## Cognitive Decline of Elders Is Reversible!
## Cognitive Training Improves Older People's Cognitive Function
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As age advances, people are more likely to complain about their cognitive deficit, such as poor memory, concentration, and reasoning. According to the 2006 Population By-census, around 640,000 older people aged 65 or above attained only primary education or below, accounting for 75% of the entire older population in Hong Kong. Research shows that this group of older people is at high risk of cognitive decline and having subjective cognitive complaints, which may further lead to their sense of frustration, a lower level of life satisfaction, or even dementia.

Against this background, Jockey Club Centre for Positive Ageing (JCCPA) and CADENZA: A Jockey Club Initiative for Seniors have jointly designed a 12-week *CogniFitness* training programme (see Table 1) to reduce the rate of cognitive decline of elders, and have launched the first randomized controlled trial to evaluate its short-term and long-term effectiveness on 223 Hong Kong Chinese elderly with subjective memory complaints since 2008.

Older participants were randomly and equally assigned to either receive cognitive training or to attend health educational lectures, both led by a trained occupational therapist. Their baseline characteristics are presented in Table 2. The Chinese version of Mattis Dementia Rating Scale (CDRS) was used to assess their cognitive abilities in five cognitive domains [i.e., attention, initiation/perseveration, construction, reasoning (conceptualization), and memory] at three time points: baseline, immediately after the intervention, and nine months after the intervention. Individuals scoring below the cutoff of 112 on the CDRS are usually classified as having dementia. At baseline, the average CDRS score of all participants in this study was 120 (see Table 2). Previous research suggests that if no intervention is given, the DRS score may drop six to nine points for cognitively normal older adults within one year.

Immediate training gain was calculated by subtracting participants' CDRS score measured at baseline from their score measured immediately after the intervention; while long-term training gain was calculated by subtracting participants' CDRS score measured at baseline from their score measured nine months after the intervention.

### Less-educated Elders Benefited More from *CogniFitness* Training

Since less-educated elders account for the majority of the entire older population in Hong Kong, providing cognitive training to this vulnerable group seems to be an effective early intervention to reduce the risk of dementia.

The immediate training gain and long-term training gain for less-educated elders in the intervention group were 2.7 and 2.8 respectively. And these two values for their

counterparts in the control group were only 0.3 and 1.3 (see Graph 1).

### *CogniFitness* **Improved Elders' Reasoning and Memory Abilities**

Compared with the control group, the participants in the intervention group with lower education levels performed exclusively well in reasoning (conceptualization) (immediate training gain = 2.1; long-term training gain = 2.1) and memory (immediate training gain = 0.7; long-term training gain = 0.3), the cognitive areas that were proximal to the training foci of the *CogniFitness* training. These four values for their counterparts in the control group were -0.2, 0.8, -0.04, and -0.4 (see Graph 2).

Reasoning and memory are essential for elders to live independently. Reasoning allows elders to identify goals and schedule daily activities by themselves and good memory empowers them to remember appointments, recall people's names, help with house chores, and enjoy social life. The resultant improvement in these two areas via cognitive training will facilitate seniors to become more alert and sensitive to their surrounding environment, enabling them to remain cognitively fit for a longer possible period of time.

### Recommendations

- As a non-drug approach to fight against cognitive decline of elders, cognitive training such as *CogniFitness* should be incorporated as part of routine programmes in both community and residential care settings and it should be held at least once per year.

- The content of cognitive training should be customized according to the trainees' education levels.

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**Attachment**

**Table 1: Content of the Cognitive Training Programme** *CogniFitness*

1. Reasoning

    e.g. activity scheduling, goal identification
2. Memory (mnemonic strategies)

    e.g. categorization, organization / association, visualization, method of loci
3. Attention (concentration and processing speed)

    e.g. search for difference, cancellation, substitution

*Note:* The last three lessons are revision class of previous topics

**Table 2: Baseline Characteristics of Participants**

| | Total Sample (N=223) M(S.D.) | Intervention Group (N=111) M(S.D.) | Control Group (N=112) M(S.D.) |
|---|---|---|---|
| Age | 75.4(5.8) | 75.4(5.8) | 75.4(5.8) |
| Gender, N (%) | | | |
| Male | 33(14.8%) | 14(12.6%) | 19(17%) |
| Female | 190(85.2%) | 97(87.4%) | 93(83%) |
| Education level, N (%) | | | |
| No or primary | 176(78.9%) | 90(81.1%) | 86(76.8%) |
| Secondary or above | 47(21.1%) | 21(18.9%) | 26(23.2%) |
| Marital status, N (%) | | | |
| Single | 6(2.7%) | 3(2.7%) | 3(2.7%) |
| Married | 93(41.7%) | 46(41.4%) | 47(42%) |
| Divorce | 15(6.7%) | 8(7.2%) | 7(6.3%) |
| Widow | 109(48.9%) | 54(48.6%) | 55(49.1%) |
| Living condition, N (%) | | | |
| Live alone | 58(26%) | 29(26.1%) | 29(25.9%) |
| Live with others | 165(74%) | 82(73.9%) | 83(74.1%) |
| CMSS | 4.1(0.8) | 4.2(0.9) | 4(0.8) |
| CDRS | 120(11.6) | 118.9(11.6) | 121.1(11.5) |
| Lower education(no or primary) | | 117.1(11.2) | 119.5(11.3) |
| Higher education(secondary or above) | | 127.2(10) | 126.5(10.7) |

*Note:* N= Number of Participants; M = Mean; S.D. = Standard Deviation; CMSS = Chinese Memory Symptoms Score; CMSS $\geq$ 3 indicates having subjective memory complaints.

**Graph 1: Immediate and Long-term Training Gains in CDRS by Intervention/Control Groups with Low Education**
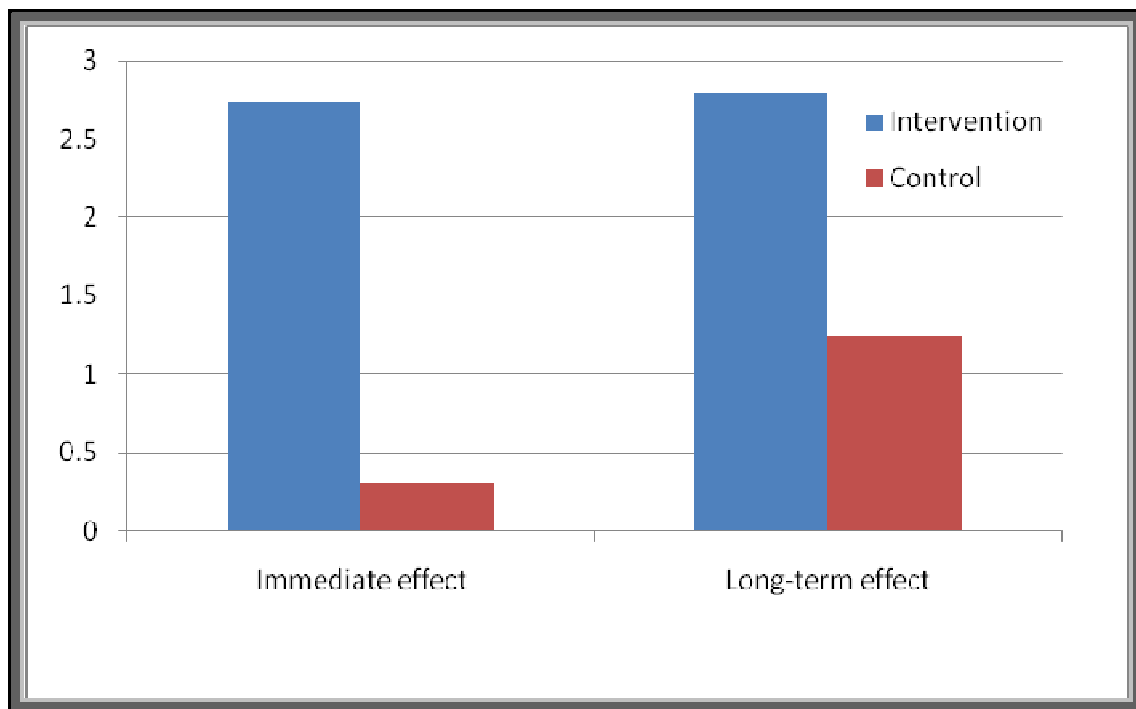


**Graph 2: Immediate and Long-term Training Gains in Reasoning (Conceptualization) and Memory of Intervention/Control Groups with Low Education**
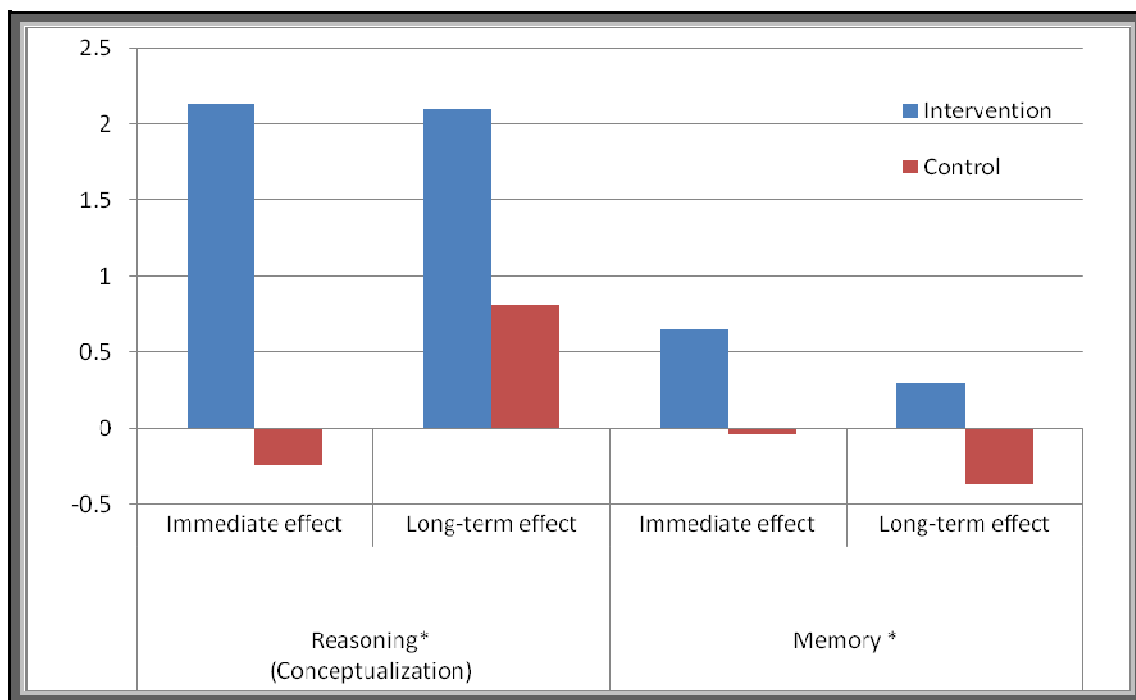


*Note:* * means statistical significance is reached.