

Assessing the Effects of Aerobics Involvement on Memory, Attention, and Executive Function

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Abstract: The objective of this research is to examine the impact of aerobic exercise on memory, attention, and executive function in a sample of university students from China. The study used a descriptive comparative correlational methodology, including a heterogeneous group of students from different academic fields and with varying levels of experience in aerobic exercises. Statistical tests such as the Mann-Whitney U, Kruskal-Wallis, and Spearman's rho correlation were used to evaluate the disparities and associations between aerobic participation and cognitive parameters. Findings suggest that consistent engagement in aerobic exercise is causally linked to enhancements in memory encoding, storage, and retrieval, as well as selective, sustained, and divided attention. Moreover, students indicated improved executive functions, such as cognitive flexibility, organizing and planning, problem-solving, and self-regulation. The research revealed notable disparities in cognitive function evaluations depending on gender, academic discipline, and duration of participation in aerobic exercise. Significantly, female students had superior test scores in some cognitive areas, and students who were engaged for more extended periods (3-5 years, 6-10 years, and more than ten years) showed more substantial improvements in executive functions. Therefore, the results indicate that aerobic exercise may be valuable for improving cognitive function in academic environments.

Keywords: Aerobics Involvement; Memory Attention; Executive Function; Selective Attention; Sustained Attention.

1. Introduction

Aerobics, known for its rhythmic and repeated motions, has been widely acknowledged as a popular workout type globally owing to its many health advantages. Recently, aerobics has been more popular in China, especially among students and young people (Zhang et al., 2020). The rise in popularity may be ascribed to several causes, such as heightened awareness of the need of physical exercise for overall wellness, improved availability of fitness facilities and programs, and the inclination towards a comprehensive approach to maintaining good health (Chen et al., 2019). Given the increasing popularity of aerobics in China, it is crucial to comprehend its possible impact on cognitive abilities, including memory, attention, and executive function, in students.

The present state of aerobics in China exemplifies a thriving fitness culture, with a wide array of persons, such as students, professionals, and retirees, actively participating in aerobic exercise activities (Zhang et al., 2020). Aerobics sessions are widely accessible at fitness facilities, community centers, and educational institutions across the nation, accommodating persons of all age groups and levels of physical fitness (Wang et al., 2019). The extensive incorporation of aerobics into school curriculum and corporate wellness initiatives emphasizes its perceived significance in boosting both physical and mental health, therefore contributing to its appeal (Chen et al., 2019).

The majority of students in China have favorable opinions of aerobics, considering it both entertaining and useful for physical exercise (Zhang et al., 2020). In addition to its physiological advantages, such as enhanced cardiovascular well-being and weight control, students acknowledge the cognitive advantages linked to consistent engagement in aerobics (Wang et al., 2019). Specifically, there is an increasing acknowledgment of the possible influence of

participating in aerobic activities on memory, attention, and executive function, which are crucial for academic achievement and general cognitive health.

The significance of evaluating the impact of participation in aerobics on memory, attention, and executive function in China cannot be overemphasized. Given the intensifying academic competition and growing concerns about student mental health, it is imperative to investigate methods that might improve cognitive function and academic achievement (Zhang et al., 2020). Aerobics offers a good opportunity for intervention due to its easy availability, reasonable cost, and capacity to potentially have a favorable impact on cognitive results. Comprehending the impact of participating in aerobics on cognitive function might have significant consequences for public health policy and educational efforts in China (Chen et al., 2019). To cultivate a culture of physical exercise and cognitive health from a young age, governments might facilitate the incorporation of aerobics into school curriculum and community-based wellness initiatives. Furthermore, the knowledge acquired from this research may be used to shape the creation of specific treatments intended to enhance cognitive capacities among susceptible groups, such as pupils hailing from economically disadvantaged families or those with learning impairments.

The results of this research are directly applicable to students, educators, and healthcare professionals who are active in enhancing cognitive health and academic achievement (Wang et al., 2019). This study aims to clarify the cognitive advantages of participating in aerobics, enabling people to make well-informed decisions on their physical activity preferences and promoting the incorporation of exercise into their daily schedules. Teachers may also consider integrating short bouts of aerobic activity into classroom activities to augment student focus and involvement.

Although there is increasing interest in studying the

cognitive impacts of aerobic exercise, there is still a significant lack of research, especially in the Chinese setting (Zhang et al., 2020). The effects of participating in aerobics on memory, attention, and executive function have been shown to be beneficial in research done in Western nations. However, it is uncertain if these results can be applied to Chinese people (Wang et al., 2019). The impact of aerobics participation on cognitive results in China may be influenced by cultural disparities, environmental elements, and variances in exercise routines. This emphasizes the need for research that is tailored to the individual situation.

The current study aims to fill this research void by investigating the impact of participation in aerobics on memory, attention, and executive function in Chinese university students. This research seeks to get a full knowledge of the cognitive advantages of participating in aerobics in the Chinese environment by using quantitative evaluations. This research aims to enhance the current understanding on the correlation between physical exercise and cognitive function in China. By conducting thorough data analysis and interpretation, the study seeks to provide valuable insights that can be used to develop evidence-based strategies for increasing cognitive health and well-being.

2. Statement of the Problem

This study aims to assess the effects of aerobics on memory, attention, and executive function. Specifically, this study will deal with the following questions:

1. What is the profile of the respondents in terms of:
 - 1.1 sex
 - 1.2 course
 - 1.3 Involvement Years
2. What is the assessment of the respondents of the effects of aerobics involvement on their memory in terms of:
 - 2.1 encoding
 - 2.2 storage
 - 2.3 retrieval
3. Is there a significant difference in the assessment of the respondents of the effects of aerobics involvement on their memory when they are grouped according to profile?
4. What is the assessment of the respondents of the effect of aerobics involvement on their attention in terms of:
 - 4.1 selective attention
 - 4.2 sustained attention
 - 4.3 divided attention
5. Is there a significant difference in the assessment of the respondents of the effect of aerobics involvement on their attention when they are grouped according to profile?
6. What is the assessment of the respondents of the effects of aerobics involvement on their executive function in terms of:
 - 6.1 cognitive flexibility
 - 6.2 planning and organization
 - 6.3 problem solving
 - 6.4 self-regulation
7. Is there a significant difference in the assessment of the respondents of the effects of aerobics involvement on their executive function when they are grouped according to profile?
8. Is there a significant relationship between the respondents' memory, attention, and executive functioning?
9. Based on the results of the study, what enhanced aerobics program can be design to increase youth's involvement?

3. Research Design

This study used a descriptive comparative correlational technique as its research methodology. This methodology facilitated the investigation of the correlations between certain factors, including participation in aerobic exercise and cognitive function dimensions such as memory, attention, and executive function, among Chinese university students. The descriptive component of the design included presenting a comprehensive description of the typical features of the sample group, including demographic variables such as gender, area of study, and length of time spent participating in aerobic activities. An empirical investigation was conducted to evaluate the cognitive function outcomes in individuals with varying levels of involvement in aerobic exercise. Comparative analysis was performed to assess differences in memory formation, retention, recall, as well as different components of attention (such as selective, sustained, and divided attention) and executive function (including cognitive flexibility, planning and organization, problem-solving, and self-regulation) by classifying individuals based on their levels of aerobic exercise participation.

Furthermore, the correlational design allowed for examining the relationships between engagement in aerobic exercise and several aspects of cognitive function. Correlation coefficients were used in statistical analysis to assess the strength and direction of these interactions, providing valuable insights into the potential links between levels of physical exercise and cognitive performance. In brief, our study methodology allowed a comprehensive examination of the correlation between engagement in aerobic exercise and cognitive performance among university students in China. This study offered significant insights into the possible cognitive benefits of consistent participation in aerobic exercise activities.

4. RESULTS AND DISCUSSIONS

Profile of the Respondents

Table 1 displays the frequency and percentages of demographic data for a certain group of students, including their gender, academic fields, and length of involvement. Based on the tabulated statistics, 65% of the participants were female and 35% were male, indicating that the majority of the respondents are female students.

The students' course selection includes 28% in aerobics, 8% in both badminton and soccer, 9% in hip-hop, 5% in line dance, 12% in swimming, 7% in both table tennis and Wushu, 3% in tennis, and 14% in track and field. The data analysis revealed that the aerobics course enrolls the overwhelming majority of students.

Finally, in terms of their duration of involvement, 11% had less than 1 year of experience, 36% had between 1 and 2 years, 41% had between 3 and 5 years, 8% had between 6 and 10 years, and just 4% had more than 10 years. Consequently, most students possess a duration of 1 to 2 years of engagement in their specific degree or program.

5. Conclusion

1. Given that the majority of participants are female and primarily engaged in aerobics, this implies that focused initiatives may be created to include a larger number of male students and broaden the variety of physical activities available, hence perhaps increasing total involvement in

aerobic exercises.

2.The favorable influence of aerobics on the processes of memory encoding, storage, and retrieval suggests that

integrating regular aerobic exercises into academic environments might be an advantageous approach to augment students' capacity to acquire and retain information.

Table 1. Frequencies and Percentage of Demographic Factors

Sex	Counts	% of Total
Female	177	65 %
Male	97	35 %
Course		
Aerobics	76	28 %
Badminton	22	8 %
Hip-hop	24	9 %
Line Dance	13	5 %
Soccer	22	8 %
Swim	34	12 %
Table Tennis	20	7 %
Tennis	7	3 %
Track and Field	38	14 %
Wushu	18	7 %
Years of Involvement		
Less than 1 year	30	11 %
1 - 2 years	100	36 %
3 - 5 years	112	41 %
6 - 10 years	22	8 %
More than 10 years	10	4 %

3.The substantial variations in memory evaluation according to gender, course, and years of participation indicate the need for customized aerobic programs designed for diverse groups, considering variables such as gender and course type to optimize cognitive advantages.

4.The beneficial influence of aerobics on the capacities for selective, sustained, and divided attention suggests that aerobic exercise may serve as a potent means to enhance students' concentration and multitasking skills, leading to improved academic achievement and everyday functioning.

5.By considering the notable variations in attention evaluation based on gender, academic level, and years of engagement, targeted aerobic treatments that address individual requirements can be developed, maximizing the cognitive advantages for different student groups.

6.Given the apparent efficacy of aerobic activity in improving executive functions, educational institutions may contemplate including organized aerobic programs into their curriculum to foster cognitive abilities such as planning, organizing, and problem-solving in students.

7.Given the substantial variations in executive function evaluation, it is advisable to create tailored aerobic programs that take into account students' histories and courses in order

to successfully improve their executive functioning abilities.

8.The correlation between the effects of aerobics on memory, attention, and executive functioning underscores the interdependence of various cognitive areas, indicating that an emphasis on aerobic exercise might have a holistic influence on the entire cognitive well-being of students.

6. Recommendations

1.Implement focused initiatives and advertising campaigns to enhance male student engagement in aerobics and broaden the selection of available physical activities, such as establishing aerobic sessions specifically designed for males or including competitive components.

2.Include organized aerobic exercise programs in the academic curriculum to optimize students' memory functions and boost learning and retention. Such activities may include organized aerobic courses or interactive learning sessions with physical exercise.

3.Develop customized aerobic schedules that take into account individual variations, such as gender and academic discipline, to optimize cognitive advantages. One approach is to include more rigorous aerobic workouts in courses that

require greater cognitive abilities.

4. Implement aerobic exercise to enhance concentration, attentiveness, and multitasking skills. Institutions of higher education might include cardiovascular activities in their everyday schedules or establish brief, high-intensity sessions before courses to enhance attentional control.

5. Administer targeted aerobic therapies tailored to the distinct requirements of different student populations by providing various degrees of intensity or kinds of aerobic exercises based on students' academic requirements and cognitive needs.

6. Encourage consistent aerobic activity among students to enhance executive functions such as strategic planning, logistical organization, and effective problem resolution. Educational institutions can organize workshops or seminars focusing on the cognitive advantages of aerobics and provide students with appropriate instructions for integrating these exercises into their daily schedules.

7. Conduct periodic evaluations of the efficacy of aerobic programs on various student demographics and adapt them appropriately by collecting input from participants to guarantee the programs stay captivating and advantageous.

8. Foster a comprehensive approach to cognitive development by advocating for aerobic exercise as a component of a well-rounded lifestyle that encompasses physical activity, appropriate diet, and sufficient rest, therefore bolstering the general cognitive well-being of children.

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