

Correlation between Badminton Training Intensity and the Preventive Effect on Social Anxiety in College Students

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Abstract: With the increasing severity of mental health issues among college students, various intervention methods for social anxiety have been developed, but these interventions remain inconsistent and limited in effectiveness. Therefore, this study investigates the preventive effects of badminton training intensity on social anxiety in college students, aiming to alleviate social anxiety and improve their mental health through exercise intervention. A randomized controlled trial is conducted, involving 60 college students with high levels of social anxiety, who are divided into an experimental group and a control group. The psychological status of both groups is assessed before and after the experiment using instruments such as the Social Anxiety Scale, the Body Image Scale, and the Self-Efficacy Scale. The results show that by the eighth week of the experiment, the social anxiety level of the experimental group has further decreased to 19.2 ± 3.0 , demonstrating a significant improvement trend, while the social anxiety level of the control group remains at 28.0 ± 4.5 , showing little change. This result confirms the long-term effects of badminton training on alleviating social anxiety, and the improvement in social anxiety levels becomes more significant with longer training periods.

Keywords: Badminton Training Intensity; Social Anxiety; College Students; Psychological Intervention; Exercise Therapy

1. Introduction

Social anxiety, a common mood disorder, widely impacts the mental health and daily lives of college students. College students are in a critical period of social adaptation and personality development. Social anxiety not only impacts their academic and career development but can also lead to negative emotions such as loneliness and low self-esteem, further exacerbating mental health issues. Although various interventions are currently available to alleviate social anxiety, there are still issues with variable efficacy and adverse side effects, such as medication dependency. In recent years, exercise intervention has been recognized as an effective means of alleviating psychological problems and enhancing self-efficacy. Physical activity, as a natural emotional regulation method, has attracted considerable attention due to its low cost and lack of side effects.

Therefore, this study aims to investigate the correlation between badminton training intensity and the preventive effect on social anxiety in college students. Through a systematic experimental design, the effects of badminton on psychological factors such as social anxiety, self-efficacy, and body image among college students are evaluated, thereby providing new insights and practical evidence for mental health interventions for college students.

2. Related Works

In recent years, with the continuous deepening of research on the treatment of social anxiety disorder (SAD), more and more treatment methods have been proposed and evaluated. The following are several representative research results, which aim to explore the effects and mechanisms of different treatment strategies on the improvement of social anxiety disorder symptoms.

Teale Sapach and Carleton evaluated the effectiveness of self-guided self-compassion training on

improving SAD symptoms. The results of this study showed that self-compassion training significantly improved SAD symptoms and self-compassion levels, which was better than the waiting list control group, but there was no significant difference compared with the applied relaxation training group [1]. Ebrahimi et al. evaluated the effectiveness of cognitive-behavioral therapy (CBT) and acceptance and commitment therapy (ACT) in reducing symptoms of seasonal affective disorder (SAD), cognitive distortions, rumination, and anxiety sensitivity in adolescents. The research results indicated that both CBT and ACT significantly improved cognitive distortions and rumination in adolescents [2]. Egbe et al. investigated how cognitive-behavioral game therapy (CBPT) treats social anxiety in students with language disorders. The results showed that CBPT significantly reduced social anxiety symptoms in children with language disorders, while there was no change observed in the control group [3]. Heinig et al. explored the acceptability and side effects of two forms of exposure therapy based on prediction error. The results showed that although the treatment burden and side effects of the intensive treatment group were greater, patients were highly satisfied, trustworthy, and engaged in the treatment [4]. Fatemi et al. investigated how social self-efficacy mediates the relationship between social anxiety and parental control [5]. The results indicated a significant correlation between social self-efficacy and social anxiety, and a direct relationship between achievement oriented and dependency oriented parental control. Chen et al. investigated the moderating effects of conversational roles and topic intimacy when studying the association between social anxiety and avoidance of facial gaze in face-to-face interactions. This study found that the higher the social anxiety, the less individuals gaze at each other's faces during conversations, and in low-density topics, the relationship between social anxiety and facial gaze time is stronger [6]. Garvey et al. analyzed semi-structured interviews with 10 mental health clinicians and found three themes: understanding and not understanding, the risk and benefit dilemma of consumer comorbidity, and protecting vulnerable consumers. Improving clinicians' awareness of the benefits of exercise therapy and supporting exercise prescriptions and referrals to professionals through policies and training can improve clinical treatment outcomes [7]. Varrette et al. explored the effects of Tabletop role-playing game (TTRPG) combined with cognitive behavioral therapy (CBT) on participants' social skills, anxiety symptoms, and mental health. During the data collection period, self-reported anxiety decreased in all groups, with one treatment group experiencing a significant reduction in social anxiety, while the remaining groups remained unchanged [8]. Masoudizadeh et al. conducted an exploratory study in which 30 adolescent girls with body image anxiety were randomly divided into an experimental group and a control group, and pre - and post tests were conducted. The research results indicated that self-healing therapy could improve body management ability and reduce anxiety related to body image [9]. Luo et al. investigated the relationship between college students' unhealthy mobile social media use, social anxiety, and subjective well-being, as well as the mediating role of self-esteem in this relationship. The research results indicated that social anxiety not only directly affects the use of unhealthy mobile social media, but also indirectly affects it through self-esteem [10]. Babaie studied how virtual reality technology therapy and conflict scheduling therapy affect the reduction of social anxiety symptoms and attention. 45 patients with social anxiety disorder were divided into three groups and a semi experimental pre-test and post test design was conducted. Research has shown that these two methods can effectively treat social anxiety disorder [11]. Although existing studies have explored the effects of various treatments on social anxiety disorder, there is still a lack of long-term effect evaluation for different populations and treatment methods, as well as a deep understanding of the treatment mechanism.

3. Methods

3.1 Definition and Current Status of Social Anxiety

Social anxiety refers to irrational emotional reactions such as excessive tension, worry, or fear in social situations, often accompanied by behavioral manifestations such as social withdrawal and avoidance. Unlike social phobia, social anxiety, while milder, can develop into social phobia if not effectively addressed, seriously impacting an individual's social skills and mental health. Existing research indicates that social anxiety not only impairs an individual's psychological well-being but also reduces their ability to regulate emotions, induces externalizing behavioral problems, and even has a profound impact on their social adaptability. The onset of social anxiety is influenced by multiple factors, including the external environment, individual psychological characteristics, and the development of a social support system.

3.2 Effect of Badminton on Moderating Social Anxiety

Badminton, as a high-intensity sport, has garnered increasing research attention in recent years for its potential to improve physical health, fitness, and mental well-being. Badminton, characterized by its complex techniques and diverse tactics, can rapidly enhance an athlete's coordination and reflexes. High-intensity exercise, in particular, can help alleviate the emotional distress caused by social anxiety.

Individuals with social anxiety are often introverted, withdrawn, and reluctant to interact with others, which can lead to psychological stress. If these issues are not addressed promptly, they can worsen. Badminton, as a challenging and entertaining sport, can effectively enhance participants' self-perception. Badminton not only improves physical health but also, through constant self-challenging, stimulates positive emotions and alleviates anxiety and tension.

Badminton, in particular, requires athletes to maintain high concentration and be flexible in responding to unexpected situations on the court. This highly engaging activity allows individuals to fully immerse themselves in the sport and reduce external distractions. More importantly, badminton matches often involve collaboration and communication, providing a relatively low-pressure social environment for those with social anxiety. This helps them gradually build confidence, overcome their closed-off mentality, and foster more positive social interactions.

3.3 Long-Term Effects of Badminton on Social Anxiety

3.3.1 Changing Individual Self-Perception

Badminton helps participants gradually shift their self-perceptions. Individuals with social anxiety often harbor excessively negative self-perceptions, believing they perform poorly in interpersonal relationships and that others view them poorly. Long-term social avoidance and self-denial can exacerbate symptoms of social anxiety. Badminton, by providing a tangible sense of accomplishment through exercise, enhances individuals' self-efficacy and allows them to experience success and accomplishment, thereby transforming their self-perception.

3.3.2 Promotes Emotional Regulation and Relaxation

Badminton involves alternating periods of tension and relaxation. After a period of exercise, individuals' physical and mental well-being can be significantly improved. Badminton can help individuals release negative emotions through rapid physical reflexes and intense mental focus. The release of "happiness hormones" such as serotonin and endorphins during exercise can effectively alleviate anxiety and foster a more positive and optimistic outlook.

3.3.3 Improves Social Skills and Interpersonal Confidence

Individuals with social anxiety often avoid interacting with others. However, badminton, as a highly social sport, encourages participation in group activities. Badminton requires teamwork, division of labor, and mutual support. This interactive activity can help individuals with social anxiety gradually overcome social barriers and strengthen their confidence in interacting with others. Through physical activity, individuals can gradually adapt and learn how to communicate, interact, and collaborate with others in a low-stress environment, effectively reducing social anxiety.

3.4 Application of Exercise Combined with Cognitive Behavioral Therapy for Social Anxiety

Cognitive behavioral therapy (CBT) has been widely used in the treatment of social anxiety. It helps alleviate anxiety by modifying individuals' negative cognitions and behavioral patterns. Within the framework of exercise combined with CBT, badminton, as a positive reinforcement tool, promotes psychological adjustment and emotional regulation, helping individuals improve cognitive biases and emotional reactions, thereby alleviating social anxiety symptoms.

Exercise can enhance social skills, improve self-efficacy, and enhance self-evaluation by enhancing body image. Cognitive behavioral therapy, on the other hand, helps individuals develop more positive and healthy social attitudes by modifying negative thought patterns. Combining these two approaches can effectively improve social anxiety symptoms.

4. Results and Discussion

4.1 Subjects

Sample Size: 60 college students (30 males, 30 females)

Inclusion Criteria:

Age: 18-24 years old, college students

Voluntary participation and self-reported social anxiety symptoms (scored ≥ 20 on the Adolescent Social Anxiety Scale) prior to participation

Exclusion Criteria:

Previous diagnosis of severe psychological disorders such as social phobia and depression

A history of sports injuries or physician-recommended avoidance of strenuous exercise

4.2 Experimental Design

This study employed an 8-week randomized controlled trial design. The experimental group received a badminton intervention, while the control group received no exercise.

The experimental group consisted of 30 college students who participated in badminton training twice weekly, with increasing intensity.

Badminton Training Content:

First 4 weeks: Basic skill training (serving, receiving, running, hitting accuracy, etc.)

Last 4 weeks: Comprehensive competitive training (singles, doubles, etc., to improve tactical application and physical fitness)

Training Intensity: Increased weekly, with training duration limited to 60 minutes per session.

Control Group: 30 college students maintained their normal daily activities without any exercise intervention.

Measurement Instruments

Social Anxiety Scale: Used to assess participants' social anxiety levels. Each participant completed the scale before and after the experiment (4 and 8 weeks).

Self-Efficacy Scale: Assessing college students' self-efficacy and helping understand the impact of the exercise intervention on their self-confidence.

Body Image Scale: Assessing individuals' self-evaluation and satisfaction with their bodies.

Exercise Participation Scale: Assessing participants' participation and engagement in badminton.

4.3 Experimental Procedure

Preliminary Screening and Grouping:

Eligible participants were selected based on self-reports and the Social Anxiety Scale.

Participants were randomly assigned to the experimental and control groups to ensure balance in social anxiety levels, age, and gender.

Intervention Phase:

The experimental group participated in 8 weeks of badminton training, twice weekly, for 60 minutes each session.

The control group did not receive any form of exercise intervention and only engaged in regular classroom learning and social activities.

Data Collection and Evaluation:

Social anxiety levels, body image, and emotional state were assessed in both groups before, after,

and after the intervention period.

Participants completed appropriate psychometric scales to collect data on changes in self-efficacy and exercise participation.

4.4 Data Analysis

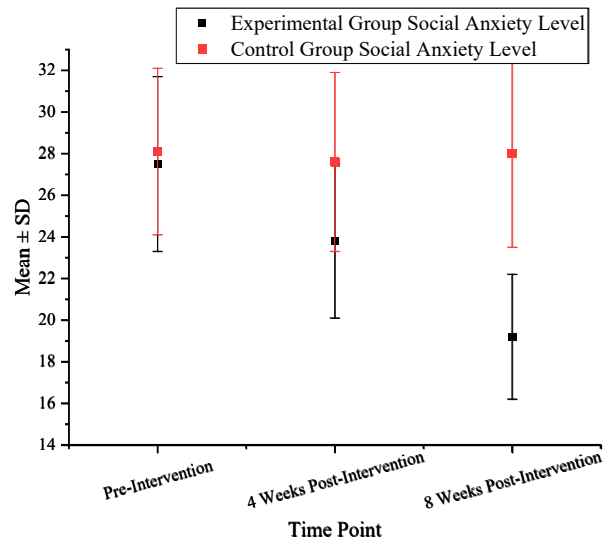


Figure 1 Changes in social anxiety levels

Note: Social anxiety levels are self-rated; higher scores indicate higher anxiety levels.

Figure 1 shows significant differences in social anxiety levels between the experimental and control groups. The experimental group's social anxiety level before the intervention was 27.5 ± 4.2 , slightly lower than the control group's (28.1 ± 4.0), but the difference between the two groups before the intervention was not significant. After four weeks of badminton training, the experimental group's social anxiety level dropped to 23.8 ± 3.7 , a significant decrease from before the intervention, while the control group's level only dropped to 27.6 ± 4.3 , a smaller change. This suggests that badminton training has a positive effect on alleviating social anxiety. By the eighth week of the experiment, the experimental group's social anxiety level had further decreased to 19.2 ± 3.0 , showing a clear trend of improvement, while the control group's social anxiety level remained at 28.0 ± 4.5 , showing little change. This result confirms the long-term effects of badminton training on alleviating social anxiety, and the improvement in social anxiety levels became more significant with longer training periods.

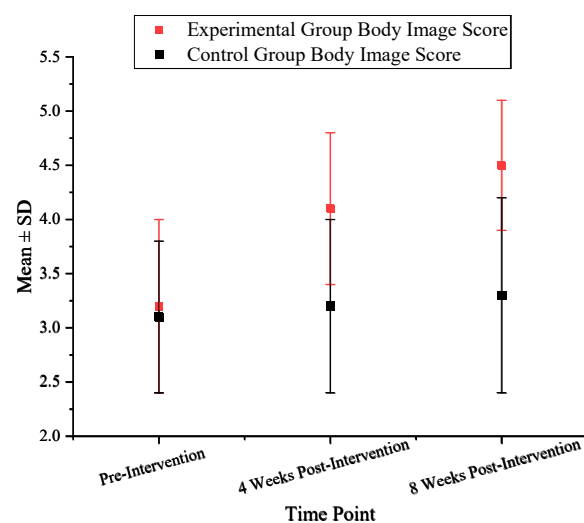


Figure 2 Changes in body image scores

Note: Body image scores are based on self-assessment, ranging from 1 to 5, with higher scores indicating greater body satisfaction.

After 8 weeks of intervention, the experimental group's body image scores further increased to 4.5 ± 0.6

0.6, a significant improvement compared to pre-intervention scores. The control group's scores only rose to 3.3 ± 0.9 , a significantly smaller increase. This change reflects the sustained effect of long-term badminton training in improving college students' body image, particularly in enhancing self-acceptance and body satisfaction, as shown in Figure 2.

Table 1 Changes in self-efficacy scores

Time Point	Experimental Group Self-Efficacy Score (Mean \pm SD)	Control Group Self-Efficacy Score (Mean \pm SD)
Pre-Intervention	3.5 ± 0.9	3.4 ± 0.8
4 Weeks Post-Intervention	4.0 ± 0.7	3.5 ± 0.8
8 Weeks Post-Intervention	4.3 ± 0.6	3.6 ± 0.9

Note: Self-efficacy scores are based on self-evaluation and range from 1 to 5. Higher scores indicate greater personal confidence and efficacy.

After 8 weeks of badminton training, the experimental group's self-efficacy scores further increased to 4.3 ± 0.6 , demonstrating sustained positive change. This suggests that long-term exercise intervention can significantly improve college students' self-efficacy, enhancing their confidence in facing challenges and their ability to solve problems. The control group's score, however, rose to 3.6 ± 0.9 . While this improvement was significant, it was still significantly lower than the change in the experimental group (see Table 1).

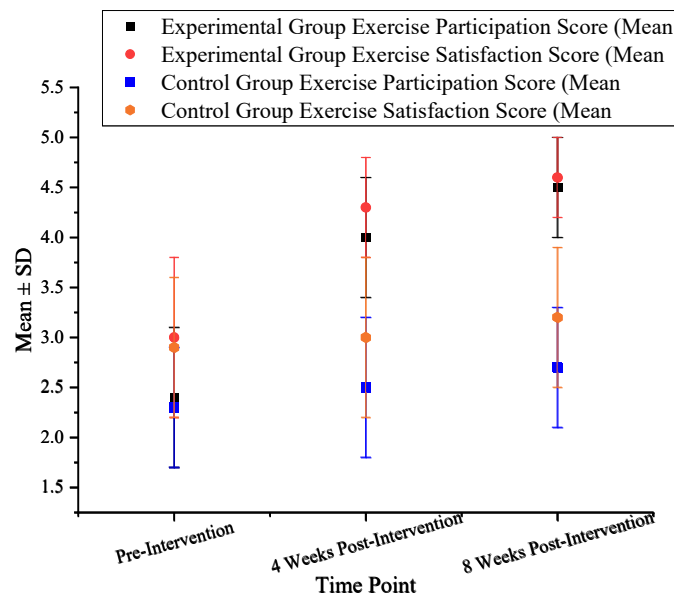


Figure 3 Changes in participation and satisfaction with exercise

Note: Exercise participation scores are based on frequency and enthusiasm for exercise, while exercise satisfaction scores are based on post-exercise enjoyment and psychological feedback. Scores range from 1 to 5, with higher scores indicating greater participation and satisfaction.

The exercise participation score of the experimental group before intervention was 2.4 ± 0.7 , slightly higher than the control group's 2.3 ± 0.6 . Although the exercise pleasure score of the experimental group (3.0 ± 0.8) was slightly higher than that of the control group (2.9 ± 0.7), there was no statistically significant difference between the two groups. With the progress of badminton training, the participation score of the experimental group increased to 4.0 ± 0.6 after four weeks of intervention, while the control group was only 2.5 ± 0.8 . Their exercise satisfaction score also increased from 3.0 ± 0.8 to 4.3 ± 0.5 , demonstrating that badminton can effectively enhance college students' enthusiasm for exercise and their post-exercise enjoyment (see Figure 3).

5. Conclusions

This study, through a systematic experimental design, explored the preventive effects of badminton training intensity on college students' social anxiety and its underlying mechanisms. These results provide empirical support for the effectiveness of exercise intervention, particularly badminton training, in alleviating social anxiety among college students. By integrating exercise and psychological

intervention, this study offers new insights into mental health intervention for college students. However, this study has some limitations. First, the sample size is limited to college students; future studies can expand this to other populations, such as adolescents or working professionals. Secondly, the study does not delve into the specific mechanisms of training intensity; future research can further refine the causal relationship between training intensity and psychological changes. Furthermore, this study does not involve long-term follow-up surveys; future research can further validate the long-term effects of badminton by extending the intervention period and conducting post-treatment effect evaluations.

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