contact with research team	Telephone call; decision to proceed to Pre-screening Step 2	Age – gender – musical and recent physical activity history – general health – native language – MRI compatibility – overall availability – contact information
PRESCREENING STEP 2		
Summary information sheet & declaration of informed consent	Send/receive by post	Read the information sheet, read the declaration of informed consent and sign it before filling in any of the following questionnaires.
Demographic questionnaire ²	Send/receive by post	Laboratory-elaborated questionnaire (GEMMI lab): detailed information on languages; handedness; physical capability to come to the interventions; health: hospitalizations (causes), locomotion, vision (correction), audition (hearing aids), height & weight ² , sleep quality; cardiovascular & neurological diseases, hypertension, diabetes, arthrosis, arthritis, rheumatism, bone fractures, thyroid problems, memory problems, other health problems; fortuitous findings: who (treating physician or patient) to contact; smoking habits over the lifespan; alcohol consumption over the lifespan; present medication ; other drug use ; sociodemographic information: age, gender, nationality, civil status, siblings, children, highest level of education (5 categories), main professional engagements, gross monthly household income ³ (5 categories); MRI compatibility: claustrophobia, implants, etc.; Interest for the study: motivation
Cognitive Reserve Index Questionnaire ⁴ [4]	Send/receive by post	The CRIq includes demographic data and items grouped into three sections: education, working activity and leisure time, each of which returns a subscore
A-IADL-Q(SV) [5]	Send/receive by post	The Amsterdam Instrumental Activity of the Daily Living Questionnaire (Short Version; (A-IADL-Q(SV)), examines proficiency in daily living activities
Music education questionnaires	Send/receive by post	Musical history laboratory-elaborated questionnaire (GEMMI lab): amount and intensity of music listening and extracurricular music training: solfege/theory, instrumental training, choir singing, intracurricular music training in school Goldsmiths Musical Sophistication Index (Gold-MSI) [6]: self-report inventory for individual differences in musical sophistication (ability to engage with music)
Godin-Shephard leisure-time physical activity questionnaire [7]	Send/receive by post	Adapted to cover physical activities in different parts of life (12-25 y.o., last 5 years and last year)
Laboratory-elaborated questionnaire on major life events	Send/receive by post	Self-report inventory on stressful events that may influence cognitive functioning, covering 6 time periods (12-25 y.o., 25-55 y.o., 55-64 y.o.; last 10 years, last 5 years and last year); GEMMI lab
PRESCREENING STEP 3		
First laboratory visit	Research team member countersigns declaration of informed consent Verify/complete questionnaires of Step 2	
- Psychometric tests i. Right-handedness [8, 9] ii. COGTEL ⁸ [10, 11] iii. International Matrix Test (Oldenburg) ⁶ [12]	Pass 3 psychometric tests	i. Edinburgh Handedness Inventory (revised) to evaluate degree of right handedness; ii. Measure gross overall cognitive level and check for potential (mild) cognitive decline (COGTEL); iii. Check for major hearing impairment.

Footnotes Table 2

- Outliers (based on cut-off scores and or other exclusion criteria) for the tests of Pre-screening Step 1, 2 & 3 are excluded progressively from the study; the declaration of informed consent will be destroyed
- Allows to compute the Body Mass Index (BMI), obese people are excluded (BMI > 30), as obesity impacts on brain (shrinkage) [13]
- Adapted to Switzerland and France
- Cognitive reserve is the resilience to neuro-pathological damage in older adults [14].
- The COGTEL test provides a global measure of cognitive function, it comprises 6 subtests covering prospective memory, short- and long-term verbal memory, working memory (digit span), verbal fluency and inductive reasoning.
- The first stage of the International Matrix Test (Oldenburg) assesses intelligibility and understanding of speech and allows to check for major hearing impairment

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