

## *Effect of Football Training on Pupils' Loneliness--the Mediating Role of Self-Esteem*

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**Keywords:** Football training, Children, Loneliness, Self-esteem

**Abstract:** Introduction: The purpose of this study was to investigate the effects of four weeks' football training on loneliness, to explore the mechanism of football training directly affecting loneliness; and through exploring the mediating effect of self-esteem on football training and loneliness. The relationship among loneliness, self-esteem and football and the internal mechanism of action are clarified. Methods: Taking 60 students from the third grade of a primary school in Jinan City as the subjects, the students are in the age range of 8-10 years old. The students are randomly divided into two groups, 30 people in each group, one group is the experimental group and the other group is the control group. The "Children's Loneliness Scale" is used to measure the degree of loneliness of students, and the "Self-Esteem Scale" is used to measure the level of students' self-esteem. Use statistical software SPSS 26.0 to establish a database and perform statistical analysis. The test data adopts 2 (group: experimental group, control group)  $\times$  2 (test time: pre-test, post-test) repeated measurement analysis of variance. Use the structural equation model to test the mediating role of self-esteem in football training and loneliness. Results: After four weeks' football training: 1. the time of main effect of the loneliness score test is significant ( $F(1,42) = 5.36, p < 0.05, \eta^2 = 0.11$ ); the main effect of the group is not significant ( $F(1,42) = 82.10, p > 0.05, \eta^2 = 0.01$ ); the interaction effect of the test time\*group is significant ( $F(1,42) = 21.01, p < 0.05, \eta^2 = 0.10$ ). In addition, simple effect analysis shows that there is no significant difference in loneliness score between the pre-test experimental group and the control group ( $F = 0.10, p > 0.05$ ), there are significant differences in loneliness scores before and after the experimental group ( $F = 10.24, p < 0.05$ ), there is no significant difference in loneliness scores before and after the control group ( $F = 0.01, p > 0.05$ ), the average loneliness score of the experimental group after exercise intervention is lower than before. 2. the main effect of self-esteem score test time is significant ( $F(1,42) = 14.32, p < 0.01, \eta^2 = 0.25$ ); the main effect of the group is not significant ( $F(1,42) = 104.73, p > 0.05, \eta^2 = 0.05$ ); the interaction effect of the test time\*group is significant ( $F(1,42) = 4.60, p < 0.05, \eta^2 = 0.10$ ). Simple effect analysis shows that there is no significant difference in self-esteem scores between the pre-test experimental group and the control group ( $F = 0.85, p > 0.05$ ), and there is no significant difference in self-esteem scores before and after the control group ( $F = 1.35, p > 0.05$ ), there are significant differences in self-esteem scores before and after the experimental group ( $F = 17.58, p < 0.05$ ), the average self-esteem score of the experimental group after exercise intervention is higher than that before the intervention. 3. The correlation between self-esteem and loneliness is significant ( $r = -0.50, p < 0.01$ ). Football has a significant positive predictive effect on self-esteem ( $p < 0.05$ ); self-esteem has a significant negative predictive effect on loneliness ( $p < 0.01$ ); football has a significant negative predictive effect on

loneliness ( $p < 0.05$ ). The direct effect of football on loneliness is not significant, but the total indirect effect of football on loneliness is significant, and the mediating effect of self-esteem is significant in football → self-esteem → loneliness. Conclusions: 4 weeks of football training can significantly reduce the loneliness of primary school students and can effectively promote the improvement of primary school students' self-esteem; self-esteem plays a completely mediating role in the impact of football training on loneliness.

## 1. Introduction

Loneliness is a negative emotional reaction of alienation, loss and dissatisfaction based on children's self-perception of their social status in the group<sup>[1]</sup>. Loneliness is regarded as the abnormal experience that promotes the connection with others. Childhood loneliness is easy to make children have no sense of social belonging, will bring great pain and trouble to children. Loneliness in childhood is often chronic, and its effects may persist into adolescence and even adulthood, leading to mental health problems in adolescence and adulthood<sup>[2]</sup>.

Pupils are in the critical period of adolescence, which is the high incidence of psychological problems. It is very important to reduce the loneliness of students for their mental health. It has been reported that 11.3% of children aged 10-15 often feel lonely, with children aged 10-12 (14.0 %) more often than children aged 13-15 (8.6%)<sup>[3]</sup>, which suggests that the experience of loneliness in childhood is more prevalent and common than at any other age<sup>[4]</sup>. Studies have shown that physical activity and exercise can improve students' physical health and reduce depression<sup>[5]</sup>, positive emotion is beneficial to reduce children's loneliness<sup>[6]</sup>. Campus football training, as a widely promoted form of sports in China, is popular among students of all ages. The development of campus football is a part of school sports. It not only carries the historical responsibility of the Chinese football dream, but also provides physical and mental education for the students participating in it<sup>[7]</sup>. At the same time, football plays a positive role in reducing the loneliness of left-behind children in rural areas<sup>[8]</sup>. Therefore, exploring the impact of football training on the loneliness of primary school students will help to expand the awareness of youth football on improving the loneliness of primary school students. It will not only inject new vitality into the monotonous campus life, but also have a positive impact on the development of students' physical and mental health.

Self-esteem is a kind of self-evaluation conducted by individuals based on external evaluation. It is an important part of self-awareness and has an important influence on self-cognition, emotion and behavior<sup>[9]</sup>. It also plays an important mediating role<sup>[10]</sup>. Empirical research shows that football training has a positive effect on improving students' physical self-esteem<sup>[11]</sup>, students in sports, individuals with high self-esteem characteristics can effectively alleviate negative emotions, enhance their psychological adaptation and adjustment capabilities, and improve their mental health<sup>[12]</sup>, positive emotions help reduce students' loneliness. Based on this, it is inferred that the self-esteem of primary school students may play a mediating role between football and loneliness.

Researching and understanding children's psychological problems is conducive to improving children's academic performance, social abilities and mental health, and promoting family happiness and social harmony<sup>[13]</sup>. Therefore, the purpose of this study is to explore the influence of four-week football training on loneliness, and use self-esteem as a mediating variable of football training on loneliness. On the one hand, it is possible to clarify the mechanism by which football training directly affects loneliness; On the other hand, it is hoped that by exploring the mediating role of self-esteem in surrounding football training and loneliness, the relationship and internal mechanism of loneliness,

self-esteem, and football can be more clarified. So as to improve the current level of self-esteem and loneliness of primary school students, improve the level of mental health of primary school students to put forward more targeted suggestions and opinions.

## **2. Participants and Methods**

### **2.1 Participants**

Taking 60 students in grade three of a primary school in Jinan City as the subjects, the age range is 8-10 years old. The students participating in the study have not participated in systematic sports training, have no basis in football sports, and have not participated in any other sports activities except for the PE in school and our training. All subjects were volunteered to participate in our study and signed an informed consent. Subjects were randomly divided into two groups, each with 30 people, one group was the experimental group, and the other was the control group.

### **2.2 Methods**

#### **2.2.1 Questionnaire Survey**

Children's Loneliness Scale (CLS): A scale developed by Asher (1984) to assess children's loneliness and social dissatisfaction. There are a total of 24 items, using a 5-point scoring method. The higher the total score, the stronger the sense of loneliness.

Self-esteem Scale (SES): The Chinese version of the "Self-Esteem Scale" compiled by Rosenberg (1965) and revised by Chinese scholars (Xiangdong Wang et al., 1999). There are 10 items in the scale, and the Likert 4-point scoring method is adopted. The higher the total score, the higher the level of individual self-esteem.

Before and after the test, the experimenter explained the filling requirements. The subjects filled out the scales according to their actual conditions. All scales were taken back on the spot after the subjects completed their answers.

#### **2.2.2 Procedure**

The experiment adopted a two-factor mixed experimental design of 2 (group: experimental group, control group)  $\times$  2 (test time: pre-test, post-test). the group is the inter-subject variable, the test time is the intra-subject variable; the four-week football training are the independent variables, and loneliness and self-esteem are the dependent variables.

In addition to normal teaching, the experimental group was given a 4-week medium-intensity football training, with basic football movements, football games and football matches as the main training content. There are 5 training sessions every on Monday, Wednesday, Friday, Saturday and Sunday, each training for 90 minutes. The control group did not receive any physical training except normal class. The two groups of subjects were filled in the questionnaires of the Child Loneliness Scale and the Self-Esteem Scale before and after the intervention.

#### **2.2.3 Data Processing and Analysis**

Use Excel 2016 software to enter, classify, and organize test data. Use statistical software SPSS 26.0 to establish a database and perform statistical analysis, the test data adopts the repeated measures analysis of variance method of 2 (group: experimental group, control group)  $\times$  2 (test time: pre-test, post-test). Use the structural equation model to test the mediating role of self-esteem in football and loneliness.

### 3. Results

Take the test time (pre-test, post-test) as the intra-group variable, and the group (experimental group, control group) as the inter-group variable. To analyze the impact of football on pupils' loneliness and self-esteem, the two groups of subjects' loneliness and self-esteem scores were used as dependent variables to perform a 2\*2 repeated measures analysis of variance. The descriptive statistical results are shown in Table 1.

*Table 1 Descriptive Statistical Results of Loneliness and Self-Esteem Scores Before and after the Test of the Experimental Group and the Control Group (m±Sd)*

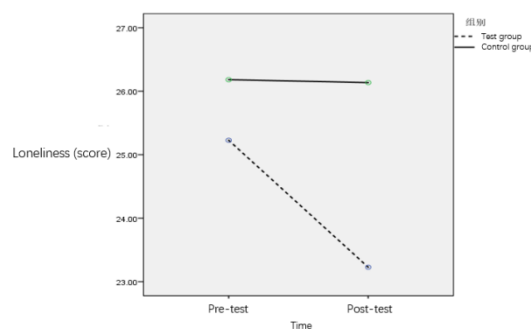
	Test group(n=30)		Control group(n=30)	
	Pre-test	Post-test	Pre-test	Post-test
Loneliness (score)	25.05±10.13	23.23±9.54	26.18±9.72	26.14±10.22
Self-esteem (score)	34.14±5.09	36.27±4.89	32.73±4.91	33.32±5.01

#### 3.1 Loneliness

After four weeks' football training, the time of main effect of the loneliness score test is significant ( $F_{(1,42)}=5.36, p<0.05, \eta p^2=0.11$ ); the main effect of the group is not significant ( $F_{(1,42)}=82.10, p>0.05, \eta p^2=0.01$ ); the interaction effect of the test time\*group is significant ( $F_{(1,42)}=21.01, p<0.05, \eta p^2=0.10$ ). simple effect analysis shows that there is no significant difference in loneliness score between the pre-test experimental group and the control group ( $F=0.10, p>0.05$ ), there are significant differences in loneliness scores before and after the experimental group ( $F=10.24, p<0.05$ ), there is no significant difference in loneliness scores before and after the control group ( $F=0.01, p>0.05$ ), the average loneliness score of the experimental group after exercise intervention is lower than before the intervention. The above results show that four weeks' football training can significantly reduce the loneliness score of primary school students. Shown in Table 2, Figure 1.

*Table 2 Time of Loneliness Score Test, Group Main Effect and Interaction Effect (m±Sd)*

		SS	df	MS	F	p	$\eta p^2$
Within the subject	Testing time	23.01	1	23.01	5.36	0.026	0.11
	Testing time * Group	21.01	1	21.01	4.89	0.033	0.10
Inter-subject	Group	82.10	1	82.10	0.43	0.515	0.01



*Fig.2 Time of Loneliness Score Test, Group Main Effect and Interaction Effect*

#### 3.2 Self-Esteem

After four weeks' football training, the time main effect of self-esteem score test is significant ( $F_{(1,42)}=14.32, p<0.01, \eta p^2=0.25$ ); the main effect of the group is not significant ( $F_{(1,42)}=104.73, p>0.05$ ,

$\eta^2=0.05$ ); the interaction effect of the test time\*group is significant ( $F_{(1,42)}=4.60, p<0.05, \eta^2=0.10$ ). simple effect analysis shows that there is no significant difference in self-esteem scores between the pre-test experimental group and the control group ( $F=0.85, p>0.05$ ), and there is no significant difference in self-esteem scores before and after the control group ( $F=1.35, p>0.05$ ), there are significant differences in self-esteem scores before and after the experimental group ( $F=17.58, p<0.05$ ), the average self-esteem score of the experimental group after exercise intervention was higher than that before the intervention. The above results show that four weeks' football training can significantly improve the self-esteem scores of primary school students. Shown in Table 3, Figure 2.

Table 3 the Time Of Self-Esteem Score Test, Group Main Effect and Interaction Effect ( $m\pm Sd$ )

		SS	df	MS	F	p	$\eta^2$
Within the subject	Testing time	40.91	1	40.91	14.32	0.000	0.25
	Testing time * Group	13.14	1	13.14	4.60	0.038	0.10
Inter-subject	Group	104.73	1	104.73	2.24	0.142	0.05

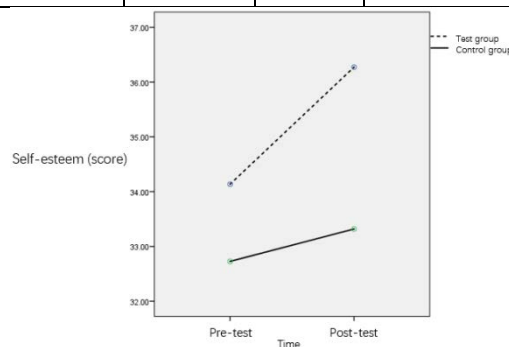


Fig.3 The Time of Self-Esteem Score Test, Group Main Effect and Interaction Effect

### 3.3 Mediating Effect

The Pearson correlation coefficient was further used to analyze the correlation between the change in self-esteem and the change in loneliness before and after the intervention. The results show that there is a significant correlation between self-esteem and loneliness ( $r=-0.50, p<0.01$ ). Based on the analysis of theories of football training, loneliness and self-esteem and related research conclusions, according to Wen Zhonglin's new mediating effect test process, the structural equation model is used to test the mediating role of self-esteem in the relationship between football training and loneliness. Shown in Figure 3.

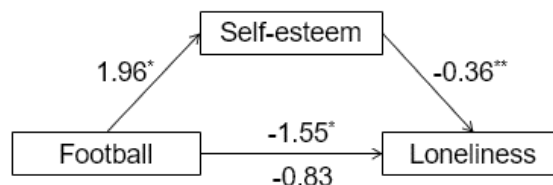


Fig.3 Mediating Effect Model of Self-Esteem in the Influence of Four Weeks of Football on Loneliness

Regression analysis found that: football training has a significant positive predictive effect on self-esteem ( $p<0.05$ ); Self-esteem has a significant negative predictive effect on loneliness ( $p<0.01$ ); Football training has a significant negative predictive effect on loneliness ( $p<0.05$ ). Shown in Table 4. The direct effect of football training on loneliness is not significant, but the total indirect effect of

football on loneliness is significant, and the mediating effect of self-esteem is significant in football → self-esteem → loneliness. Shown in Table 5.

*Table 4 Regression Coefficients Of Football Activity, Self-Esteem and Loneliness (m±Sd)*

Independent variable	dependent variable	B	SE	T	p	LLCI	ULCI
Football	Self-esteem	1.96	0.88	2.21	0.033	0.17	3.74
Self-esteem	Loneliness	-0.36	0.11	-3.20	0.003	-0.59	-0.13
Football	Loneliness	-1.55	0.72	-2.14	0.038	-3.0	-0.09

*Table 5 Statistical Results Of Direct and Indirect Effects of Football Training and Loneliness (m±Sd)*

	Effect	SE	LLCI	ULCI
Direct effect	-0.83	0.69	-2.23	0.56
Total indirect effect	-0.71	0.44	-1.71	-0.03
Football → Self-esteem → Loneliness	-1.55	0.72	-3.00	-0.09

#### 4. Discussion

Our study shows that compared with the control group, the loneliness of elementary school students decreased significantly after four weeks' football training. Sameer K also proposed in the study that football training intervention has a positive effect on reducing children's loneliness<sup>[14]</sup>. This is because loneliness is a kind of depression and negative feeling experienced by individuals because they are often not accepted in group relationships or intimate relationships<sup>[15]</sup>. Often accompanied by anxiety, depression, despair and other bad emotions<sup>[16]</sup>. Football is a team sport. Cooperative learning mode is often used for training. It can not only promote communication and interaction between students, but also cultivate their team awareness and cooperation ability, and mobilize their positive emotions<sup>[17]</sup>. At the same time, the competitive nature of football can arouse children's desire to compete, and make students coordinate and cooperate and work together for victory in the process of continuous competition, increased mutual interaction in the atmosphere of competition, thereby improving students' social skills, which is conducive to promoting the establishment of interpersonal relationships between students, improving students' teamwork ability, increasing their sense of group integration, and helping to alleviate loneliness<sup>[18]</sup>. In addition, physical exercise can also promote the release of neurotransmitters. In the process of football, the nervous system can be effectively regulated, and a large amount of dopamine will also be produced<sup>[19]</sup>. It is very beneficial to the neutralization of students' excitement and negative emotions, and can alleviate depression, anxiety and other bad emotions<sup>[20]</sup>. This has a positive effect on weakening students' sense of loneliness.

In addition, this study confirmed that physical exercise is an important factor affecting the development of pupils' self-esteem<sup>[21-23]</sup>. The four-week football sports have a significant impact on pupils' self-esteem, and it has a significant positive correlation with self-esteem. In today's society, people's requirements for beauty are getting higher and higher<sup>[24]</sup>. The self-esteem of children and adolescents is largely affected by their appearance, and by what they think is the appearance<sup>[25]</sup>. Physical activity will change the body's self-esteem and then affect the overall self-esteem. This is because physical activity can change the body shape, so that students can establish a good sense of self-achievement, and self-efficiency promotes the development of physical self-esteem<sup>[26]</sup>. Football is known as the "world's No. 1 sport" and requires the coordination of the entire body of the individual to complete the technical movements in the game. This requires high flexibility, agility and coordination of the participants, and has a good exercise effect<sup>[11]</sup>. In addition, due to the large field of football matches and the large number of participants, its high intensity and strong antagonism

are not comparable to ordinary sports. Therefore, football has a very good role in promoting the strength, endurance and body shape of the participants. And the biggest feature of campus football is to encourage students to break through many difficulties, surpass themselves, and realize themselves, especially in the field of cheering from other students in the class will also promote their pride and self-confidence. All these have a positive effect on the development of students' self-esteem level.

At the same time, this experiment shows that self-esteem and loneliness have a significant negative correlation, and this result is consistent with existing related studies that self-esteem has a negative predictive effect on students' loneliness 性<sup>[27-29]</sup>, and self-esteem plays a complete mediating role between football training and loneliness. This may be because football is a team sport. The cooperation between players during the sport can promote the feeling that individuals with high self-esteem are accepted by the group in peer relationships. The better the peer relationship, the less the loneliness<sup>[30, 31]</sup>. And elementary school students are in childhood, children at this stage are full of curiosity, imitating ability and competitive spirit, but at the same time they are not easy to concentrate, and their emotions fluctuate greatly. Physical activity has a certain effect on strengthening students' collective awareness and increasing communication between students, and can also enhance physical health and relieve depression<sup>[5, 32]</sup>, individuals with higher self-esteem are more capable of relieving negative emotions. Positive emotions and a good sense of group integration help reduce children's loneliness<sup>[33]</sup>.

## 5. Conclusion and Shortcomings

### 5.1 Conclusion

4 weeks of football training can effectively reduce the loneliness of primary school students; 4 weeks of football training can effectively promote the self-esteem level of primary school students; Self-esteem plays a completely mediating role in the influence of football training on loneliness.

### 5.2 Shortcomings

In this study, 60 third-grade pupils were selected as the research objects. Due to the experimental site and the age of the students, it would be difficult to use more complex equipment operations, so the scale test was chosen. Although the results of the study show that 4 weeks' football training has a certain effect on loneliness, and it can negatively predict loneliness through the mediating effect of self-esteem. However, there are fewer students in the test, more concentrated age, and the problems reflected are more one-sided. In the future, it is possible to conduct sports intervention research on more pupils of different grades, and if conditions permit, choose functional magnetic resonance imaging (fMRI), functional near infrared spectroscopy and other brain mechanism test tools that can observe changes in brain nerve structure, On the basis of the existing theoretical research, the mechanism of the influence of football on loneliness is further explored.

## 6. Suggest

Individuals with high levels of loneliness and low self-esteem are likely to regard their interpersonal environment as threatening and insecure<sup>[34]</sup>. Throughout the whole process of human development, the physical function and mental development of childhood play a vital role in the development of later adulthood, and children in this period have high physical and psychological plasticity<sup>[35]</sup>. Under the influence of the concept of test-oriented education, parents and schools pay more attention to cultural lessons and academic performance, and tend to ignore the importance of physical exercise. If blindly pursuing students' academic performance and ignoring the requirements

for physical and mental health, not only is it not conducive to the physical and mental health of students, but also leads to a decline in academic performance<sup>[36]</sup>. Football is loved by many children because of its unique charm and the characteristics that are beneficial to the overall development of children's body and mind<sup>[8]</sup>. Therefore, it is recommended that schools respond to the call of “campus football” and promote football sports in schools. At the same time, in the process of football teaching, not only should the children's growth and development characteristics be fully considered, but also the boring basic exercises should be selected as little as possible, and more basic movements and technical learning content composed of games and competitions should be selected. This can more stimulate students' interest and enthusiasm for competition, and it is also conducive to the development of students' mental health to the maximum<sup>[37]</sup>.

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