Title
Physical activity and cognitive function in mild cognitive impairment

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Table S1. Correlation of cognitive function with age and education

| Cognitive function                          | Age (years) | Education (years) |
|---------------------------------------------|-------------|-------------------|
| **Memory task**                             |             |                   |
| CASI-Short-term memory                      | -0.125      | 0.194             |
| CVVLT-30 sec (immediate free recalls)       | -0.166      | 0.166             |
| CVVLT-10 min (delayed free recalls)         | -0.109      | -0.013            |
| CVVLT-cued (memory in cued response)        | -0.176      | 0.131             |
| **Abstract reasoning**                      |             |                   |
| CASI-Abstraction                            | -0.230      | 0.501*            |
| FAB-Similarity (conceptualization)          | -0.206      | 0.587*            |
| **Attention**                               |             |                   |
| CASI-Concentration                         | -0.302*     | 0.526*            |
| CASI-Attention                              | -0.138      | 0.217             |
| Digital Forward Span                        | -0.236      | 0.537*            |
| **Executive task scores**                   |             |                   |
| TMB (corrected)                             | -0.101      | 0.269             |
| Stroop interference test                    | -0.221      | 0.179             |
| Calculation                                 | -0.223      | 0.462*            |
| **Visuospatial task scores**                |             |                   |
| VOSP                                        | -0.121      | 0.029             |
| Modified ROCF copy                          | -0.112      | 0.349*            |
| CASI-Visual construction                    | -0.094      | 0.272*            |
| **Language ability**                        |             |                   |
| Boston naming test                          | -0.096      | 0.661*            |
| CASI-Language ability                       | -0.279*     | 0.543*            |
| **Semantic category fluency**               |             |                   |
| CASI-List-generating                       | -0.265      | 0.373*            |
| Animal naming                               | -0.343*     | 0.455*            |
| Fruit naming                                | -0.273*     | 0.190             |
| Transportation naming                       | -0.106      | 0.299*            |
| Town naming                                 | -0.301      | 0.429*            |

Data present as ρ coefficient. * p < 0.05; CASI, Cognitive Abilities Screening Instrument; CVVLT, Chinese version of the Verbal Learning Test (CVVLT-30 sec: free recall after 30 seconds; CVVLT-10 min: free recall after 10 minutes);
FAB-Similarities, similarities (conceptualization) in frontal assessment battery; ROCF, Rey-Osterrieth complex figure; TMB, Trail Making Test B; VOSP, visual object and space perception.
Table S2. Correlation between each measure of activity and each cognitive score

|                                | Direct Correlation between Each Cognitive Score and Each Measure of Activity | Correlation Analysis after Controlling for Age and Sex | Correlation Analysis after Controlling for Age, Sex, and Education |
|--------------------------------|--------------------------------------------------------------------------------|--------------------------------------------------------|------------------------------------------------------------------|
|                                | A   | B   | C   | A   | B   | C   | A   | B   | C   |
| **Memory tasks**               |     |     |     |     |     |     |     |     |     |
| CASI-Short-term memory         | 0.289, 0.260, 0.231, 0.034, 0.058, 0.093 | 0.087, 0.065, 0.061, 0.559, 0.664, 0.685 | 0.093, 0.070, 0.066, 0.540, 0.644, 0.665 |
| CVVLT-30 sec                   | 0.183, 0.155, 0.130, 0.186, 0.264, 0.351 | 0.186, 0.119, 0.143, 0.210, 0.425, 0.338 | 0.166, 0.097, 0.122, 0.271, 0.523, 0.421 |
| CVVLT-10 min                   | 0.236, 0.191, 0.194, 0.085, 0.167, 0.159 | 0.253, 0.182, 0.216, 0.086, 0.220, 0.145 | 0.268, 0.196, 0.230, 0.072, 0.192, 0.124 |
| CVVLT-cued                     | 0.163, 0.123, 0.121, 0.238, 0.375, 0.382 | 0.166, 0.105, 0.122, 0.264, 0.484, 0.412 | 0.161, 0.099, 0.117, 0.284, 0.515, 0.439 |
| **Abstract reasoning**         |     |     |     |     |     |     |     |     |     |
| CASI-Abstraction               | 0.252, 0.225, 0.292, 0.066, 0.101, 0.032 | 0.212, 0.118, 0.204, 0.153, 0.428, 0.168 | 0.162, 0.060, 0.155, 0.283, 0.694, 0.304 |
| FAB-Similarity                 | 0.182, 0.181, 0.220, 0.188, 0.190, 0.110 | 0.137, 0.082, 0.103, 0.358, 0.583, 0.491 | 0.059, -0.006, 0.021, 0.698, 0.968, 0.890 |
| **Attention**                  |     |     |     |     |     |     |     |     |
| CASI-Concentration             | 0.161, 0.132, 0.236, 0.246, 0.342, 0.085 | 0.145, 0.070, 0.142, 0.330, 0.641, 0.342 | 0.100, 0.019, 0.097, 0.510, 0.899, 0.521 |
| CASI-Attention                 | 0.238, 0.293, 0.296, 0.083, 0.032, 0.030 | 0.286, 0.322, 0.254, 0.051, 0.027, 0.085 | 0.264, 0.301, 0.232, 0.076, 0.042, 0.121 |
| Digital Forward Span           | -0.023, -0.031, 0.069, 0.870, 0.824, 0.622 | -0.079, -0.133, -0.040, 0.599, 0.373, 0.789 | -0.153, -0.213, -0.110, 0.310, 0.156, 0.467 |
| **Executive task scores**      |     |     |     |     |     |     |     |     |
| TMB (corrected)                | 0.327, 0.330, 0.379, 0.021, 0.019, 0.007 | 0.216, 0.224, 0.307, 0.145, 0.130, 0.036 | 0.197, 0.205, 0.291, 0.189, 0.172, 0.050 |
| Stroop interference test       | 0.230, 0.199, 0.177, 0.109, 0.166, 0.220 | 0.181, 0.089, 0.067, 0.224, 0.554, 0.655 | 0.162, 0.068, 0.046, 0.281, 0.654, 0.760 |
| Calculation                    | 0.045, 0.028, 0.109, 0.744, 0.842, 0.433 | 0.144, 0.075, 0.104, 0.334, 0.616, 0.485 | 0.104, 0.031, 0.063, 0.494, 0.840, 0.679 |
| **Visuospatial task scores**   |     |     |     |     |     |     |     |
| VOSP                           | -0.102, -0.092, -0.130, 0.465, 0.507, 0.349 | -0.069, -0.076, -0.199, 0.644, 0.612, 0.179 | -0.045, -0.052, -0.179, 0.764, 0.731, 0.233 |
|                           | Modified ROCF copy | CASI-Visual construction | Language ability | Semantic category fluency |
|---------------------------|--------------------|--------------------------|------------------|--------------------------|
|                           | 0.139, 0.170, 0.194, 0.318 | 0.253, 0.259, 0.225, 0.065 | 0.253, 0.259, 0.225, 0.065 | 0.253, 0.259, 0.225, 0.065 |
|                           | 0.170, 0.219 0.159 | 0.318 0.219 0.159 | 0.065 0.059 0.102 | 0.253, 0.259, 0.225, 0.065 |
|                           | 0.194, 0.261, 0.077, 0.015 | 0.253, 0.344, 0.181, 0.011 | 0.253, 0.344, 0.181, 0.011 | 0.253, 0.344, 0.181, 0.011 |
|                           | 0.261, 0.239, 0.276, 0.085 | 0.335, 0.325, 0.350, 0.023 | 0.335, 0.325, 0.350, 0.023 | 0.335, 0.325, 0.350, 0.023 |
|                           | 0.027, 0.272, 0.068 | 0.350, 0.017, 0.017, 0.023 | 0.350, 0.017, 0.023, 0.023 | 0.350, 0.017, 0.023, 0.023 |

### Language ability

|                           | Boston naming test | CASI-Language ability | Animal naming | Fruit naming |
|---------------------------|--------------------|-----------------------|---------------|--------------|
|                           | 0.113, 0.092, 0.127, 0.414 | 0.079, 0.061, 0.129, 0.569 | 0.429, 0.395, 0.475, 0.001 | 0.329, 0.298, 0.311, 0.015 |
|                           | 0.001, 0.002, -0.011, 0.992 | 0.075, 0.047, 0.048, 0.616 | 0.352, 0.301, 0.375, 0.015 | 0.318, 0.281, 0.306, 0.029 |
|                           | -0.093, -0.090, -0.103, 0.941 | 0.023, -0.008, -0.005, 0.881 | 0.273, 0.273, 0.350, 0.027 | 0.273, 0.254, 0.282, 0.027 |
|                           | 0.537 0.552 0.497 | 0.027 0.067 0.017 | 0.326, 0.273, 0.350, 0.027 | 0.273, 0.254, 0.282, 0.027 |
|                           | 0.069 0.038 0.028 | 0.029 0.056 0.036 | 0.326, 0.273, 0.350, 0.027 | 0.273, 0.254, 0.282, 0.027 |
|                           | 0.128, 0.040, 0.153, 0.395 | 0.273, 0.254, 0.282, 0.067 | 0.326, 0.273, 0.350, 0.027 | 0.273, 0.254, 0.282, 0.067 |
|                           | 0.792 0.309 | 0.273, 0.254, 0.282, 0.067 | 0.326, 0.273, 0.350, 0.027 | 0.273, 0.254, 0.282, 0.067 |

### Semantic category fluency

|                           | CASI-List-generating | Animal naming | Fruit naming | Transportation naming |
|---------------------------|----------------------|---------------|--------------|-----------------------|
|                           | 0.212, 0.219, 0.239, 0.169 | 0.429, 0.395, 0.475, 0.001 | 0.329, 0.298, 0.311, 0.015 | 0.332, 0.323, 0.357, 0.014 |
|                           | 0.124 0.112 0.081 | 0.352, 0.301, 0.375, 0.015 | 0.318, 0.281, 0.306, 0.029 | 0.262, 0.287, 0.281, 0.029 |
|                           | 0.255 0.564 0.195 | 0.015 0.040 0.009 | 0.029 0.056 0.036 | 0.075 0.050 0.056 |
|                           | 0.128 0.040 0.153, 0.395 | 0.326, 0.273, 0.350, 0.027 | 0.273, 0.254, 0.282, 0.067 | 0.257, 0.284, 0.285, 0.085 |
|                           | 0.792 0.309 | 0.273, 0.254, 0.282, 0.067 | 0.326, 0.273, 0.350, 0.027 | 0.257, 0.284, 0.285, 0.085 |
|                           | 0.069 0.038 0.028 | 0.273, 0.254, 0.282, 0.067 | 0.326, 0.273, 0.350, 0.027 | 0.257, 0.284, 0.285, 0.085 |

|                           | 0.202, 0.219, 0.239, 0.169 | 0.429, 0.395, 0.475, 0.001 | 0.329, 0.298, 0.311, 0.015 | 0.332, 0.323, 0.357, 0.014 |
|                           | 0.124 0.112 0.081 | 0.352, 0.301, 0.375, 0.015 | 0.318, 0.281, 0.306, 0.029 | 0.262, 0.287, 0.281, 0.029 |
|                           | 0.255 0.564 0.195 | 0.015 0.040 0.009 | 0.029 0.056 0.036 | 0.075 0.050 0.056 |
|                           | 0.128 0.040 0.153, 0.395 | 0.326, 0.273, 0.350, 0.027 | 0.273, 0.254, 0.282, 0.067 | 0.257, 0.284, 0.285, 0.085 |
|                           | 0.792 0.309 | 0.273, 0.254, 0.282, 0.067 | 0.326, 0.273, 0.350, 0.027 | 0.257, 0.284, 0.285, 0.085 |
|                           | 0.069 0.038 0.028 | 0.273, 0.254, 0.282, 0.067 | 0.326, 0.273, 0.350, 0.027 | 0.257, 0.284, 0.285, 0.085 |

Data present as (ρ, p). A: average step counts per day of 7-day activity; B: average distance (kilometers) per day of 7-day activity; C: average calorie expenditure per day of 7-day activity; CASI, Cognitive Abilities Screening Instrument; CVVLT, Chinese version of the Verbal Learning Test (CVVLT-30 sec: free recall after 30 seconds; CVVLT-10 min: free recall after 10 minutes); FAB-Similarities, similarities (conceptualization) in frontal assessment battery; ROCF, Rey-Osterrieth complex figure; TMB, Trail Making Test B; VOSP, visual object and space perception.
Table S3. Multiple regression between average step counts per day of 7-day activity and cognitive function

| Cognitive function                  | Model 1  \(^a\)  \((R^2 = 0.167)\) | Model 2  \(^b\)  \((R^2 = 0.199)\) |
|-------------------------------------|-------------------------------------|-------------------------------------|
| **Memory tasks**                    |                                     |                                     |
| CASI-Short-term memory              | 0.052                               | 0.085                               |
| CVVLT-30 sec (immediate free recalls)| 0.18                                | 0.196                               |
| CVVLT-10 min (delayed free recalls) | 0.224                               | 0.272                               |
| CVVLT-cued (memory in cued response)| 0.157                               | 0.200                               |
| **Abstract reasoning**              |                                     |                                     |
| CASI-Abstraction                    | 0.099                               | 0.162                               |
| FAB-Similarity (conceptualization)  | 0.036                               | 0.008                               |
| **Attention**                       |                                     |                                     |
| CASI-Concentration                  | -0.005                              | -0.051                              |
| CASI-Attention                      | 0.198                               | 0.200                               |
| Digital Forward Span                | -0.206                              | -0.207                              |
| **Executive task scores**           |                                     |                                     |
| TMB (corrected)                     | 0.180                               | 0.066                               |
| Stroop interference test            | 0.158                               | 0.129                               |
| Calculation                         | -0.030                              | -0.034                              |
| **Visuospatial task scores**        |                                     |                                     |
| VOSP                                | -0.076                              | -0.040                              |
| Modified ROCF copy                  | 0.127                               | 0.030                               |
| CASI-Visual construction            | 0.355*                              | 0.192                               |
| **Language ability**                |                                     |                                     |
| Boston naming test                  | -0.047                              | -0.127                              |
| CASI-Language ability               | -0.040                              | 0.024                               |
| **Semantic category fluency**       |                                     |                                     |
| CASI-List-generating                | 0.132                               | 0.070                               |
| Animal naming                       | 0.262                               | 0.256                               |
| Fruit naming                        | 0.214                               | 0.191                               |
| Transportation naming               | 0.108                               | 0.186                               |
| Town naming                         | 0.211                               | 0.230                               |

\(^a\) Multiple regression controlled for age and gender. Data present as β coefficient.
Multiple regression controlled for age, gender, and education. Data present as β coefficient.

* p < 0.05; CASI, Cognitive Abilities Screening Instrument; CVVLT, Chinese version of the Verbal Learning Test (CVVLT-30 sec: free recall after 30 seconds; CVVLT-10 min: free recall after 10 minutes); FAB-Similarities, similarities (conceptualization) in frontal assessment battery; ROCF, Rey-Osterrieth complex figure; TMB, Trail Making Test B; VOSP, visual object and space perception.
Table S4. Multiple regression between average distance (kilometers) per day of 7-day activity and cognitive function

| Cognitive function                        | Model 1 \(^a\) (\(R^2 = 0.157\)) | Model 2 \(^b\) (\(R^2 = 0.177\)) |
|-------------------------------------------|-----------------------------------|-----------------------------------|
| **Memory tasks**                          |                                   |                                   |
| CASI-Short-term memory                    | 0.029                             | 0.061                             |
| CVVLT-30 sec                              | 0.086                             | 0.119                             |
| (immediate free recalls)                  |                                   |                                   |
| CVVLT-10 min                              | 0.149                             | 0.194                             |
| (delayed free recalls)                    |                                   |                                   |
| CVVLT-cued                                | 0.091                             | 0.129                             |
| (memory in cued response)                 |                                   |                                   |
| **Abstract reasoning**                    |                                   |                                   |
| CASI-Abstraction                          | -0.004                            | 0.053                             |
| FAB-Similarity                            | -0.022                            | -0.057                            |
| (conceptualization)                       |                                   |                                   |
| **Attention**                             |                                   |                                   |
| CASI-Concentration                        | -0.089                            | -0.130                            |
| CASI-Attention                            | 0.241                             | 0.245                             |
| Digital Forward Span                      | -0.262                            | -0.265                            |
| **Executive task scores**                 |                                   |                                   |
| TMB (corrected)                           | 0.189                             | 0.087                             |
| Stroop interference test                  | 0.060                             | 0.030                             |
| Calculation                               | -0.108                            | -0.105                            |
| **Visuospatial task scores**              |                                   |                                   |
| VOSP                                       | -0.082                            | -0.048                            |
| Modified ROCF copy                        | 0.105                             | 0.025                             |
| CASI-Visual construction                  | 0.346*                            | 0.195                             |
| **Language ability**                      |                                   |                                   |
| Boston naming test                        | -0.042                            | -0.120                            |
| CASI-Language ability                     | -0.068                            | -0.008                            |
| **Semantic category fluency**             |                                   |                                   |
| CASI-List-generating                      | 0.043                             | -0.021                            |
| Animal naming                             | 0.206                             | 0.202                             |
| Fruit naming                              | 0.175                             | 0.157                             |
| Transportation naming                     | 0.146                             | 0.221                             |
| Town naming                               | 0.165                             | 0.186                             |

\(^a\) Multiple regression controlled for age and gender. Data present as \(\beta\) coefficient.
Multiple regression controlled for age, gender, and education. Data present as $\beta$ coefficient.

* $p < 0.05$; CASI, Cognitive Abilities Screening Instrument; CVVLT, Chinese version of the Verbal Learning Test (CVVLT-30 sec: free recall after 30 seconds; CVVLT-10 min: free recall after 10 minutes); FAB-Similarities, similarities (conceptualization) in frontal assessment battery; ROCF, Rey-Osterrieth complex figure; TMB, Trail Making Test B; VOSP, visual object and space perception.
Table S5. Multiple regression between average calorie expenditure per day of 7-day activity and cognitive function

| Cognitive function                                      | Model 1 $^a$ (R² = 0.224) | Model 2 $^b$ (R² = 0.232) |
|---------------------------------------------------------|-----------------------------|-----------------------------|
| **Memory tasks**                                        |                             |                             |
| CASI-Short-term memory                                  | -0.098                      | 0.027                       |
| CVVLT-30 sec (immediate free recalls)                    | -0.065                      | 0.095                       |
| CVVLT-10 min (delayed free recalls)                      | 0.092                       | 0.196                       |
| CVVLT-cued (memory in cued response)                     | -0.027                      | 0.106                       |
| **Abstract reasoning**                                  |                             |                             |
| CASI-Abstraction                                        | 0.054                       | 0.046                       |
| FAB-Similarity (conceptualization)                       | -0.010                      | -0.077                      |
| **Attention**                                            |                             |                             |
| CASI-Concentration                                      | 0.021                       | -0.051                      |
| CASI-Attention                                          | 0.211                       | 0.145                       |
| Digital Forward Span                                    | -0.061                      | -0.224                      |
| **Executive task scores**                               |                             |                             |
| TMB (corrected)                                         | 0.213                       | 0.267                       |
| Stroop interference test                                | -0.058                      | 0.021                       |
| Calculation                                             | 0.039                       | -0.117                      |
| **Visuospatial task scores**                            |                             |                             |
| VOSP                                                    | -0.192                      | -0.202                      |
| Modified ROCF copy                                       | 0.259                       | 0.142                       |
| CASI-Visual construction                                | 0.274                       | 0.342*                      |
| **Language ability**                                    |                             |                             |
| Boston naming test                                      | -0.121                      | -0.131                      |
| CASI-Language ability                                   | -0.048                      | -0.116                      |
| **Semantic category fluency**                           |                             |                             |
| CASI-List-generating                                   | 0.017                       | 0.128                       |
| Animal naming                                           | 0.392*                      | 0.267                       |
| Fruit naming                                            | 0.093                       | 0.179                       |
| Transportation naming                                   | 0.157                       | 0.138                       |
| Town naming                                             | 0.084                       | 0.078                       |

$^a$ Multiple regression controlled for age and gender. Data present as β coefficient.
Multiple regression controlled for age, gender, and education. Data present as β coefficient.

* p < 0.05; CASI, Cognitive Abilities Screening Instrument; CVVLT, Chinese version of the Verbal Learning Test (CVVLT-30 sec: free recall after 30 seconds; CVVLT-10 min: free recall after 10 minutes); FAB-Similarities, similarities (conceptualization) in frontal assessment battery; ROCF, Rey-Osterrieth complex figure; TMB, Trail Making Test B; VOSP, visual object and space perception.