Verification of the impact of storage by the rhythm phrase to be repeated

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[**Introduction**]
Alzheimer’s Disease accounts for a high percentage of dementia at over 60%. As dementia incidence doubles every 5 years from 65 years old onwards, developing a countermeasure is an urgent issue [1]. As a countermeasure, the effectiveness of cognitive function training tasks such as dual-task (performing two tasks simultaneously) and n-back task (a delayed recall task for items shown n steps earlier) have been verified. Furthermore, it has been verified that music accompanied with sound or rhythm is stored easily by the memory, but difficult to remember without sound or rhythm. It was hypothesized that combining rhythmic music with repeated memory tasks would improve memory performance. Please refer to Figure 1. It was also predicted that stress associated with memory tasks would be alleviated by the relaxing effect of music. The purpose of this study is to verify a new training method combining rhythmic music and repeated memory tasks. An intervention study was conducted over 3 months, and compared results from the intervention group and the control group.

[**Method**]

Screening test for mild cognitive impairment: Montreal Cognitive Assessment (MoCA test) and; Stress check: Measured α-amylase levels of saliva taken from the sublingual gland. Please refer to Figure 2 and Table 1.

**Target group:** Participants from the elderly population of City Kashihara.

**Period:** April – September 2016

**Intervention:** Once a month, over 3 months Intervention method developed.

**Analysis** was conducted by a corresponding t-test, comparing the control group and intervention group results.

[**Results**]

Among the 108 participants, data of the 79 that participated until the end were analyzed. The average age of the subjects is 75 ± 8.2, with 12 being male and 67 being female. For the cognitive function, the average value of score for each category on the MoCA test and the t-test results are indicated in Figure 3.

The average score in the MoCA test: Please refer to Figure 3 and 4.

For each cognitive item, a significant function improvement was acknowledged in trail making and clock drawing (visual-spatial cognitive ability), verbal fluency (exploration of semantic memory), repetition immediate memory, short-term memory, recall delayed memory, recall repeat, reciprocal number, target detection, subtraction task concentration, attention, memory (p < 0.05).

For total score, before the intervention was 23.4 points (< 26 points), and it did not meet the cut-off value. After the non-intervention control period of 3 month, when measured again, it was 24.7 points (< 26 points), though with a slight increase in the total score, there was not much changed in each cognitive category. After the intervention, the average total score was 25.8 points (< 26 points), it increased to a score significantly closer to the cut-off value.

Next, for α-amylase of the stress measurement results, in the correlation between psychological stress and cognitive abilities, correlation has been observed; the higher saliva amylase that reflects mental stress was, the lower the cognitive ability was (Pearson’s product-moment correlation coefficient, r = -0.25). Subsequently as for the results of measuring stress (α-amylase), the control group did not show any significant change, while the intervention group showed a significant decrease in negative stress from 47.88 (before the intervention) to 40.51 (after the intervention) on average (p < 0.01). Please refer to Figure 5.

[**Discussion**]

The method developed in this study combines brain training with music therapy. It is a technique called “Ostinato” that repeats a short phrase and choreography multiple times. There is a characteristic that phrases can be easily reproduced. As it has a trait which makes it easy retain and recall, it is easy to recall during memory and recall tasks when incorporated into these activities. Music can also help recollecting memories and through this, recalling memory and emotional activity can both be anticipated [2,3]. A synergistic effect can be expected when the hippocampus is stimulated through recollection through music as well.

[**Conclusion**]

Repeated memory tasks combined with rhythmic music were effective both in improving memory capacity and reducing stress.