

The influence of badminton on the psychological regulation of College Students

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Abstract

To investigate the psychological effects of badminton on students. This study examines badminton's impact on college students' psychological regulation using mathematical statistics, a questionnaire survey, and a review of the relevant literature. The exercise Rating Scale (PARS-3) and the self-rating scale of physical and mental symptoms were used to conduct a quantitative analysis of the experimental results presented in this paper. After 12 weeks of routine instruction, the control group's performance did not change significantly. After 12 weeks of equally intense badminton instruction, the total mental health score of College Students in the experimental group was significantly lower than in the pre-test. The results after the experiment were significantly better than before the experiment. Under 12 weeks of badminton instruction, there were significant differences in the mental health of college students, and 12 weeks of badminton instruction of equal intensity positively affected mental health. Badminton can produce favorable changes in the psychological variables of students in higher vocational programs, demonstrating that it can improve the mental health of these individuals.

Keywords: Badminton; Higher vocational students; Psychological regulation

Introduction

As social competition becomes more intense, so does the mental pressure on students, particularly those who have been in constant contact with society throughout their schooling, such as those who study mostly professional skills at a higher vocational college. The lack of a developed psychological outlook on life and self-concept of value will impede the cultivation of Chinese students' self-concept of value when higher vocational college students do not have stable psychological difficulties and complicated social values. In light of this circumstance, finding a simple and effective way to address the psychological issues of students in higher vocational programs has become a topic of crucial importance.

In Chinese exercise research, the primary scales used to measure mental health include the mental health self-test scale, the mental health diagnosis scale, the mood state scale, and the mood scale. The first two can assess an individual's mental health, whereas the last two are primarily used to assess an individual's emotional condition. The Chinese Journal Full-text database is used to search the mental health of college students, and the "College Students' mental health" scale, which was compiled by Professor Zheng Richang of the school of psychology at Beijing Normal University, is selected for use to gain an accurate and comprehensive understanding of the mental health status of college students. Physical activity is beneficial for the development of physical health, as well as for the mental health and social adaption of individuals. Previous research has demonstrated that certain

sports can reduce or eradicate psychological disorders, including anxiety and sadness (Okechukwu, 2021).

Currently, as a result of the rapid development of society, competition is intensifying. In this scenario, society has stricter criteria for college students, particularly those enrolled in vocational colleges. In addition to establishing requirements for college students' professional knowledge, professional abilities, and physical quality, it stipulates that employees must also possess high psychological qualities. College students are under rising mental pressure due to the escalation of their academic load, particularly those in Higher Vocational Colleges with a focus on nurturing skilled skills. Excessive mental pressure will harm their physical growth and psychological development, resulting in various psychological disorders and behavioral abnormalities. According to a Ministry of education poll, 83.7% of college students have low self-esteem and lack of self-confidence; 66.9% of college students are timid and shy; and 62% of the students are not excellent at communicating with people, being introverted and distant (Lin et al., 2021). Therefore, it has become a crucial duty to intervene and promote the mental health of college students, particularly those in higher vocational schools. College students' regular and suitable badminton engagement can provide numerous benefits. The intervention results revealed that after 12 months of regular badminton exercise, college students had no significant changes in body shape but significant changes in body composition, as evidenced by an increase in lean weight and muscle content and a significant decrease in the fat and body fat percentage of female college

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students (Aryanti, Solahuddin, & Azhar, 2021). In addition, long-term badminton has been shown to not only considerably improve the cardiovascular function of college students but also successfully promote their muscular fitness and flexibility fitness. Under intensely competitive circumstances, badminton players will exhibit heightened focus and tension. This is because badminton's project attribute forces athletes to coordinate their entire bodies when handling the ball, which poses a significant challenge to the ability of the central nervous system to regulate and the coordination ability of various sports connections. This type of exercise increases the neuronal processes of the cerebral cortex and makes limb motions more flexible and swift (Berhimping, Motto, & Selian, 2021). In addition to the influence of physiological variables, badminton may aid college students with mental health issues. From a psychological standpoint, CHO, K. C. confirmed the intervention of several initiatives on college students' depression and anxiety symptoms. Results indicate that participation in badminton initiatives can successfully reduce college students' anxiety levels (Cho & Jeon, 2021). Marques, G. discovered through the intervention experiment that badminton with moderate intensity has a substantial impact on reducing the depressive symptoms of female college students.

In conclusion, badminton has significant potential for the growth of college students, but colleges and universities do not allocate venues and trainers adequately (Marques et al., 2021). Numerous studies have indicated that frequent badminton participation can successfully benefit college students' physical and mental health development and enhance their quality of life. The preceding material answers why badminton should be strongly pursued in colleges and universities and provides a theoretical justification for the analysis and research presented in this work. The research of Chau, V. H. demonstrates that sports dancing can not only improve college students' physical health and posture but also significantly impact their mental health. Their daily mental tension and emotional anxiety can be alleviated through sports dance (Chau, 2020). The "analysis of the impact of basketball on the mental health of college students" by N. Gazali demonstrates that basketball provides a good outlet for modern college students to release negative emotions, which can effectively regulate students' emotions and maintain their high vitality, thereby enhancing college students' ability to resist tension, sadness, pressure, pessimism, and other negative emotions and maintain a high level of mental health (Gazali & Cendra, 2020).

Jufri, J., and colleagues investigated badminton's influence on female participants' health markers (who have not received badminton training). The trial consisted of three groups: badminton, running, and control. The maximum oxygen

consumption of the badminton group increased by 16% after 8 weeks of recreational badminton (jogging exercise). In contrast, the resting heart rate and arterial, systolic, and diastolic pressure all fell significantly. Similar adaptability was also observed in the running group, suggesting that running and recreational badminton can significantly enhance the aerobic exercise capacity of female participants (Jufri, Ruslan, & Rahmadi, 2020). The vertical leap height of the badminton group increased, which may be owing to the higher braking and acceleration in badminton (like in bow and arrow), which strengthened the muscle strength of the participants' lower limbs and boosted their vertical jump height. In addition, compared to the running and control groups, badminton can successfully enhance the participants' social involvement motivation (i.e., sense of belonging), which is viewed as a potential incentive for female participants to join badminton organizations. This also verifies Kamaruddin, I., and others' theory on the driving force of physical exercise, according to which the satisfaction derived from physical activity and the expansion of social networks are major driving forces for sports participants aged 18 to 50. (Kamaruddin, Nur, & Sufitriyono, 2020). People typically pick more traditional steady-state exercises (jogging, cycling, and swimming) to develop their aerobic capacity to maintain healthy lifestyles. However, the current study indicates that the oxygen consumption of unstable sports such as basketball, tennis, and squash can also exceed the American Sports Medicine Association criteria (ACSM). Wang, P., and others conducted an experimental investigation as a result. Even in amateur badminton (simulation) competitions, the intensity of the activity can still surpass the American Sports Medical Association's standard for high-intensity sports, which is violent exercise. This demonstrates that amateur badminton, tennis, and other unstable sports can improve their participants' aerobic function (Wang, 2021). Previous researchers have also provided a comprehensive summary of the potential badminton-related injuries. Guo, S. analyzed the injury rates of professional and amateur badminton players, which were 2.3% and 3.2% per 1000 exercise hours, respectively. It is evident that recreational athletes sustain more sports injuries than elite athletes, most of which are caused by overuse (Guo et al., 2020). Jaworski, J. discovered that the lower limbs account for most badminton injuries. Sn and G. discussed the potential shoulder injuries of badminton amateurs. 52% of participants reported past or present shoulder pain, and 16% of players had persistent shoulder pain, according to the survey. In conclusion, although badminton has potential injury risk, compared to basketball, football, ice hockey, and other ball games, the incidence of injury in the racket is relatively low because there is no physical confrontation. The injury is primarily caused by non-standard technical action or the excessive use of body parts. Such injuries

can be avoided to a large extent through the guidance of coaches or professionals.

Methodology

Research object

This study examines 60 students from two optional badminton classes for non-sports majors at the university, 30 men and 30 women, with a mean age of 20.11 years. The students in the optional class are badminton novices with no prior experience.

Research methods

Literature method

This paper refers to the books on physical education teaching, sports training, sports physiology, sports psychology, sports psychology, and sociology, as well as the Internet, the online library of Xinjiang Normal University, China Academic Journal Network, China knowledge network, Youxiu Shubo's thesis, and the reading room of the school of physical education, based on the needs. This paper classifies, organizes, analyzes, and investigates these materials, comprehends the fundamental theories of relevant disciplines and the cutting-edge level of relevant research, and offers conceptual materials and fundamental theoretical support for this research.

Psychometric method

The physical self-esteem scale (PSPP) revised by Xu Xia and others are selected as the measuring instrument for this study. The PSPP comprises a primary scale (general physical self-worth) and four subscales. There are thirty items on the entire scale. In every question of the scale,

subjects are presented with two types of statements. The participants select one of the statements that best describes them and then rate the degree of agreement as "fully consistent" or "somewhat consistent." This scale is widely employed. Cronbach's alpha ranges from 0.72 to 0.84 and has excellent reliability and validity. Before and after a semester of badminton instruction, the physical self-esteem of college students was assessed. It was accomplished through unified distribution in class, unified instruction, a self-administered survey, and unified recycling. In this study, sixty questionnaires were sent out, and sixty were returned. Both the recovery and effectiveness rates for the questionnaire were 100%. The objective is to comprehend and master the changes in the physical self-esteem of students before and after the experiment.

Questionnaire survey method

This study utilized the "College Students' mental health" scale developed by Professor Zheng Richang of the School of Psychology at Beijing Normal University. Using a 5-point Likert scale, there are 104 questions encompassing 12 dimensions, including somatization, anxiety, sexual, and psychological disorders. The lower each dimension's score, the better the psychological state.

Mathematical statistics

All data were analyzed using the statistical software spss20.0. Before the experiment, the experimental and control groups' physical and mental health homogeneity was evaluated using a t-test for independent samples. The repeated measurement analysis of variance was used to investigate the impact of badminton practice on college students' physical and mental health. P 0.05 was a statistically significant value

Results and Discussion

Homogeneity test of mental health level between the experimental group and the control group before the experiment

Table 1

Analysis of the differences in mental health and scores in different groups before the experiment.

Dimension	Control group	Experience group	T	P
Somatization	55.51±5.83	53.293±6.07	0.998	0.321
Anxious	50.78±7.43	49.71±6.73	0.73	0.45
Depressed	49.21±6.83	48.33±9.22	0.35	0.71
Inferiority	47.78±5.43	49.23±6.72	-1.53	0.14
Social withdrawal	51.73±6.33	46.53±8.89	0.14	0.88
Social attack	48.78±7.43	49.75±7.22	1.13	0.25
Sexual psychological Disorder	50.77±6.93	49.21±6.34	0.44	0.659
Paranoid	47.84±6.23	49.62±8.22	-1.05	0.28
Force	47.72±6.73	50.63±5.72	-1.17	0.23
Dependence	48.32±5.83	51.33±5.32	-1.92	0.58
Impulse	50.02±7.23	48.33±7.52	1.03	0.23
Psychotic tendency	47.32±9.13	48.16±7.44	-0.35	0.77

The indices of somatization, sadness, inferiority complex, social withdrawal, social aggressiveness, sexual and psychological disorder, paranoia, compulsion, impulse, and psychotic propensity were all $P > 0.05$, according to the questionnaire analysis in

Table 1. Before the trial, there was no statistically significant difference between the experimental and control groups regarding College Students' mental health. Therefore the experiment can proceed to the next phase.

The influence of Table tennis on College Students' anxiety

Table 2

Analysis of variance of repeated measurement of anxiety of college students in each group

Source of variation	Type III sum of squares	Freedom	Mean square	F	P	Partial ETA square
Group	664.433	1	664.433	8.434	0.005	0.082
Time	195.989	1	195.989	47.102	<0.001	0.323
Group * Time	199.876	1	199.876	47.985	<0.001	0.335

The repeated measurement analysis of variance was conducted with college students' anxiety as the dependent variable, group variables (experimental group and control group) as the inter-subject variable, and time factors (pre-test and post-test) as the intrasubject variable (see Table 2). The results indicated that group factors were statistically significant, $f(1,96) = 8.434$, $P < 0.05$, time factors were statistically

significant, $f(1,96) = 47.102$, $P < 0.01$, and the interaction between time and group factors was statistically significant, $f(1,96) = 47.985$, $P < 0.01$. The anxiety indicators of college students changed not only with the change of exercise duration factors but also with the different group factors. As a result, a basic effect analysis of time factors and group variables is conducted to identify the origins of the discrepancies.

Table 3

Comparative Test of anxiety indicators of college students in the experimental group at different times

Dimension	Time (I)	Time (J)	Mean difference (I-J)	Standard error	P
Anxious	Before experiment	After experiment	4.000	0.414	$P < 0.01$

Table 4

Comparative test of anxiety indicators of college students in the control group at different times

Dimension	Time (I)	Time (J)	Mean difference (I-J)	Standard error	P
Anxious	Before experiment	After experiment	-0.010	0.405	0.851

The results indicate that the effect of time on the anxiety index of experimental group college students is statistically significant (see Table 3). The anxiety index score of college students in the experimental group is 4 points lower after the experiment than it was before the experiment ($P < 0.01$), while the time factor has no statistical significance on the anxiety index score of the control group (see Table 4; $P = 0.851$). The anxiety index score of the control group is 0.010 points higher after 12 weeks of routine instruction than

before the experiment. After 12 weeks of equal-intensity badminton instruction, the anxiety index of college students is significantly lower than the pre-test, and the scores after the experiment are significantly better than those before the experiment, indicating that there are significant differences in the anxiety of college students under 12 weeks of equal intensity badminton instruction. It indicates that 12 weeks of badminton instruction of equivalent intensity has a favorable effect on the anxiety component.

The impact of badminton on College Students' depression

Table 5

Analysis of variance of repeated measures of depression of college students in each group

Source of variation	Type III sum of squares	Freedom	Mean square	F	P	Partial ETA square
Group	82.934	1	82.934	1.021	0.317	0.012
Time	122.201	1	122.201	9.802	0.002	0.093
Group * Time	127.643	1	127.643	10.385	0.002	0.097

The repeated measurement analysis of variance was conducted with the depression index of college students as the dependent variable, the group factors (experimental group and control group) as the inter-subject variables, and the time factors (pre-test and post-test) as the intra-subject variables (see Table 5). The results indicated that group factors were not statistically significant, $f(1,96) = 1.021, P = 0.317$. In contrast, time factors were statistically

significant, $f(1,96) = 9.802, P < 0.05$, and the interaction between time and group factors was statistically significant, $f(1,96) = 10.385, P < 0.05$, indicating that the depression index of college students changed not only with the change of exercise duration factors, but also with the difference of group factors. Consequently, a simple impact analysis of time and group factors is conducted to identify the source of the difference 4.

Table 6

Comparative test of depression indexes of college students in the experimental group at different times

Dimension	Time (I)	Time (J)	Mean difference (I-J)	Standard error	P
Depression	Before experiment	After experiment	3.176	0.611	$P < 0.001$

Table 7

Comparative test of depression indexes of college students in the control group at different times

Dimension	Time (I)	Time (J)	Mean difference (I-J)	Standard error	P
Depression	Before experiment	After experiment	-0.030	0.605	0.844

The results indicated that the effect of time on the depression index of the experimental group of college students was statistically significant (see Table 6). The depression index score of college students in the experimental group reduced by an average of 3.176 points after the experiment, $P < 0.01$; the effect of time on the depression index score of college students in the control group has no statistical significance (see Table 7; $P = 0.844$). After 12 weeks of standard instruction, the depression

index score of college students in the control group is 0.030 points higher than before the trial. After 12 weeks of equal-intensity badminton teaching, the depression index of college students is significantly lower than the pre-test. The results after the experiment are significantly better than before, indicating significant differences in the depression index of College Students under 12 weeks of equal-intensity badminton teaching and that 12 weeks of equal-intensity badminton teaching has a positive effect.

The impact of badminton on College Students' sexual and psychological disorders

Table 8

Analysis of variance of repeated measurement of sexual and psychological disorders of college students in different groups in different periods

Source of variation	Type III sum of squares	Freedom	Mean square	F	P	Partial ETA square
Group	32.663	1	32.663	0.268	0.603	0.003
Time	11.831	1	11.831	8.102	0.005	0.079
Group * Time	0.233	1	0.233	0.185	0.684	0.003

The repeated measurement analysis of variance was conducted with the score of College Students' sexual and psychological disorders as the dependent variable, the group factors (experimental group and control group) as the inter-subject variables, and the time factors (pre-test and post-test) as the intra-subject variables. The results

revealed (see Table 8) that the interaction between time and group factors was not statistically significant, $f(1,96) = 0.185, P = 0.68$, and that the main effect of group factors was not statistically significant, $f(1,96) = 0.268, P = 0.603$. $f(1,96) = 8.102, P < 0.05$, indicates that the influence of time should be statistically significant.

The influence of badminton on the total score of College Students' mental health

Table 9

Repeated measurement analysis of variance of total mental health scores of college students in each group

Source of variation	Type III sum of squares	Freedom	Mean square	F	P	Partial ETA square
Group	0.002	1	0.002	0.000	0.998	0.001
Time	311.131	1	311.131	18.002	<0.001	0.153
Group * Time	171.533	1	171.533	8.535	0.004	0.082

The repeated measurement variance analysis was conducted using the total score of College Students' mental health as the dependent variable, group variables (experimental group and control group) as the inter-subject variable, and time factors (pre-test and post-test) as the intra-subject variable (see Table 9). The results indicated that group factors were not statistically significant, $f(1,96) = 0.000$, $P = 0.998$, whereas time factors

were statistically significant, $f(1,96) = 18.022$, $P < 0.01$. Furthermore, the interaction between time factors and group factors was statistically significant, $f(1,96) = 8.535$, $P < 0.05$, indicating that the total score of College Students' mental health changed not only with the change of exercise duration factors but also with the difference of, As a result, a basic effect analysis of time factors and group variables is conducted to identify the origins of the discrepancies.

Table 10

Comparative test of total mental health scores of college students in the experimental group at different times

Dimension	Time (I)	Time (J)	Mean difference (I-J)	Standard error	P
The total score of mental health	Before experiment	After experiment	4.472	0.9110	<0.001

Table 11

Comparative test of total mental health scores of college students in the control group at different times

Dimension	Time (I)	Time (J)	Mean difference (I-J)	Standard error	P
The total score of mental health	Before experiment	After experiment	0.730	0.810	0.243

The results indicated that the effect of time on the total mental health score of the experimental group of college students was statistically significant (see Table 10). After the experiment, the total score index of mental health of college students in the experimental group decreased by an average of 4.472 points compared to that before the experiment ($P < 0.01$); the effect of time on the total score of mental health in the control group (see Table 11) has no statistical significance ($P = 0.243$). The total mental health score of college students in the control group is 0.73 lower after 12 weeks of normal instruction than before the experiment. After 12 weeks of routine instruction, the results indicate that the control group's performance has not changed much. After 12 weeks of equal-intensity badminton teaching, the total score of College Students' mental health in the experimental group is significantly lower than in the pre-test. The performance after the experiment is significantly better than before, indicating significant differences in college students' mental health after 12 weeks of equal-intensity badminton teaching.

Analysis of the impact of badminton on College Students' mental health

Badminton can control bad emotions and preserve a positive mental state.

Numerous college students face a range of psychological issues today. Due to their young, their psychological development is not yet fully developed. Faced with various pressures, such as learning, life, emotion, and employment, they are susceptible to psychological obstacles that negatively impact their mental health. Badminton is an effective way to boost the mental health of individuals. Through its lively rhythm and powerful swing, it intoxicates listeners with the euphoria of sports. Badminton enables athletes to release all negative energy stored in their bodies, divert their attention, and alleviate various negative emotions associated with work and daily life. Our body produces a great deal of dopamine during exercise, immersing athletes in the enjoyment of exercise training and giving people a better physical appearance and a more upbeat disposition.

Badminton enhances social communication skills.

When playing badminton, two or more people often need to complete the practice, which necessitates communication and cooperation, thereby enhancing social communication, interpersonal communication, and social adaptation. In addition, they will find better friends through various badminton associations and clubs to improve their technical and tactical skills. They will also frequently watch wonderful ball games to enhance their emotions.

Badminton helps to temper college students' tenacity and promotes emotional stability.

Willpower is a psychological process in which individuals consciously and deliberately regulate and dominate their behavior to overcome obstacles and attain their objectives. Badminton can relieve mental stress and temper willpower, which requires college students to overcome their inertia and fatigue in training, and rationally vent their negative emotions to enjoy the happiness badminton brings and achieve the goals of relieving stress and gaining achievement motivation.

Badminton enhances both performance and confidence.

Self-assurance is the fundamental determinant of success. People in sports can frequently experience the pleasure of success or victory through sports, and badminton is unquestionably an effective sport. By conducting rich second classes in some classes, we can organize badminton competitions so that students can fully display their talents in the competition, master the flexibility, coordination, and personality characteristics of the ball, and constantly show themselves through their beautiful actions and strong performance, allowing them to experience the joy of success, discover

their true selves, and continually increase their self-confidence.

Conclusion

The influence of badminton on the mental health of college students Consistent with the findings of previous studies, the mental health of college students is generally average. This study found that after 12 weeks of twice-weekly badminton exercise for a total of 90 minutes, anxiety and depression in college students improved significantly and that there was a relationship between the duration of physical exercise and anxiety and depression. College students' anxiety and depression show a downward trend after 12 weeks of equal-intensity badminton instruction, indicating that anxiety and depression are affected by 12 weeks of equal-intensity badminton instruction.

As a sport, badminton is an effective way to improve the mental health of college students. Numerous theoretical and experimental studies have validated the findings of the research. Participation in badminton has significantly boosted the physical self-esteem of college students. Badminton can alleviate, neutralize, and combat negative emotions. By playing badminton, we can not only burn off excess energy but also release pent-up negative emotions. Badminton can improve interpersonal relationships, alleviate tension, strengthen a sense of self-control, foster an independent personality, and foster a striving and enterprising spirit.

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