ISSN 2618-1576 Vol. 7, Issue 6: 50-60, DOI: 10.25236/FSR.2025.070608

Exercise Participation and Negative Emotions among Young Women: A Randomized Trial of the Mediating Role of Emotion Regulation Self-Efficacy

Zhou Tian[1,a], Fang Luoning[1,b], Xue Xiang[1,c], Gao Jinxia[1,d,*]

[1]School of Physical Education and Sports, Sichuan University, Chengdu, Sichuan, China
[a] zhoutian912@scu.edu.cn, [b]444937813@qq.com, [c]xuexiang@stu.scu.edu.cn, [d]562942830@qq.com
**Corresponding author*

Abstract: *This study investigated the effects of exercise participation on negative emotions in young women, with a particular focus on the mediating role of emotion regulation self-efficacy. A randomized controlled trial was conducted with 53 female college students, who were assigned to a yoga group, a running group, or a no-exercise control group. The intervention lasted for eight weeks and consisted of a structured fitness yoga program and regular running sessions. Anxiety and depression were assessed at baseline and post-intervention using the Self-Rating Anxiety Scale and Self-Rating Depression Scale, and emotion regulation self-efficacy was measured with the Regulatory Emotional Self-Efficacy Scale. The results showed that both the yoga group and the running group exhibited significant reductions in anxiety and depression compared with the control group ($P < 0.05$). Furthermore, emotion regulation self-efficacy partially mediated the relationship between exercise participation and negative emotions. Exercise participation significantly predicted higher emotion regulation self-efficacy, which in turn significantly predicted lower levels of anxiety and depression, and the indirect effects were statistically significant ($P < 0.05$). These findings suggest that regular participation in yoga or running can effectively alleviate negative emotions in female college students, and that enhancing emotion regulation self-efficacy may be an important psychological mechanism underlying the mental health benefits of exercise.*

Keywords: *exercise participation, Yoga, anxiety, depression, emotion regulation self-efficacy, female college students*

1. Introduction

With the profound and extensive advancement of China's higher education system reform, significant transformations have occurred in the quantity and composition of university students. Under this background, the psychological status of college students has also appeared new characteristics, mainly manifested in lack of social experience, low psychological maturity, unclear self-identification, heightened emotional instabilities and more. According to the "Blue Book of National Depression in 2022" jointly published by People's Daily Health Client and Health Times, 50% of individuals suffering from depression are students, and the prevalence rate of women is twice that of men. Furthermore, depression patients under the age of 18 account for 30.28% of the total in China. Among those impacted by depression, a significant portion includes students, with 41% dropping out of school because of this mental health condition(Fu Xiaolan, Zhang Kan, 2023).

Adolescence represents a distinct phase in personal growth. The swift changes of physique, hormones and social surroundings, along with brain maturation and enhanced cognitive capabilities, may render individuals susceptible to mental health issues during this period(Blakemore, 2019).Notably, adolescent depression has attracted increasing attention, and this group is a specific group prone to depression(Liu, 2020).Given the rapid progress in social, emotional and cognitive development, and the incidence rate rises significantly during the period of 10-24 years old, especially among females, who exhibit double the propensity for depression compared to males(Thapar et al., 2022).The diagnosis of adolescent depression is based on depression that exists almost daily for most of the time, or loss of interest or pleasure in almost all activities (called lack of pleasure), alongside other symptoms(Lee et al., 2014).

A number of prior research studies have demonstrated the significant influence of sports on mental health. Engaging in moderate to high-intensity physical activity, or even low-intensity exercise, can help

ISSN 2618-1576 Vol. 7, Issue 6: 50-60, DOI: 10.25236/FSR.2025.070608

prevent depression(Choi et al., 2020). It can relieve anxiety caused by various specific situations. During adolescence, there is a rapid surge in estrogen levels in young women and an increase in testosterone levels in young men, which is the period when gender differences in mental health problems begin to appear. Prevalence of depression in pre-adolescent individuals of both genders is relatively low; however, following puberty, women are twice as likely as men to experience depression(Davey & McGorry, 2019). Despite existing research, investigations focusing solely on female is obviously insufficient. Compared with men, many women do not maintain consistent exercise routines and typically opt for simpler forms of exercise(Noetel et al., 2024). The general group projects tailored for men may not be suitable for female groups. Therefore, there is a need to identify exercise modes tailored to female populations to improve female college students' self-regulation efficiency of negative emotions and subjective well-being, and then improve their depression and anxiety.

Some studies have pointed out that during the process of relieving anxiety and depression through physical exercise, the self-efficacy of emotional regulation may act on other internal psychological mechanisms(Guo et al., 2024; N. Li et al., 2023). Self-efficacy of emotional regulation refers to the degree of self-confidence level in recognizing their ability to regulate emotions, which is positively correlated with the effect of individuals in regulating and improving negative emotions. A large number of studies have shown that regardless of the type of exercise, engaging in physical activity helps enhance college students' self-efficacy of emotional regulation, which holds great practical significance to promote college students' mental well-being(Kaufmann et al., 2022; X. Li et al., 2024; Wang et al., 2022). At the same time, more and more studies have confirmed that emotion regulation self-efficacy can obviously improve the effect of individual anxiety and depression, and can directly predict depression and anxiety. All these evidences suggest that there is a complex relationship among physical exercise, anxiety and depression, and self-efficacy of emotional regulation, yet current studies primarily examine this relationship from a singular perspective.

Combined with the current research, it is evident that there exists a intricate interconnection between self-efficacy and exercise, as well as anxiety and depression. However, the majority of existing studies focus on these correlations from a singular standpoint. It is not clear whether exercise can improve the self-efficacy of emotional regulation to increase personal subjective well-being, thus affecting anxiety and depression. Especially for female college students in the late adolescence who are under great academic pressure, the particularity of their group and environment still needs to be discussed from many angles and aspects.

2. Subject and Methods

Dance, exercise combined with SSRI and walking or jogging are the most likely treatments to perform best. In terms of acceptability is concerned, the subjects of strength training and yoga are less likely to drop out of the study(Pertl et al., 2022). Combined with the existing research, data was collected from a university's psychological testing center in Sichuan. Contact was established with 203 female students experiencing severe depression or anxiety in the psychological test of admission, who were then recruited. Through detailed interviews, insights were gained into the participants' self-evaluation of their own situation and their cognition of sports intervention, and plan to screen out the sports events with higher acceptance among female students as the primary intervention measures from the existing sports events in this school(DiCicco-Bloom & Crabtree, 2006).

2.1 Qualitative data collection and organization

We established contact with 203 students by telephone interview, among which 49 students expressed inconvenience or refused to participate. Finally, we successfully interviewed 154 female students who exhibited issues like depression and anxiety in the entrance psychological test for 10-20 minutes(Aguinis & Solarino, 2019; Mohd Arifin, 2018). Following the interview, we completed the depression scale test. Through in-depth interviews, we can understand the subjects' preliminary understanding and evaluation of their own situation, and understand and accept the degree of exercise to improve the self-regulation efficiency of female college students' negative emotions, and then improve their cognition, understanding and acceptance of depression and anxiety. Help researchers to establish good contact with subjects and make better training plans, which is convenient for the effective conduct of later research.

In-depth interviews are mainly conducted by the project leader. After a brief description of the research plan, it mainly focuses on the following issues, as shown in Table 1:

ISSN 2618-1576 Vol. 7, Issue 6: 50-60, DOI: 10.25236/FSR.2025.070608

Table 1: Interview Outline.

	issues
1	"Cognition of one's own situation"
2	"Are you currently receiving drug intervention or treatment"
3	"Understanding of sports intervention"
4	"Whether proper exercise can help to regulate emotions"
5	"What do you think is the most willing course to participate in the physical education courses that the school has the conditions to start at present"
6	"Do you like our plan and are willing to participate in it"
7	"What do you think of our plan?"
8	"What do you think of the plan?"
9	"Do you have any concerns or worries about our plan, if any?"
10	"Would you like to join our plan"
11	"Moderate intensity and difficulty, can you persist in practicing three times a week"
12	"Make a simple evaluation of your flexibility, core strength and balance ability"
13	"Do you have any ideas to make our project more attractive?"
14	"Predict the benefits that long-term participation in the project may bring to physical and mental health"
	……

2.2 Analysis of interview results

154 data obtained from in-depth interviews are analyzed, and then coding is realized, and a system based on Boolean logic and a conceptual network system are established. The research extracts the interview content of in-depth interviews, and decomposes it into independent sentences, extracts the coding elements of the sentences, and then refines the easy-to-understand language to form a preliminary concept, which is subsequently categorized(Brink et al., 2006; Glaser et al., 1968).

Through the analysis of the interview results, it was discovered that most students have a relatively clear understanding of their own issues, and there are obviously many problems such as low sleep quality and emotional. They unwilling to resort to medication, but deeply powerless, willing to try physical intervention such as exercise.

Some students have previously acquired knowledge on exercise intervention and attempted to improve and adjust it through exercise. Nevertheless, due to the lack of professional guidance or the inadaptability of sports events and intensity, they finally failed to adhere to the exercise intervention.

In view of the favorite or most likely to persist in the physical education courses currently provided by the school, 61% students ultimately selected fitness yoga, 20.8% students selected tennis, table tennis or badminton, 9.7% students chose aerobics, and 8.4% students opted for orienteering and Tai Ji Chuan.

The vast majority of female students chose yoga, mainly because it is a series of practices that promote a state of harmony in the body and mind, and it includes many components such as doing physical movements, relaxation, positive thinking, and meditation. Using yoga to intervene in mental health has a number of advantages, especially in promoting a range of mental health outcomes. Yoga is practiced by a large number of people and is also mostly considered by people to be beneficial to their lives(Hendriks et al., 2017).

The vast majority of students hope to improve the existing situation and are eager to make an effort. However, the biggest concern is that the students around me know that they have problems such as depression and anxiety, potentially altering their self-perception. Hence, I aim for the research can be kept completely confidential (Mohd Arifin, 2018).

The vast majority of students think that they have been neglected in physical exercise for a long time, resulting in poor physical abilities. They hope to have a professional coach to instruct and motivate them in their workouts. It is recognized that physical exercise may bring some help to the regulation of physical and mental health, and I anticipate to benefit from this experiment.

2.3 Interventions:

In view of the opinions and suggestions given by in-depth interviews, based on the fact that most students choose yoga projects, we have drawn up a set of moderate-intensity fitness yoga exercises which

ISSN 2618-1576 Vol. 7, Issue 6: 50-60, DOI: 10.25236/FSR.2025.070608

was studied by the State Sport General Administration, drew up a protocol: two months and eight weeks, three times a week, and one hour each time. Specific arrangements are shown in Table 2:

Table 2: The 8-week yoga intervention program.

Sports event	Week	Times	Per session	Exercise intensity	Details
yoga	1	3	45~60min	medium strength	Fitness Yoga Level 2 Asana
yoga	2	3	45~60min	medium strength	Fitness Yoga Level 2 Asana
yoga	3	3	45~60min	medium strength	Fitness Yoga Level 3 Asana
yoga	4	3	45~60min	medium strength	Fitness Yoga Level 3 Asana
yoga	5	3	45~60min	medium strength	Fitness Yoga Level 3 Asana
yoga	6	3	45~60min	medium strength	Fitness Yoga Level 4 Asana
yoga	7	3	45~60min	medium strength	Fitness Yoga Level 4 Asana
yoga	8	3	45~60min	medium strength	Fitness Yoga Level 4 Asana

We recruited the subjects in the group who participated in the interview in the early stage, and promised to carry out the research under the premise of protecting the privacy of the students who participated in the experiment, and to give extra points for compensation in the physical education class grade in the semester. Finally, 53 people were successfully recruited to participate in the experiment and randomly divided into fitness yoga group, running group and control group. Students in the yoga group participated in training for 45 minutes to 1 hour three times a week; the running group passed the APP test and completed a half-hour campus run of more than 3 kilometers three times a week. Self-rating Depression Scale (SDS), Subjective Well-being Scale and Emotional Self-efficacy Scale (ERS) were used to investigate 53 female students. Then the participants were randomly divided into three groups, that is, the experimental group included yoga test group (18 people), ordinary running group (18 people) and control group (17 people). Participants (two experimental groups and observation group) completed the evaluation within one week after the training.

2.4 Measuring tool

Emotional Regulation Self-efficacy Scale (ERS): It is a self-rating scale with 12 items, all of which are scored by 5 grades. Compiled by Caprara et al., Sinicized by Yujie Wang et al(Wang, 2013). It includes two dimensions: self-efficacy of positive emotions and self-efficacy of regulating negative emotions. The higher the score, the higher the self-efficacy of emotion regulation. Cronbach's α coefficient is 0.826.

Self—Rating Depression Scale (SDS): It is a self-rating scale with 20 items (10 in the forward direction and 10 in the reverse direction) and divided into four grades. It is used to evaluate depression, and it is one of the scales recommended by the US Department of Education, Health and Welfare for psychopharmacology research. Because of its simple use, it is widely used. A score below 50 is the normal range, and the higher the score, the more obvious the depressive tendency. Cronbach's α coefficient is 0.912.

Self-Rating Anxiety Scale (SAS): It is a self-rating scale with 20 items (15 in the positive direction and 5 in the negative direction), which is divided into four grades. Compiled by Zung(Zung, 1971). The main evaluation item is the frequency of symptoms. In recent years, SAS has been used as a self-assessment tool to understand anxiety symptoms in consultation clinics. A score below 50 is the normal range, and the higher the score, the higher the anxiety level. Cronbach's α coefficient is 0.912.

3. Experimental process and results

3.1 Test results of psychological status of participants in the experiment

All the students who participated in the experiment were randomly divided into 18 students in the fitness yoga group, 18 students in the ordinary running group and 17 students in the control group, and the one-way ANOVA tested, as shown in Table 3.

Table 3: Intergroup Differences Comparison Based on one-way ANOVA

	Group(M±SD)			F	p
	A (n=18)	B (n=18)	C (n=17)		
Anxiety	51.22±8.67	52.11±8.85	51.72±8.19	0.049	0.952
Depression	53.94±7.94	51.17±8.24	54.22±7.30	0.814	0.449

As can be seen from Table 3, there is no significant difference between the three groups of data at $p>0.05$, indicating that there is no significant difference between the different groups of students in terms

ISSN 2618-1576 Vol. 7, Issue 6: 50-60, DOI: 10.25236/FSR.2025.070608

of depression and anxiety, and that they are basically at the same baseline level in the pre-test(Larsen et al., 2022). This is also in line with the specificity of the selection of the pre-test population, which was found to have certain psychological conditions such as depression and anxiety at the stage of the general entrance test, requiring regular attention and certain interventions.

3.2 The effects of different exercise methods on female college students' negative emotions, subjective well-being and self-efficacy of emotional regulation

Following an 8-week exercise intervention, the yoga cohort adhered to the instructor's guidance to successfully complete the entire study; Five participants from the running group gave up their participation and collected 13 questionnaires because of the way of self-monitoring through APP punching. Subsequently, the corresponding data collection was also completed for the control group.

Firstly, the differences of anxiety, depression and emotion regulation self-efficacy in each group before and after the test (post-test-pre-test), that is, the change amount, were calculated. Descriptive statistical results of the changes before and after each variable are presented in Table 4.

Table 4: Descriptive statistics for each group in the before and after changes.

Group	Anxiety	Depression	Regulate positive emotions	Negative emotions	
				Regulate frustration/pain	Regulate anger/irritability
Yoga Group	-8.944	-10.722	0.611	2.389	2.500
Running Group	-9.769	-9.308	0.615	1.692	1.539
Control Group	-2.056	-3.667	0.333	0.500	1.389

Secondly, equipped samples t-tests were conducted for different groups (yoga group, running group, and control group) on the three dimensions of anxiety, depression, and emotional regulation self-efficacy in the pre-tests and post-tests to examine whether different training modalities induced a change in the status of each variable.

Table 5: Comparative analysis of changes before and after intervention.

Group		Regulate positive emotions	Regulate frustration/pain	Regulate anger/irritability	Anxiety	Depression
Yoga Group	pre-tests (n=18)	15.06±1.63	13.72±2.05	13.67±2.66	51.22±8.67	53.94±7.94
	post-tests (n=18)	15.67±1.78	16.11±1.60	16.17±1.76	42.28±3.49	43.22±3.28
	t	-1.479	-5.780	-4.547	5.047	5.289
	p	0.158	0.000**	0.000**	0.000**	0.000**
Running Group	pre-tests (n=18)	15.22±1.63	14.33±3.36	14.22±2.76	52.11±8.85	51.17±8.24
	post-tests (n=13)	15.85±1.68	16.38±1.66	16.31±1.60	42.62±2.87	43.46±2.82
	t	-1.860	-2.549	-2.159	4.013	3.869
	p	0.088	0.052	0.026**	0.002**	0.002**
Control Group	pre-tests (n=17)	14.41±1.58	13.41±1.42	12.65±2.34	51.72±8.19	54.22±7.30
	post-tests (n=17)	14.82±1.55	13.94±2.16	14.12±2.45	50.06±5.37	51.24±3.87
	t	-0.577	-1.342	-1.809	1.869	1.869
	p	0.571	0.197	0.088	0.145	0.079

According to the analysis of data in Table 5, there was no significant difference between students in different exercise groups in terms of emotional self-efficacy to regulate positive emotional expression,

ISSN 2618-1576 Vol. 7, Issue 6: 50-60, DOI: 10.25236/FSR.2025.070608

with P>0.05; however, in terms of expressing negative emotions, in the dimension of regulating self-efficacy for frustration and pain, there was a significant difference between the Yoga Intervention Group and the APP Running Group, with P<0.05, i.e., there was a significant difference between the two groups. In the dimension of regulating self-efficacy of angry and irritable emotions, in the yoga intervention group and APP running group, P<0.05, i.e., there is a significant difference within the groups.

The students' levels of anxiety were influenced by various modalities of physical activity, and both experimental groups, yoga group and APP running, demonstrated a reduction in anxiety levels when compared to the post-test results. The results of paired samples t-test were t=4.013,P<0.05,t=5.047, P<0.05,, i.e. there was a significant difference between the groups;

Students' depressive mood was affected by different physical activity modalities, the two experimental groups of Yoga group and APP running decreased compared to the post-test. The results of paired samples t-test were t=3.869,P<0.05,t=5.289,P<0.05,, i.e. there was a significant difference between the groups.

Finally, a two-factor ANOVA of time*exercise mode was performed for the different groups of exercise interventions, combining the change in measurements before and after the time change, and post hoc comparisons were made to discuss which exercise mode intervention was the most effective.

Table 6: Post-hoc multiple comparisons of group effects on pre-posterior changes in anxiety levels.

Group	Compare the group	Mean difference	standard error	p
Yoga Group	Running Group	-1.379	1.689	.416
	Control Group	-4.191*	1.649	.013
Running Group	Yoga Group	-1.379	1.689	.416
	Control Group	-2.812	1.712	.104
Control Group	Yoga Group	4.191*	1.649	.013
	Running Group	-2.812	1.712	.104

According to Table 6 Post hoc comparison of group effects of pre- and post-test changes in anxiety levels, there was no significant difference between the yoga group and the running group, but there was a significant difference in the comparison with the control group at P<0.05. In terms of the effect of exercise intervention, yoga group=running group>control group, which proves that exercise can alleviate students' anxiety to a certain extent.

Table 7: Post-hoc multiple comparisons of group effects on pre-posterior changes in depression levels.

Group	Compare the group	Mean difference	standard error	p
Yoga Group	Running Group	.65	1.519	.671
	Control Group	-4.15*	1.483	.006
Running Group	Yoga Group	.65	1.519	.671
	Control Group	-4.80*	1.540	.002
Control Group	Yoga Group	4.15*	1.483	.006
	Running Group	4.80*	1.540	.002

According to Table 7 Post hoc comparison of group effects of pre- and post-test changes in depression levels, there was no significant difference between the yoga group and the running group before, but there was a significant difference in the comparison with the control group at P<0.05. In terms of the effect of exercise intervention, yoga group=running group>control group, which proves that engaging in physical activity can mitigate symptoms of depression among students to a significant degree.

According to Table 8 Post hoc comparison of group effects of pre- and post-test changes in emotional self-regulation efficacy, in terms of positive emotional expression, except for P=0.036,there is a significant difference between the running group and the control group, the rest of the groups between the P>0.05, there is no significant difference between the groups; in terms of negative emotions: there is no significant difference between the yoga group and the running group, but between the yoga group and the running group, P<0.05, there is a significant difference, yoga group=running group>control group, proving that exercise can regulate students' emotional self-efficacy to a certain extent.

ISSN 2618-1576 Vol. 7, Issue 6: 50-60, DOI: 10.25236/FSR.2025.070608

Table 8: shows post hoc multiple comparisons of group effects on emotion-regulation self-efficacy as the dependent variable.

dependent variable		Group	Compare the group	Mean difference	standard error	p
Positive mood	Regulate positive emotions	Yoga Group	Running Group	-.123	.402	.761
			Control Group	.743	.393	.061
		Running Group	Yoga Group	.123	.402	.761
			Control Group	.866*	.408	.036
		Control Group	Yoga Group	-.743	.393	.061
			Running Group	-.866*	.408	.036
Negative emotions	Regulate frustration/pain	Yoga Group	Running Group	-.442	.536	.411
			Control Group	1.240*	.519	.019
		Running Group	Yoga Group	.442	.536	.411
			Control Group	1.683*	.543	.003
		Control Group	Yoga Group	-1.240*	.519	.019
			Running Group	-1.683*	.543	.003
	Regulate anger/irritability	Yoga Group	Running Group	-.180	.571	.753
			Control Group	1.534*	.557	.007
		Running Group	Yoga Group	.180	.571	.753
			Control Group	1.714*	.578	.004
		Control Group	Yoga Group	-1.534*	.557	.007
			Running Group	-1.714*	.578	.004

3.3 Analysis of the mediating effect of emotional self-efficacy in exercise participation and negative mood of anxiety and depression

As shown in Table 9, the correlations between the variables of anxiety and depression and the dimensions of emotion regulation self-efficacy were calculated separately. The results showed that there was a significant negative correlation between anxiety level and self-efficacy for regulating positive emotions, self-efficacy for regulating frustrated/painful emotions, and self-efficacy for regulating angry/irritable emotions with $P<0.05$, while there was a significant negative correlation between depression level and self-efficacy for regulating positive emotions, self-efficacy for regulating frustrated/painful emotions, and self-efficacy for regulating angry/irritable emotions with $P<0.05$. negative correlation. This indicates that the reduction in anxiety and depression levels could be associated with the enhancement of self-efficacy in emotional regulation.

ISSN 2618-1576 Vol. 7, Issue 6: 50-60, DOI: 10.25236/FSR.2025.070608

Table 9: Cortests of anxiety and depression with emotional self-efficacy after exercise intervention.

		Regulating Positive Emotional Self-Efficacy	Regulating Negative Emotional Self-Efficacy	
			Regulate frustration/pain	Regulate anger/irritability
Anxiety	correlation coefficent	-0.328*	-0.476**	-0.521**
	P-value	0.023	0.001	0.000
Depression	correlation coefficent	-0.367*	-0.433**	-0.469**
	P-value	0.010	0.002	0.001
* p<0.05 ** p<0.01				

As shown in Table 9, Mediation effects were analyzed based on Bootstrap with exercise participation mode as the independent variable, anxiety or depression as the dependent variable, and each dimension of emotional self-efficacy as the mediating variable.

Table 10: Summary of the mediation effect test results.

Subject	c gross effect	a	b	a*b Intermediary effect	a*b (Boot SE)	a*b (z)	a*b (p)	a*b (95% BootCI)	c' direct effect	inspect the conclusion
Exercise style => regulation of anger / irritability emotional self-efficacy => anxiety	3.000**	-0.735	-0.882*	0.648	0.056	11.641	0.000	0.003 ~ 0.215	2.352*	Part of the intermediary
Exercise style => modulation of depression / distress emotional self-efficacy => depression	3.376**	-0.735	-0.861**	0.633	0.057	11.149	0.000	0.007 ~ 0.228	2.743**	Part of the intermediary

* p<0.05 ** p<0.01

Bootstrap type: percentile bootstrap

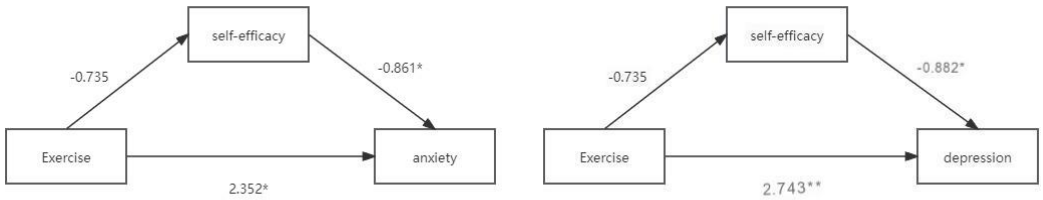

Figure 1: Partial Mediation Effect.

As shown in Table 10,The analysis found that the mediating effect of regulating anger/irritability self-efficacy was significant for anxiety levels, which was partially mediated, and for depression levels regulating anger/irritability self-efficacy was significant, which was partially mediated. This indicates that engaging in physical activity may impact individuals' self-efficacy in managing anger and irritability, subsequently affecting the enhancement of their negative emotional states (Figure 1).

4. Discussion

4.1 The analysis of the psychological negative emotional state of the subject students

As a result of the pre-test, all three student groups exhibited varying levels depression and anxiety, which were comparable at the initial assessment, partly due to the subject selection process during the pre-test. After an 8-week period, those in the yoga and running groups showed a notable enhancement in

ISSN 2618-1576 Vol. 7, Issue 6: 50-60, DOI: 10.25236/FSR.2025.070608

their negative mood states, whereas the control group displayed no significant changes in the levels of depression and anxiety following the same timeframe(Hendriks et al., 2017). This kind of negative emotions may exist during the transition to middle school or arise from the adjustments required upon entering high school and college(Blakemore, 2019). Factors contributing to these feelings can include the competitive nature of college entrance examinations, the perception of peers excelling academically, which diminishes one's sense of accomplishment, increased academic pressure due to heightened study difficulty, as well as the challenges of adapting to a communal living environment and navigating interpersonal relationships with classmates(Cataldo Miranda, 2023; Davey & McGorry, 2019). To a certain extent, these negative emotions affect the academic performance and overall well-being of students.

4.2 Selection of exercise modes to be included in the intervention

After conducting an 8-week intervention study, we observed that nearly all participants in the yoga group persisted, and 1/3 of the students in the running group gave up their participation despite the fact that we detected them through the APP and gave encouragement through WeChat. In the yoga exercise group, enhanced by gentle music and guided by the instructor, the stretching of the body accompanied by abdominal breathing was more effective in improving the individual's mood and alleviate tension in nerves(Gustavson et al., 2021). At the end of the 8-week course, every participant remained committed throughout the duration, exhibiting no signs of disengagement or hesitation to continue. The findings highlighted that the instructor's mentorship, along with the support and motivation from peers, significantly impacted the participants' dedication to engaging in physical activity and alleviating negative emotional states(Cooper et al., 2024). This is consistent with the feedback we collected from the focus groups, which indicated that female students were more receptive to yoga, which is a group exercise with a moderate amount of exercise and a certain aesthetic appeal, and that they were more likely to participate.

4.3 The effects of different physical exercise modalities on home students' emotion regulation self-efficacy, subjective well-being, and depression

Based on the outcomes of this research, both types of physical activity interventions can improve the anxiety and depression levels among female college students. Therefore, scientific, rational and effective physical exercise can play an effective role in regulating the negative emotions of female college students, which is consistent with the results of previous studies(Hendriks et al., 2017; Parkinson & Smith, 2023). Consistent engagement in physical exercise can enhance mental well-being and alleviate the detrimental effects associated with stress. Potential explanations include, firstly, the physiological alterations induced by physical exercise can cause functional or structural changes in the brain, accelerate cerebral blood flow and metabolism, and produce physiological hormones to inhibit the production of related negative emotions(Qin et al., 2024); secondly, exercise interventions affect insulin metabolism, accelerate metabolism, and influence the intermediary mechanism of neuroendocrine responses, thereby influencing human mood(Małkowska, 2024).

It was also found that fitness yoga was even better than APP running in improving anxiety and depression among female college students, which was largely due to the fact that the yoga group had the full intervention and encouragement of the instructor, while APP running required more persistence and self-regulation from the participants themselves. As we are all aware, application-based jogging alleviates anxiety and depression through the form of training sweating. However, given that running is predominantly an individual activity, particularly during strenuous efforts, it necessitates a significant degree of perseverance and self-discipline to discover the satisfaction and joy of overcoming personal challenges. Consequently, many participants may find it quite easy to abandon their efforts at this critical juncture. On the other hand, it could also be attributed to the calming and tranquil background music, which can stimulate the auditory nerves of the practitioners and loosen the tension. For the students, their attention is entirely directed toward their own bodies throughout the exercise(Allen et al., 2021). The various stretching techniques and postural training serve the objective of physical conditioning, while abdominal breathing facilitates a rhythmic, gradual, gentle, deep, and fluid breath, allowing practitioners to relax their bodies and promote mental regulation(Thompson et al., 2021).

ISSN 2618-1576 Vol. 7, Issue 6: 50-60, DOI: 10.25236/FSR.2025.070608

4.4 The mediating role of emotional self-efficacy in the effects of fitness yoga exercise on emotion regulation

The study explored the complex relationship between physical exercise, mental health and emotion regulation self-efficacy. Physical exercise emotion regulation self-efficacy has both direct and indirect effects on anxiety and depression, but emotion regulation self-efficacy has a greater direct effect on anxiety and depression, whereas the effect of physical exercise is mostly reflected through the indirect effect of emotion regulation self-efficacy(Zhang et al., 2024). In addition, the mediating mechanisms of negative emotion regulation self-efficacy in the improvement of anxiety and depression by exercise interventions were different. Among the negative emotion regulation self-efficacy, the regulation of frustration/distress self-efficacy was the mediating mechanism for the improvement of anxiety, whereas the regulation of anger/rage self-efficacy was the mediating mechanism for the improvement of depression(Hasking et al., 2018). This provides a theoretical and practical basis for revealing the mechanisms by which exercise improves anxiety and depression, and suggests that more attention should be paid to the enhancement of self-efficacy for emotion regulation in physical exercise, which is an important way to improve the effectiveness of exercise interventions in improving negative emotions.

5. Conclusion

In conclusion, an eight-week yoga- and running-based exercise program significantly improved anxiety, depression, and emotion regulation self-efficacy in female college students, with yoga showing slightly better adherence and outcomes than running. Emotion regulation self-efficacy partially mediated the effects of exercise on negative emotions, suggesting that strengthening students' confidence in managing their emotions may enhance the mental health benefits of exercise interventions.

References

[1] Aguinis, H., & Solarino, A. M. (2019). Transparency and replicability in qualitative research: the case of interviews with elite informants. Strategic Management Journal, 40(8), 1291–1315.
[2] Allen, J. G., Romate, J., & Rajkumar, E. (2021). Mindfulness-based positive psychology interventions: a systematic review. BMC Psychology, 9(1), 116.
[3] Blakemore, S.-J. (2019). Adolescence and mental health. Lancet, 393(10185), 2030–2031.
[4] Brink, E., Dellve, L., Hallberg, U., Abrahamsson, K. H., Klingberg, G., & Wentz, K. (2006). Constructing grounded theory. A practical guide through qualitative analysis. International Journal of Qualitative Studies On Health and Well-Being, 1(3), 188–192.
[5] Cataldo Miranda, P. (2023). Re: "Environmental vs psychosocial barriers to active commuting to university: which matters more?" Public Health, 225, e3–e4.
[6] Choi, K. W., Zheutlin, A. B., Karlson, R. A., Wang, M., Dunn, E. C., Stein, M. B., … Smoller, J. W. (2020). Physical activity offsets genetic risk for incident depression assessed via electronic health records in a biobank cohort study. Depression and Anxiety, 37(2), 106–114.
[7] Cooper, R. E., Saunders, K. R. K., Greenburgh, A., Shah, P., Appleton, R., Machin, K., … Johnson, S. (2024). The effectiveness, implementation, and experiences of peer support approaches for mental health: a systematic umbrella review. BMC Medicine, 22(1), 72.
[8] Davey, C. G., & McGorry, P. D. (2019). Early intervention for depression in young people: a blind spot in mental health care. The Lancet Psychiatry, 6(3), 267–272.
[9] DiCicco-Bloom, B., & Crabtree, B. F. (2006). The qualitative research interview. Medical Education, 40(4), 314–321.
[10] Fu Xiaolan, Zhang Kan. (2023). Mental Health Blue Book China National Mental Health Development Report(2021-2022)（in Chinese）. Social Sciences Literature Publishing House.
[11] Glaser, B. G., Strauss, A. L., & Strutzel, E. (1968). The discovery of grounded theory; strategies for qualitative research, Nursing Research, 17(4), 364.
[12] Guo, Y., Qin, K., Yu, Y., Wang, L., Xu, F., Zheng, Q., … Zheng, J. (2024). Physical exercise can enhance meaning in life of college students: the chain mediating role of self-efficacy and life satisfaction. FRONTIERS IN PSYCHOLOGY, 14, 1306257.
[13] Gustavson, D. E., Coleman, P. L., Iversen, J. R., Maes, H. H., Gordon, R. L., & Lense, M. D. (2021). Mental health and music engagement: review, framework, and guidelines for future studies. Translational Psychiatry, 11(1), 1–13.
[14] Hasking, P., Boyes, M., & Greves, S. (2018). Self-efficacy and emotionally dysregulated behaviour: an exploratory test of the role of emotion regulatory and behaviour-specific beliefs. Psychiatry Research,

ISSN 2618-1576 Vol. 7, Issue 6: 50-60, DOI: 10.25236/FSR.2025.070608

270, 335–340.
[15] Hendriks, T., De Jong, J., & Cramer, H. (2017). The effects of yoga on positive mental health among healthy adults: a systematic review and meta-analysis. Journal of Alternative and Complementary Medicine, 23(7), 505–517.
[16] Kaufmann, L., Ninaus, M., Weiss, E. M., Gruber, W., & Wood, G. (2022). Self-efficacy matters: Influence of students' perceived self-efficacy on statistics anxiety. Annals of the New York Academy of Sciences, 1514(1), 187–197.
[17] Larsen, R. T., Wagner, V., Korfitsen, C. B., Keller, C., Juhl, C. B., Langberg, H., & Christensen, J. (2022). Effectiveness of physical activity monitors in adults: systematic review and meta-analysis. BMJ (Clinical Research Ed.), 376, e068047.
[18] Lee, F. S., Heimer, H., Giedd, J. N., Lein, E. S., Šestan, N., Weinberger, D. R., & Casey, B. J. (2014). Adolescent mental health—opportunity and obligation. Science, 346(6209), 547–549.
[19] Li, N., Zhao, S., Liu, C., Dai, K., & Huang, W. (2023). Exploring the relationship between perceived social support and college students' autonomous fitness behavior: chain mediating effect test. Frontiers in Psychology, 13, 1036383.
[20] Li, X., Xia, B., Shen, G., Dong, R., Xu, S., & Yang, L. (2024). The interplay of depressive symptoms and self-efficacy in adolescents: a network analysis approach. Frontiers in Psychology, 15, 1419920.
[21] Liu. (2020). Developmental trajectories of depressed mood in college students based on a latent variable mixed growth model: a 3-year follow-up study（in Chinese）. Chinese Journal of Clinical Psychology, 28(1), 71–75, 118.
[22] Małkowska, P. (2024). Positive effects of physical activity on insulin signaling. Current Issues in Molecular Biology, 46(6), 5467–5487.
[23] Mohd Arifin, S. R. (2018). Ethical considerations in qualitative study. International Journal Of Care Scholars, 1(2), 30–33.
[24] Noetel, M., Sanders, T., Gallardo-Gómez, D., Taylor, P., Del Pozo Cruz, B., Van Den Hoek, D., ... Lonsdale, C. (2024). Effect of exercise for depression: systematic review and network meta-analysis of randomised controlled trials. BMJ, e075847.
[25] Parkinson, T. D., & Smith, S. D. (2023). A cross-sectional analysis of yoga experience on variables associated with psychological well-being. Frontiers in Psychology, 13.
[26] Pertl, M. M., Perez, S., Collier, S., Guinan, E., Monahan, G., Verling, K., ... Doyle, F. (2022). Effective maNagement of depression among patients witH cANCEr (ENHANCE): a protocol for a hybrid systematic review and network meta-analysis of randomised controlled trials of interventions for depressive symptoms. Systematic Reviews, 11(1), 239.
[27] Qin, G.-Y., Han, S.-S., Zhang, Y.-S., Ye, Y.-P., & Xu, C.-Y. (2024). Effect of physical exercise on negative emotions in Chinese university students: The mediating effect of self-efficacy. Heliyon, 10(17), e37194.
[28] Thapar, A., Eyre, O., Patel, V., & Brent, D. (2022). Depression in young people. Lancet, 400(10352), 617–631.
[29] Thompson, C., Quigley, E., & Taylor, A. (2021). The influence of a short-term mindfulness meditation intervention on emotion and visual attention. Journal of Cognitive Enhancement, 5(1), 73–82.
[30] Wang. (2013). Revision of the Scale of Regulatory Emotional Self-efficacy（in Chinese）. Journal of Guangzhou University (Social Science Edition), 12(1), 45–50.
[31] Wang, K., Li, Y., Zhang, T., & Luo, J. (2022). The relationship among college students' physical exercise, self-efficacy, emotional intelligence, and subjective well-being. International Journal of Environmental Research and Public Health, 19(18), 11596.
[32] Zhang, G., Feng, W., Zhao, L., Zhao, X., & Li, T. (2024). The association between physical activity, self-efficacy, stress self-management and mental health among adolescents. Scientific Reports, 14(1), 5488.
[33] Zung, W. W. (1971). A rating instrument for anxiety disorders. Psychosomatics, 12(6), 371–379.