ORIGINAL ARTICLE

The Effect of Super Brain Yoga on Concentration, Memory, and Academic Progress in Nursing Students: A Quasi-Experimental Study

Pouran Varvani Farahani[1], PhD candidate; Candan Ozturk[2], PhD; Abimbola Carew[2], BSN

[1]Department of Nursing, Faculty of Health Science, Cyprus International University, Lefkoşa, Turkey;
[2]Department of Pediatric Nursing, Faculty of Nursing, Near East University, Lefkoşa / KKTC, Mersin 10, Türkiye

Corresponding Author:
Pouran Varvani Farahani, PhD candidate; Department of Nursing, Faculty of Health Science, Cyprus International University, P.O. Box: PK: 99138, Lefkoşa / KKTC, Mersin 10, Türkiye
Tel/Fax: +90 392 6711111 (EXT: 2295); Email: pfarahani@ciu.edu.tr

ABSTRACT

Background: During university life, students often face significant changes in relationships and academic pressures. Given the stressors faced by nursing students and the importance of their academic success, the study aimed to assess the impact of Super Brain Yoga on nursing students' concentration, memory, and academic progress.

Methods: This quasi-experimental study was conducted on 59 nursing students at Near East University in Cyprus from February to June 2023. The intervention group (N=29) performed Super Brain Yoga three times a week for two months, while the control group (N=30) continued the usual routines. Data were collected using the demographic questionnaire, Wechsler's memory test, Concentration test, and the semester grade point average. Data analysis was performed using independent and paired t-test, chi-square, and ANCOVA using SPSS software version 26, with a significance level of $P<0.05$.

Results: The study revealed a significant difference in total memory scores ($P<0.001$) and its subscales including personal and public information ($P<0.001$), orientation ($P<0.001$), mental control ($P<0.001$), logical memory ($P=0.002$), repeating numbers ($P<0.001$), visual memory ($P<0.001$), and learning associations ($P=0.003$) between the experimental and control groups after the intervention. Findings revealed a significant difference between the two groups in the reaction time ($P=0.003$) and the error of the reverse counting ($P=0.021$) following the intervention. After the intervention, based on ANCOVA test with adjusting the baseline values, there was no statistically significant difference in the semester mean of Grade Point Average between the two groups (95% confidence interval, $P=0.657$)

Conclusion: Super Brain Yoga is a non-invasive intervention that can improve memory, concentration, and cognitive abilities in nursing students.

Keywords: Academic performance, Brain, Memory, Nursing, Yoga

INTRODUCTION

Nursing students play a crucial role in society as future healthcare providers, and it is essential to protect their mental health and support their academic progress. Entering university is a delicate period for young adults, often accompanied by significant changes in interpersonal relationships and living environments. These changes can lead to stress and anxiety, impacting their academic performance and overall well-being.[1, 2] Factors contributing to mental discomfort among students include lack of familiarity with the university environment, separation from family, lack of interest in the field of study, and difficulties adjusting to new living conditions.[3] Attention to students' academic progress is critical as they are at the core of the educational process. Both university officials and students prioritize preventing academic decline, which is often linked to mental health issues.[4] Effective learning is influenced by various psychological elements such as intelligence, memory, concentration, and personality type.[5] Enhancing concentration is particularly important as it helps to process information more efficiently and improve academic outcomes.[6]

Yoga, particularly Super Brain Yoga, has emerged as a promising complementary therapy for improving mental health and cognitive function.[7, 8] It is known to reduce anxiety, promote relaxation, and improve physical and mental stability.[9, 10] Super Brain Yoga, an ancient form of yoga, promotes overall health and well-being through ear acupuncture and subtle energy movement in the body.[11] It nourishes the brain by directing energy from the lower body to the upper centers, enhancing thought, attention, and coordination of the brain's alpha waves.[12] This practice boosts intelligence and inventiveness, making the brain function more efficient. As a non-invasive, cost-effective therapy, it does not require specialized technology or specific conditions, thereby preserving the patient's independence.[13, 14] Previous studies have explored various benefits of yoga on cognitive functions, but there is limited research specifically on the effects of Super Brain Yoga on nursing students' concentration, memory, and academic performance. For instance, some studies on college students revealed significant improvements in physiological and psychological factors, such as aggressiveness, heart rate, and anxiety levels, following Super Brain Yoga practice.[15, 16] Similarly, another study demonstrated enhancement in brainwave balance and short-term memory among participants.[17] The existing studies often lack a focus on this demographic and do not thoroughly investigate the potential academic benefits. Nursing education presents distinct challenges compared to other medical and non-medical science disciplines. The multifaceted nature of nursing practice demands not only academic prowess but also exceptional cognitive abilities, including sharp concentration and reliable memory recall.[18, 19] Nursing students often navigate complex clinical environments where split-second decisions can have life-altering consequences. Given the unique stressors faced by nursing students and the importance of their academic success, it is essential to explore interventions that could support their mental health and academic achievements. For this reason, this study aimed to assess how Super Brain Yoga affects nursing students' concentration, memory, and academic development.

MATERIALS AND METHODS

This is a quasi-experimental study conducted from February to June 2023 in the nursing department of Near East University, located in Northern Cyprus. Near East University is a prominent institution known for its comprehensive nursing program, which spans four years and combines rigorous academic coursework with extensive clinical training. Nursing education at Near East University includes theoretical classes, practical laboratory sessions, and clinical rotations in various healthcare settings, ensuring that students develop the necessary skills and knowledge

for their professional careers. Out of the 100 available nursing students, we selected a sample of 60 students using convenience sampling. All 60 students included in the study met the specified eligibility criteria.

The samples were chosen based on the inclusion criteria: having informed consent for participation, being currently busy with study in the nursing program, not having a history of recognized physical or mental illness (e.g., conditions that would prevent participation in physical exercise), not using sleeping aids or antidepressants in the six months before the study, not smoking or using drugs currently. The exclusion criteria were being unwilling to participate in the study and performing exercises less than three times a week during the two months for the intervention group participants.

The samples were divided into two groups of intervention and control groups. The statistician and the researcher (A.C.) who collected the data were blind to the group allocation. To determine the sample size based on the findings of a similar study[20] and the mean comparison formula, the first type error level was 0.05, the power of the test was 80%, and with
(S_1=0.89, S_2=0.77, μ_1=22.13, μ_2=21.53)
the sample size in each group was 30 people.

$$n = \frac{(z_{1-\frac{\alpha}{2}} + z_{1-\beta})^2 (s_1{}^2 + s_2{}^2)}{d^2}$$

During the process, one participant from the intervention group dropped out during the fifth week of the intervention due to health issues. Consequently, the final sample size was 59 participants (29 in the intervention group and 30 in the control group).

Super Brain Yoga, a form of yoga known for its potential cognitive benefits, was chosen as the intervention method due to its accessibility and simplicity. Nursing students who met the eligibility criteria were invited to participate in the study. The invitation included the explanation of the study goals

and procedures, ensuring transparency and informed consent from all participants. Upon written informed consent was obtained, the experimental group underwent Super Brain Yoga training, and the control group, did not receive any intervention. To prevent data contamination, the researcher first filled out the questionnaire for the control group and then for the intervention group. The questionnaires were distributed and collected by another research assistant (A.C.) who was not involved in the participants' recruitment or the intervention delivery. The questionnaires were completed before the intervention and at the end of the two months after the start of the intervention. During the intervention, another researcher)P.VF.), who has training experience in this style of yoga, trained the participants in Super Brain Yoga both theoretically and practically in person. In the training session, all 30 students in the intervention group received their training in a single initial session. The session was conducted in a designated room at the nursing school, providing a consistent and distraction-free environment. After the initial training session, students were instructed to continue practicing Super Brain Yoga at home for two months. They were required to practice at least three times a week, for two minutes each session. We specified that the students practice Super Brain Yoga every other day, specifically on Mondays, Wednesdays, and Fridays. To ensure adherence to the practice schedule, the researcher contacted the students through a WhatsApp group to check if they were consistently practicing the yoga routines. The following actions were included in every session of the Super Brain Yoga instruction:

1. Face east; 2. Place your tongue against the roof of your mouth; 3. Lightly press the left thumb and index finger against the right earlobe. 4. Pinch the left earlobe with the right hand's thumb and index finger; 5. Put the left hand inside and the right hand outside; 6. while sitting, simultaneously inhale; 7. While standing, simultaneously exhale; and 8. Repeat the previous step fourteen times.

Performing all seven steps was considered as a single round of Super Brain Yoga. Each round lasted approximately 2 minutes. Women in the menstrual cycle avoided this practice.[12, 14]

Demographic Data Questionnaire: This part of the questionnaire collected demographic information about the students, including age, gender, marital status, and educational background. This section was completed by the researcher to ensure consistency and accuracy. Wechsler Memory Scale (WMS-IV) was used to assess memory function. This scale includes 7 subscales with their scorings including: Personal and public information (6 questions) with score=6, orientation (5 questions) with score=5, Mental control (3 tasks scored on time and accuracy, including counting backward, naming months, and skip counting) with a score of 6, Logical memory (2 text passages with 23 recall points each, assessing the participant's ability to remember logical sequences) with a score of 23, and Repeating numbers (10 sets of digits, scored on the ability to recall sequences both forwards and backward. The forward recall is scored up to 8 points, and the reverse recall is scored up to 7 points with a score of 15, visual memory (This subscale involves 3 cards, each contributing to the total score. Card A is scored with 3 marks, Card B with 5 marks, and Card C with 6 marks. This scoring system reflects the varying levels of detail required to be recalled from each card.) with a score of 14, and Learning associations (21 pairs of associations, evaluating the participant's ability to learn and recall paired items) with a score of 21. The scale takes approximately 20 minutes to complete. Each subscale is scored separately, and the scores are then combined to give a comprehensive assessment of memory function. These subscales are combined to provide a maximum score of 90, with higher overall scores indicating better overall memory function. The validity and reliability of this measure have been demonstrated in numerous studies conducted across multiple nations. [21-24] Lee conducted a project to validate this tool in 2023, obtaining the internal consistency coefficient of 0.82–0.85.[25] The WMS-IV is widely used and has been validated in various cultural contexts. In 1955, David Wechsler created the first version of the WAIS. It underwent several changes and enhancements.[26] WAIS-IV is an extensive clinical tool for evaluating the cognitive capacities of older adolescents and adults.[27]

The concentration test used was the Reverse Counting Test. This test assesses the participant's ability to concentrate by having them count backward from 100 by sevens. Participants are instructed to count backward from 100 by sevens (i.e., 100, 93, 86, 79, etc.). They continue this sequence until they either make an error or are unable to proceed. The Reverse Counting Test scores are determined based on two primary factors: accuracy and speed. Participants who accurately subtract 7 fewer times (e.g., 100, 93, 86, 79, 72, 65, 58, 51, 44, 37) with minimal errors are considered to have high concentration. This test is a common component of psychiatric assessments and has been found reliable in measuring concentration and attention.

Academic performance was assessed using the students' semester Grade Point Average (GPA). The GPA data were obtained directly from the nursing school education department to ensure accuracy and reliability. GPA was measured on a 4.0 scale, where higher scores indicate better academic performance. High GPA (3.5-4.0) indicates strong academic performance, probable significant improvement, or consistently high achievement. Moderate GPA (2.5-3.4) suggests average to good performance, with potential room for improvement. Low GPA (Below 2.5) Reflects below-average performance, possibly requiring additional support or changes in academic strategies. The academic progress indicator was also reviewed at the end of the semester. The average index of the previous semester grade point average was used to assess the students' academic performance, and the average grade point average for the current semester was considered as a measure of academic advancement.

The normality of the data was assessed using the Kolmogorov-Smirnov test. After confirming normal distribution, descriptive statistics, Chi-square test, paired and independent t-tests, and ANCOVA were employed for data analysis using SPSS version 26. A significance level of P<0.05 was applied to determine statistical significance.

The project code that was adopted and the Council of Ethics code of ethics by the Near East University Ethics Review Board (approval number NUE/2023/110-1688) were incorporated into this work. The study was carried out following the Declaration of Helsinki principles.[28] Moreover, signed written informed consent was obtained from experimental and control groups. Subjects were assured that their data would remain confidential and their privacy will be respected without any unfavourable effects. The project units were assured that doing this yoga has no negative effects. The goals and benefits of the initiative were presented to the authorities, who also had access to the results upon request. If they agreed, the control group received super brain yoga training after the study period to ensure they also benefited from the intervention.

Results

The mean age of the participants in the experimental group was 22.2±3.8 years, while in the control group, it was 23.5±3.7 years. In both groups, a higher percentage of participants were female (79.3% in the experimental group and 76.7% in the control group), and most of the individuals were single (96.5% in the experimental group and 93.3% in the control group). There were no significant differences in education level, marital status, or age between the two groups (P>0.05) (Table 1).

According to the independent t-test results, there was no significant difference in the total mean score of memory and its subscales between the two groups before the intervention (P>0.05). In the experimental group, comparison of total mean score of memory and all subscales showed a statistically significant difference between before and after the intervention (P<0.05). There was no difference in the control group's total mean score of memory and its subscales before and after the intervention (P>0.05) (Table 2).

There was no significant difference between the two groups in the reaction time before the intervention (P=0.539); also, it was not significant for the error on the reverse counting before the intervention (P=0.709). Findings revealed a significant difference between the two groups in the reaction time and the error of the reverse counting following the intervention (P<0.05). In the experimental group, the mean time of reaction (P=0.004) and the error on the reverse counting (P<0.001) were significant differences between before and after the intervention (Table 3).

There was a statistically significant difference in the semester GPA between the two groups before the intervention (P=0.022). After the intervention, based on the ANCOVA

Table 1: Comparison of sociodemographic characteristics between the experimental and control groups

Variable	Experimental group (n=29) N (%)	Control group (n=30) N (%)	P value
Marital status			0.574*
Single	28 (96.5)	28 (93.3)	
Married	1 (3.5)	2 (6.7)	
Sex			0.807*
Male	6 (20.7)	7 (23.3)	
Female	23 (79.3)	23 (76.7)	
Educational Level			0.695*
3rd Year, 5th Semester	4 (13.8)	3 (10.0)	
3rd Year, 6th Semester	25 (86.2)	27 (90.0)	
Age (year) (Mean±SD)	22.2±3.8	23.5±3.7	0.197**

*Chi square; **Independent t-test

Table 2: Comparison of participants' total and subscales score of Wechsler's Memory Scale in the experimental and control groups

Wechsler's Memory subscales	Groups	Before intervention (Mean±SD)	After intervention (Mean±SD)	P value*
Personal and public information	Experimental	4.5±0.7	5.8±0.4	<0.001
	Control	4.6±0.8	4.7±0.9	0.520
	P value**	0.654	<0.001	
Orientation	Experimental	3.9±0.5	4.8±0.3	<0.001
	Control	4.0±0.6	4.1±0.7	0.490
	P value**	0.610	<0.001	
Mental control	Experimental	5.2±1.1	6.4±0.6	<0.001
	Control	5.2±0.8	5.1±1.7	0.717
	P value**	0.450	<0.001	
Logical memory	Experimental	9.2±3.8	12.1±3.8	<0.001
	Control	9.9±4.0	9.3±2.8	0.445
	P value**	0.388	0.002	
Repeating numbers	Experimental	11.5±2.6	13.1±2.4	<0.001
	Control	10.7±2.0	10.8±2.1	0.501
	P value**	0.214	<0.001	
Visual memory	Experimental	11.1±1.8	13.0±1.5	<0.001
	Control	10.8±2.3	10.9±2.5	0.879
	P value**	0.760	<0.001	
Learning associations	Experimental	13.0±3.8	16.3±3.5	<0.001
	Control	13.9±3.5	13.9±3.3	0.974
	P value**	0.125	0.003	
Total score	Experimental	50.6±8.1	61.8±8.4	<0.001
	Control	50.5±7.7	51.2±6.6	0.623
	P value**	0.344	<0.001	

*Paired t-test; **Independent t-test

Table 3: Comparison of participants' concentration test (reaction time and error on reverse counting) and academic progress scores (grade point average) in the experimental and control groups

Variables	Group	Mean±SD		P value*
		Pretest	Post test	
Concentration (Reaction time/ Minute)	Experimental	02:23±02:1	00:5±00:5	0.004
	Control	02:02±01:2	02:00±01:2	0.477
	P value**	0.539	0.003	
Concentration (Amount of errors on reverse counting)	Experimental	2.1±1.6	0.9±1.4	<0.001
	Control	1.8±1.7	1.9±1.6	0.415
	P value**	0.709	0.021	
Academic progress	Experimental	1.9±1.3	2.1±1.3	0.208
	Control	2.7±1.1	2.3±1.1	0.007
	P value	0.022**	0.657***	

*Paired t-test; **Independent t-test; ***ANCOVA

test with adjusting the baseline values, there was no statistically significant difference in the semester mean score of GPAs between the two groups (95% confidence interval, P=0.657) (Table 3).

DISCUSSION

The aim of this study was to evaluate the effects of Super Brain Yoga on nursing students' concentration, memory, and academic development. The findings of the study shed important light on the implications and possible advantages of including Super Brain Yoga in nursing students' daily routines. First and foremost, our study revealed that Super Brain Yoga had a significant positive effect on the memory of nursing students. While there was

no significant difference in memory between the experimental and control groups before the intervention, we observed a noteworthy improvement in memory among the participants who practiced Super Brain Yoga. This finding suggests that the practice of Super Brain Yoga may offer a practical and accessible way to enhance memory among nursing students. Our findings are consistent with those of a study that demonstrated that performing Super Brain Yoga could enhance short-term memory and the balancing index.[17]

Moreover, results showed significant improvements in specific memory-related subscales, such as Personal and public information, Orientation, mental control, logical memory, repeating numbers, visual memory, and learning associations, within the experimental group. These improvements further reinforce the idea that Super Brain Yoga can be a targeted approach to addressing cognitive functions important for academic success in nursing education. The same outcomes were obtained in a clinical trial study which indicated that the elderly's cognitive health could be enhanced by Super Brain Yoga exercise, and in those with mild cognitive impairment, it could help avoid Alzheimer's disease.[20] The findings of the other research showed that practicing the Super Brain Yoga exercise improved the slow readers' reading comprehension abilities and behavior.[29]

Our findings also revealed that Super Brain Yoga greatly enhanced concentration, as evidenced by the participants' reduced reaction times and fewer mistakes made on the reverse counting test. For nursing students who must handle complicated and stressful events in clinical settings, concentration is a critical cognitive skill. The standard of patient care and overall academic performance can both be considerably impacted by the capacity to concentrate and pay attention.[19] Our results imply that Super Brain Yoga can be a useful strategy for improving concentration, which is especially pertinent to medical professionals. These findings are in the same line with studies that have explored the effects of Super

Brain Yoga on attention deficit hyperactivity disorder in children and autism disorder.[13, 14] It is noteworthy that Super Brain Yoga, as a relatively simple and short daily practice, has shown promising results in our study. Our findings contribute to the increasing amount of research that suggests mind-body activities may have positive cognitive effects in learning environments. The comparison between the experimental and control groups revealed no significant improvements in academic progress as measured by semester GPA. This finding suggests that the benefits of Super Brain Yoga may be more evident in enhancing cognitive abilities than directly influencing academic achievement. However, it is crucial to delve deeper into the reasons behind this observation. One plausible explanation for the lack of significant effects on GPA could be the multifaceted nature of academic success. While Super Brain Yoga may enhance cognitive functions such as memory and concentration, academic performance is influenced by various factors beyond cognitive abilities alone. Factors such as study habits, time management, motivation, and external stressors can all impact GPA.[30] Therefore, improvements in cognitive skills resulting from Super Brain Yoga may not directly translate into higher academic scores without addressing these other contributing factors.

Another consideration is the duration and intensity of the intervention. Our study implemented Super Brain Yoga sessions over a two-month period, which may not have been sufficient to produce noticeable changes in GPA. Academic improvement often requires consistent and prolonged efforts over an extended period. Therefore, a more extended intervention duration or increased frequency of Super Brain Yoga sessions may be necessary to observe significant improvements in academic progress. In contrast, i a study conducted in India examined whether the long-term practice of Super Brain Yoga had a positive effect on adolescents' academic performance, and there was little evidence of a gender gap in this area.[31]

Although our study offers insightful information, it is important to recognize its limitations, such as the small sample size. Future research with larger and more diverse samples could further validate the observed effects of Super Brain Yoga. Additionally, extending the duration of the intervention might yield a better understanding of its long-term impact on academic performance.

CONCLUSION

This study demonstrates that Super Brain Yoga has a positive impact on nursing students' memory and concentration. This research underscores the potential of Super Brain Yoga as a practical and accessible strategy to enhance cognitive functions in the educational setting, ultimately benefiting both students and the quality of healthcare they provide. Further investigations and integration into nursing education programs are warranted to explore the full scope of its potential contributions.

Authors' Contribution

PVF was responsible for the conceptualization and design of this study. The data analysis and interpretation were carried out collaboratively by PVF, CÖ, and AC. PVF and AC drafted the initial manuscript. All authors critically reviewed, revised, and approved the final version for publication. All authors account for the integrity of the data and the accuracy of the data analysis. The corresponding author attests that all listed authors meet authorship criteria.

REFERENCES

1 Asghari SZ, Seid-mohammadi A, Roshanaei G, et al. Mental Health Status Among Iranian Medical University Students: A Cross-sectional Study. Journal of Education and Community Health. 2022;9:111-7.

2 Chen F, Chen J, Chen B, et al. Mental health status of medical students during postgraduate entrance examination. BMC Psychiatry. 2022;22:829.

3 Muñoz-Carril PC, Hernández-Sellés N, Fuentes-Abeledo EJ, González-Sanmamed M. Factors influencing students' perceived impact of learning and satisfaction in Computer Supported Collaborative Learning. Computers & Education. 2021;174:104310.

4 Kalashchenko S, Lutsak O, Hrynzovskyi A, et al. Assessment level of physical activity and psycho-emotional health status of the bogomolets national medical university students under conditions of distance learning organization. Ukrainian Scientific Medical Youth Journal. 2021;127:116-23.

5 Jamil N, Belkacem AN, Lakas A. On enhancing students' cognitive abilities in online learning using brain activity and eye movements. Education and Information Technologies. 2023;28:4363-97.

6 Ogunleye BO, Ojo OR. Impact of physical fitness activities on students' Basic Science achievement in selected Nigerian secondary schools. Annual Journal of Technical University of Varna. 2019;3:21-31.

7 Stritter W, Everding J, Luchte J, et al. Yoga, Meditation and Mindfulness

in pediatric oncology − A review of literature. Complementary Therapies in Medicine. 2021;63:102791.

8 Derlic D. A Systematic Review of Literature: Alternative Offender Rehabilitation-Prison Yoga, Mindfulness, and Meditation. Journal of Correctional Health Care. 2020;26:361-75.

9 EUROCAM. CAM 2020: The Contribution of Complementary and Alternative Medicine to Sustainable Healthcare in Europe. Belgium: EUROCAM; 2020.

10 Tomasi DL. Mind-Body Medicine in Inpatient Psychiatry. Columbia: Ibidem / Columbia University Press; 2020.

11 Premalatha BR, Sudhir J, Hegde U, et al. Effectiveness of Superbrain Asana on the Academic Performance in Dental Students, An Interventional Study. Journal of Natural Remedies. 2021;21:291-5.

12 Kok Sui C. Advanced Pranic Healing: The Most Advance Energy Healing System Using Color Pranas. 11st ed. India: Institute For Inner Studies; 2009.

13 Varvani Farahani P, Hekmat Pou D, Khonsari AH, et al. The Effect of super brain yoga on children with autism disorder. Complementary Medicine Journal. 2016;6:1549-59. [In Persian]

14 Farahani PV, Hekmatpou D, Khonsari AH, Gholami M. Effectiveness of super brain yoga for children with hyperactivity disorder. Perspectives in Psychiatric Care. 2019;55:140-6.

15 Lakshmi PY, Vaithianathan K. Impact of super brain yoga on selected physiological and psychological variables of college students. Journal of Positive School Psychology. 2022;6:6425-8.

16 Gurupriya R, Mathangi DC. Effect of super brain yoga on heart rate variability among undergraduate medical students. Annals of Tropical Medicine and Public Health. 2020;23:231-313.

17 Murat ZH, Muhsin AFM, Kadir RSSA, Ahmad FH. Intervention of super brain yoga towards brainwave balancing index, brainwave dominance and short term memory. AIP Conference Proceedings. 2020;2306:020037.

18 Younas A, Sundus A, Zeb H, Sommer J. A Mixed Methods Review of Male Nursing Students' Challenges during Nursing Education and Strategies to Tackle these Challenges. Journal of Professional Nursing. 2019;35:260-76.

19 Farzi S, Shahriari M, Farzi S. Exploring the challenges of clinical education in nursing and strategies to improve it: A qualitative study. Journal of Education and Health Promotion. 2018;7:115.

20 Derayat A, Beydokhti TB, Mottaghy MR, et al. The Effect of Superbrain Yoga Exercises on Cognitive Functions of Older Adults: A Randomized Controlled Clinical Trial. Journal of Research and Health. 2023;13:325-32.

21 Webber TA, Critchfield EA, Soble JR. Convergent, discriminant, and concurrent validity of nonmemory-based performance validity tests. Assessment. 2020;27:1399-1415.

22 Mackin RS, Rhodes E, Insel PS, et al. Reliability and Validity of a Home-Based Self-Administered Computerized Test of Learning and Memory Using Speech Recognition. Neuropsychology, Development and Cognition. 2022;29:867-81.

23 Vaccaro MG, Liuzza MT, Pastore M, et al. The validity and reliability of the Test of Memory Strategies among Italian healthy adults. PeerJ. 2022;10:e14059.

24 Bouman Z, Hendriks MPH, Van Der Veld WM, et al. Clinical validation of three short forms of the Dutch Wechsler Memory Scale–Fourth Edition (WMS-IV-NL) in a mixed clinical sample. Assessment. 2016;23:386-94.

25 Lee SC, Chien TH, Chu CP, et al. Practice effect and test–retest reliability of the Wechsler Memory Scale-Fourth Edition in people with dementia. BMC Geriatrics. 2023;23:209.

26 Valentine T, Block C, Eversole K, et al. Wechsler Adult Intelligence Scale-IV

(WAIS-IV). US: John Wiley and Sons; 2020.

27 Ryan JJ, Gontkovsky ST. Age effects on Wechsler Memory Scale–Fourth Edition (WMS–IV) indexes and subtests. Applied Neuropsychology Adult. 2023. [Online]. doi:10.1080/23279095.2023.2217461

28 Rickham PP. Human Experimentation. Code of Ethics of the World Medical Association. Declaration of Helsinki. British Medical Journal. 1964;2:177.

29 Janagap A, Janagap TMF. Superbrain Yoga: Impact on the Reading Comprehension and Behavior of Slow Readers. Psychology and Education: A Multidisciplinary Journal. 2022;4:1-8.

30 Rabbi F, Islam S. The Effect of Academic Stress and Mental Anxiety among the Students of Khulna University. Edukasiana: Jurnal Inovasi Pendidikan. 2024;3:280-99.

31 Vinu V, Jois SN, Moulya R, et al. Longitudinal Evaluation of Superbrain Yoga Practice on Academic Performance among Adolescents. Health Education and Health Promotion. 2022;10:271-6.