Brain Training Using a Robot and Familiar Music

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Introduction

The purpose of this study was to use familiar music for brain training to verify the effect of using music therapy with robot therapy. We investigated whether cognitive ability would increase by implementing a method combining brain-training tasks with dance using familiar music. Cognitive abilities were significantly improved through listening to familiar music, and the goal was then to incorporate Bon Festival dance in the robot so that it could dance with the elderly. Bon Festival dance is a folk dance performed in the evenings in the community units of various parts of Japan during the Bon season, usually in August. This music is the most well-known among the elderly.

Results

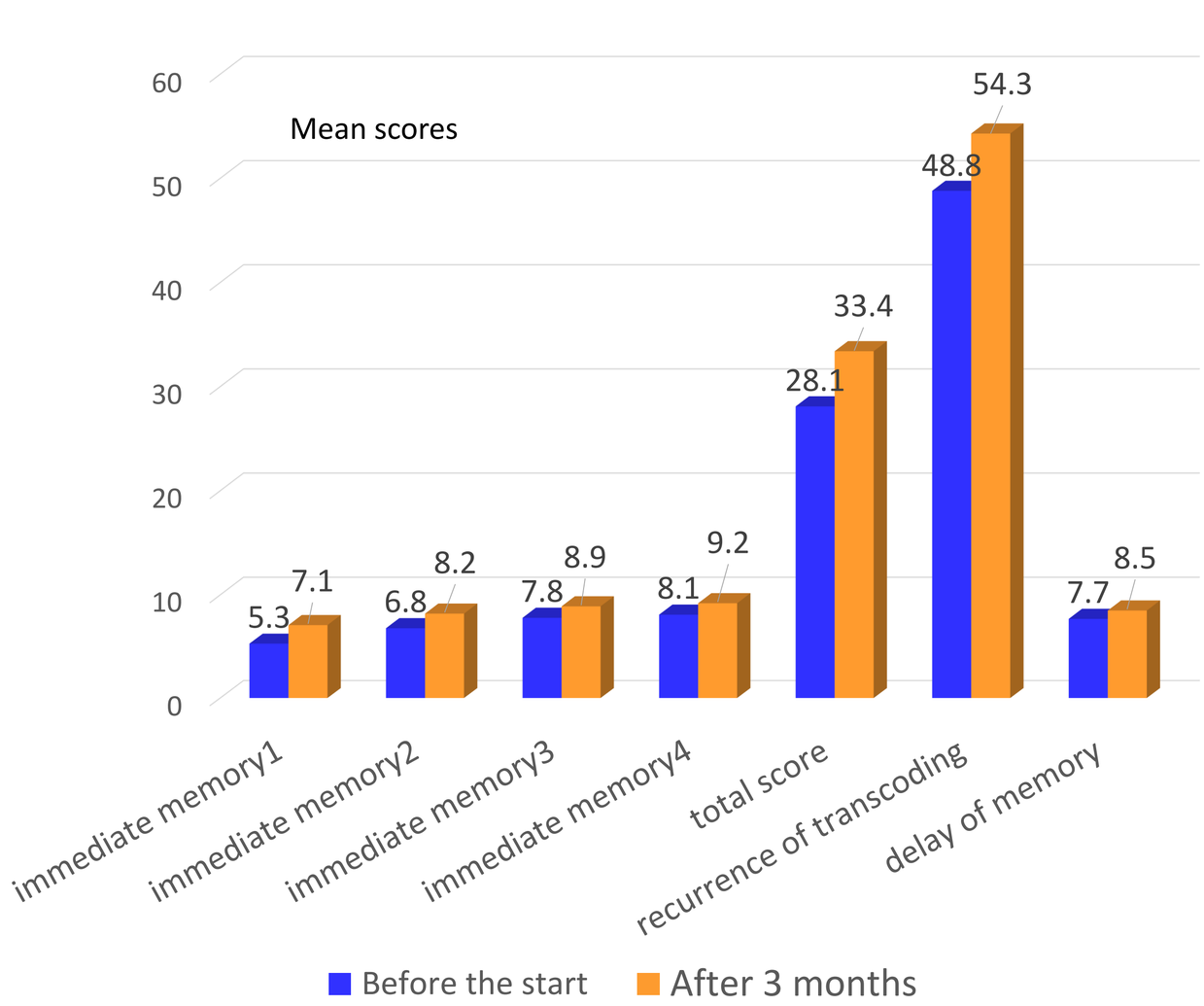

Figure 1. Comparison before and after the music therapy
paired t-test p<0.05

Figure 3. Explanation of effect of music therapy by robot

Methods

For comparison before and after the intervention, a cognitive ability test was used. A ten-word memory test measured immediate reproduction and delayed reproduction. A code conversion test and word recall test were also used. Next, α-amylase levels of saliva taken from the sublingual gland were measured to measure distress. About this, sympathetic nerve activity is reflected, unpleasant stimulation causes levels to rise and pleasant stimulation causes it to decrease.

Results

The brain training dance continued once a month for three months, and cognitive tests were conducted before and after. Data of 112 people were analyzed. The score of the cognitive test items (immediate memory, delay of memory, recurrence of transcoding) was analyzed by a paired t test and showed significant improvement after therapy ($p<0.05$). Next, for α-amylase of the stress measurement results, showed a significant decrease in negative stress from 72.8 (before the intervention) to 41.9 (after the intervention) on average ($p < 0.01$).

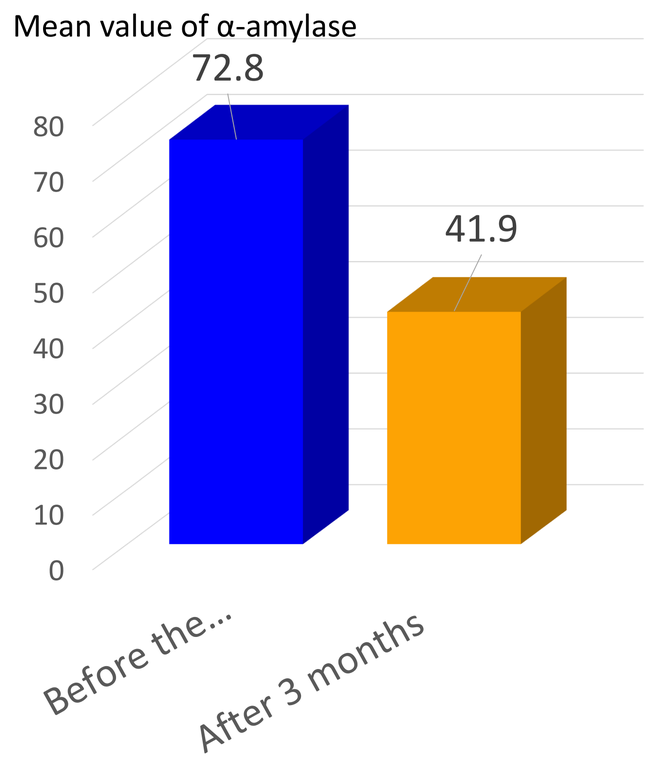

Figure 2. Before and after comparison of sublingual salivary α- amylase: Paired T-test
p<0.05

Figure 4. Brain training dance by robot

Discussion and Conclusion

The brain-training dance to familiar music improved cognitive ability and, based on this result, we incorporated brain-training tasks and Bon Festival dance into the robot. By dancing the brain-training dance along with the robot, both improved cognitive ability and exercise capacity, and reducing stress can be expected.

Acknowledgments

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