

Study on the Relationship and Intervention of Residents' Sports Participation, Social Capital and Subjective Well-being



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Study on the Relationship and Intervention of Residents' Sports Participation, Social Capital and Subjective Well-being



for Doctor of Philosophy (Exercise and Sport Science)

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The examining committee has unanimously approved this Thesis, submitted by Ms. Xianli Lyu, as a partial fulfillment of the requirements for the Doctor of Philosophy Exercise and Sport Science at Mahasarakham University

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#### **ABSTRACT**

The main purpose of this study is to explore the relationship among sports participation, social capital and subjective well-being. In order to achieve this goal, we take happiness theory, physical exercise behavior theory and social capital theory as the theoretical basis of research, and comprehensively use literature method, project-goal consistency index (IOC) test method, questionnaire survey method, mathematical statistics method and experiment method.

The study was conducted in three different phases. In the first stage, a comprehensive questionnaire on residents' sports participation, social capital and subjective well-being was prepared to provide an operable measurement tool for subsequent research. The second stage is to carry out a questionnaire survey. On this basis, a variety of mathematical statistical analysis methods such as independent sample t test, multivariate analysis of variance, correlation analysis and regression analysis are comprehensively used to analyze the relationship among residents' sports participation, subjective well-being and social capital, as well as the differences among different gender and age groups. The third stage is to use the experimental method, through an 8-week controlled experiment, to verify the effect of sports participation behavior on individual subjective well-being.

The results are as follows:

In the first stage, based on the relevant research results of domestic and foreign scholars, this study compiled a comprehensive questionnaire of residents' sports participation, social capital and subjective well-being. The questionnaire included basic information survey and 3 subscales of physical exercise motivation, social capital and subjective well-being, with a total of 68 questions. Nine experts were invited to evaluate the questionnaire. The evaluation results showed that the IOC evaluation score of each item design was greater than or equal to  $0.78(\geq 0.78)$ , and the Cronbach's alpha coefficient of each dimension index of the pre-survey questionnaire was between 0.817-0.921, all of which were more than 0.7, indicating the reliability of the questionnaire design results and providing a reliable research tool for subsequent research.

In the second stage, through descriptive statistics and difference analysis, it is found that there is still a lot of room for improvement in residents' sports participation. The average physical exercise of residents is 24.3015, which belongs to the medium level (19< physical exercise  $\leq$ 42). There are also significant differences between different genders and different age groups, with males being higher than females and 46-60 years old being better than other age groups. Secondly, there are significant differences in the social capital of residents of different genders and different age groups. Males are higher than females, and the 25-45 age group has the highest social capital score. Moreover, the average subjective well-being of residents at this stage is 79.144, which is at the medium level. There is no significant difference in subjective well-being among different gender groups, but there are significant differences among different age groups, among which the score of 46-60 years old is the highest, and the score of over 60 years old is the lowest. Finally, through correlation analysis, regression analysis, mediation effect analysis and structural equation analysis, it is concluded that sports participation has a positive impact on individual subjective well-being, which can not only positively predict their subjective well-being, but also indirectly affect their subjective well-being through social capital. Social capital plays an intermediary role between sports participation and residents' happiness.

In the third stage, we verified the effect of sports participation behavior on individual subjective well-being through experimental intervention. Before the experiment, there was no difference between the experimental and control groups in terms of sports participation, social capital, and subjective well-being. After the intervention of moderate intensity physical exercise for 40 minutes twice a week for 8 weeks, there were no significant differences in social capital and subjective well-being between the experimental group and the control group except contentment, goal experience, mental balance and family atmosphere (P > 0.05). There were significant differences in other dimensions (P<0.05), indicating that sports participation can effectively improve subjects' subjective well-being and social capital level.

Keyword : Sports participation, Social capital, Subjective well-being, Happiness



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F

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## **TABLE OF CONTENTS**

Page
ABSTRACTD
ACKNOWLEDGEMENTSF
TABLE OF CONTENTS
LIST OF TABLESK
LIST OF FIGURES
CHAPTER I INTRODUCTION 1
1. Background1
2. Research Problem
3. Objectives of the study
4. Research Questions
5. Hypothesis of Research
6. Significant of Study6
7. Scope of study7
8. Related concepts and definitions9
CHAPTER II REVIEW OF RELATED LITERATURE
1. Theoretical basis
1.1 Happiness theory11
1.2 Sports behavior theory19
1.3 Social capital theory25
1.4 Sports health promotion theory27
2. Research Evident
2.1 Research on the impact of sports participation on subjective well-being 29
2.2 Research on the impact of health on happiness
2.3 Research on the impact of social capital on happiness
2.4 Research on the impact of sports participation on individual social capital37

3. Research conceptual framework	40
CHAPTER III RESEARCH METHODS	41
Research Design	41
Population	43
Phase 1	43
1. Objective	43
2. Participants	43
4. Data Collection Procedure	63
5. Statistical Analysis	64
Phase 2	64
1. Objective	64
2. Participants and Sample size	65
3. Research Instrument	66
4. Research methods and data collection	66
5. Statistical Analysis	67
Phase 3	67
1. Objective	67
2. Research Instrument	68
3. Sample size	80
4. Research methods and data collection	81
5. Statistical Analysis	83
CHAPTER IV RESULTS	84
Phase 1	84
1.Preparation of questionnaire items	84
2. The evaluation results of the questionnaire	
Phase 2	86
1. Questionnaire issuance and retrieval	87
2. Common method deviation test	87
3. The difference analysis of residents' sports participation	

4. Difference analysis of residents' social capital	90
5. Difference analysis of residents' subjective well-being	94
6. Correlation analysis among variables	101
7. Regression analysis among variables	104
8. Intermediate effect test	110
Phase 3	113
1. Research purpose	113
2. Test subjects	113
3. Time and place of experiment	113
4. Experimental control	113
5. Data processing	114
6. Results from the Main Stud <mark>y</mark>	114
CHAPER V DISCUSSION, CONCLUSION, AND SUGGESTIONS	120
1. Discussion	120
1.1 Discussion of method	120
1.2 Status of sports participation, social capital and subjective well-being or residents of different genders and ages	of 121
1.3 Influence and mechanism of residents' sports participation on subjective well-being	/e 123
1.4 Analysis of experimental effect of sports intervention on subjective we being	:11- 126
2. Conclusion	127
3. Research deficiencies and prospects	128
3.1 Research deficiencies	128
3.2 Research prospect	129
REFERENCES	131
APPENDIX	162
APPENDIX 1 Sports Participation, Social Capital and Subjective Well-being	
Questionnaire (over 18 years old)	162
APPENDIX 2 IOC results from the first round of the questionnaire	169

APPENDIX 3	3 IOC final results of the questionnaire	174
APPENDIX 4	4 IOC results of the first round of exercise intervention program 1	80
APPENDIX :	5 Sports intervention scheme and final IOC evaluation results	87
APPENDIX	6 Human ethics research certificate	93
APPENDIX '	7 Expert Invitation Letter Example	94
APPENDIX experimer	8 Sample photos of questionnaire survey and sports intervention	208
BIOGRAPHY		216



### LIST OF TABLES

Table 1 List of Evaluation Experts44
Table 2 Exercise Motivation Scale 47
Table 3 Chinese Residents Subjective Well-being Scale (SWBS-CC20)
Table 4 The IOC Results of the Questionnaire  55
Table 5 Demographic Information of Pre-survey  62
Table 6 Confirmatory factor analysis and reliability analysis
Table 7 Sports participation behavior characteristics of sample population aged 18-25 years
Table 8 Brief table of sports intervention programs
Table 9 List of Evaluation Experts
Table 10 The IOC Results of the Experiment plan
Table 11 Common method deviation detection results  87
Table 12 Analysis of differences of sports participation in different demographics89
Table 13 Statistical table for testing the effect of sports participation between groups
Table 14 Analysis of the difference of social capital in different demographics90
Table 15 Statistical table of inter-group effect test of social capital
Table 16 Analysis of the difference of subjective well-being in different demographics
Table 17 Statistical table of inter-group effect test of subjective well-being
Table 18 Correlation analysis of residents' sports participation and social capital 101
Table 19 Correlation analysis of residents' Sports participation and subjective well- being
Table 20 Correlation analysis of residents' social capital and subjective well-being 103
Table 21 Correlation analysis of residents' Sports participation, social capital and subjective happiness
Table 22 Regression statistics of sports participation and social capital105

Table 23 Hierarchical regression statistics of Sports participation and subjective well-    being
Table 24 Hierarchical regression statistics of social capital and subjective well-being    108
Table 25 Regression analysis of residents' sports participation, social capital and subjective well-being
Table 26 The mediating effect of social capital on sports participation and subjective well-being
Table 27 The mediating effect of social capital on sports participation and subjective well-being       111
Table 28 The mediating effect of social capital on sports participation and subjective well-being fitting index
Table 29 Comparison of pre-test differences between experimental group and control group
Table 30 Comparison of before and after measurements in the experimental group. 116
Table 31 Comparison of before and after measurements in control group
Table 32 Comparison of post-test differences between experimental group and control group    118



### **LIST OF FIGURES**

Р	a	g	e
-	•••	-	-

Figure 1 Causal model of tripartite reciprocal decision in social cognitive theory22
Figure 2 Research conceptual framework
Figure 3 Research technology roadmap
Figure 4 Experimental thinking of implementing sports participation to interfere with subjective well-being
Figure 5 Empirical diagram of the mediating model between social capital and sports participation and subjective well-being
Figure 6 Train assistants to assist in issuing questionnaires
Figure 7 Offline questionnaire survey pictures
Figure 8 Pay close attention to the development of online questionnaire survey210
Figure 9 Before the experiment intervention, inform the assistant of the precautions
and requirements of the intervention experiment
Figure 10 Pre-test and sports knowledge presentation
Figure 11 Table tennis in sports intervention
Figure 12 Badminton sports intervention
Figure 13 Sports intervention for basketball projects



#### **CHAPTER I**

#### **INTRODUCTION**

#### 1. Background

Happiness is a positive or pleasurable emotional state, ranging from contentment to intense joy. Happiness as a concept is easily accepted by most people and seems to be more valuable than the pursuit of money, moral goodness, or going to heaven (Ruchi Sundrival et al., 2013). Due to its close association with an individual's health and quality of life, happiness has been an issue of great interest to researchers (Amy Chan Hyung Kim et al., 2021). After people's basic survival needs are met, everyone will pursue happiness (Lan,2020). The pursuit of happiness is the eternal motivation of human behavior, and the promotion of personal well-being has become the central goal of all modern societies and organizations (Chen et al., 2013). From the data of the World Happiness Report, it can be seen that richer countries tend to be happier, while poor African countries rank lower in terms of national happiness (United Nations, 2021). It can be seen that the level of economic development is to some extent an important indicator to reflect the level of national happiness. After more than 40 years of reform and opening up, China's economic and social development has achieved leap-forward development, the economic growth rate has created a world miracle, and the people's living standards have been continuously improved. Before 2017, with the growth of GDP, China's national happiness has been rising year by year, but since 2017, although China's economy is still growing at a high speed, Per capita GDP rose from 59,600 yuan in 2017 to 85,700 yuan in 2022, but the ranking of national happiness declined, and the development of happiness no longer kept pace with economic growth, and the growth of national happiness significantly lagged behind economic development (Research Report on People's Happiness Index, Tsinghua University, 2021). Some studies have shown that rapid economic growth over the past two decades has not generally led to a corresponding increase in national happiness, and that the effect of personal income on happiness is actually very weak, or exists only in low income groups (Minya Lee, 2020). Ordinary people are not very happy about economic growth. They are faced with many problems such as low salary, high housing price and imperfect medical security. In an increasingly fast-paced and competitive society, people often lack the time and opportunity to pay attention to and take care of their inner world, lack emotional care, narrow social circle, and spiritual needs cannot be effectively satisfied. It makes individual happiness hover at a low level for a long time. When economic growth no longer leads to increased happiness, what other factors might be key to increasing

happiness? This problem has also attracted the attention of scholars. As a result, research on non-income sources of happiness has also grown rapidly (Rodriguez-Pose & von Berlepsch 2014; Sarracino, 2013)

With the deepening of happiness research, happiness has become an interdisciplinary research topic, and more and more scholars, organizations and decision-makers pay attention to it, which also lays a theoretical foundation for happiness research from the perspective of sports science. Earlier research on physical activity and happiness dates back to the 1970s by Snyder et al. Research has found that physical exercise means more interaction with others, and that the process of physical exercise creates a sense of pleasure, which can help boost happiness. Jane E.Ruseski et al. (2014) pointed out that people who participate in physical exercise have a higher life happiness index, that is to say, physical exercise can help improve personal subjective happiness index. Barreto (2014) found that physical activity is indirectly related to happiness, and that happiness is mediated by social functioning and health status. A study by Khazaee-Pool et al. (2015) found that physical activity programs can help improve well-being in older adults. Older adults who participated in the 8-week physical activity program experienced a significant increase in well-being, while a control group who did not participate showed no change in well-being. According to the study of Lera-Lopez et al. (2017), leisure physical activity is positively correlated with the well-being of the elderly, and perceived health moderates this association. In addition, Sukkyung You & Kyulee Shin (2017) conducted a survey of 402 adults aged between 40 and 59 in South Korea. The results showed that although men and women exercised for different reasons, sports participation led to an increase in the subjective well-being of middle-aged men and women. Stefano Testoni et al. (2018) reviewed the current status of the impact of sports on subjective well-being and argued that sports can help improve individual and social well-being, but it is not completely equal because everyone's preferences are different. Gregory A Panza et al. (2019) studied the relationship between physical exercise and subjective well-being in adults, and pointed out that physical exercise of different intensities was positively correlated with mental health and negatively correlated with depression. Zhang Yong and Li Ling (2021) pointed out that the higher the degree of participation in physical exercise, the stronger the subjective well-being, and social interaction and physical health played a partial mediating role in the influence of physical exercise on subjective well-being. In addition, an experimental study based on the amount of physical activity group showed that regular physical exercise can lead to higher levels of happiness. Even short periods of physical activity (4 weeks) may help increase subjective well-being, with people who exercise showing higher levels of well-being and life satisfaction than beginners and non-exercisers (Katarzyna et al., 2021). Exercise can reduce stress by diverting attention

and changing one's evaluation of potentially stressful events, buffer the negative effects of stress, help restore physical and mental health, create balance and happiness, and induce a positive emotional state in the short term. Regular exercise over the long-term leads to greater happiness (Sarabjit Kaur Sran et al.,2021). The current study expands the understanding of sports participation and well-being to include passive participation, and the correlation of social interactions to explain this association. Finally, different forms of exercise participation provide new insights into the analysis of exercise participation and well-being (Fernando Lera-Lopez, et al.2021).

Happiness is a complex and multidimensional phenomenon, in which there are many interacting factors (Maurizio Lanfranchi et al., 2019). In addition to the impact of sports participation on well-being, previous research has shown a positive correlation between sports participation and social capital. Toepoel (2013) found that physical activity can significantly predict the social connection of the elderly. In contrast to human capital, social capital exists in connections between people and plays an important role in improving well-being (Judith K. Hellerstein & David Neumark, 2020). Bartolini et al. (2013) conducted an empirical study on social capital and the happiness of American citizens and found that the decrease of social capital was an important reason for the decrease of the happiness of American citizens, and there was a significant positive correlation between social capital and the happiness of American citizens. Stefano Bartolini & Francesco Sarracino (2015) analyzed the data from the World Value Survey and concluded that the reduction of social comparison and social capital explained the reasons for the decline in happiness, and analyzed the predictors of the trend of life satisfaction in China. Yang Xiuyong (2021) considers the impact on happiness from four dimensions of social capital: social trust, social network, neighborhood interaction and friend interaction. The results show that social capital has a positive impact on residents' subjective well-being to varying degrees, and the impact of social trust in the four dimensions is particularly significant. Wei Jiaojiao (2020) shows that the growth of social capital such as social participation and social trust can reduce the subjective life pressure of farmers, significantly improve their life satisfaction and happiness, and improve their living standards. Thus, the empirical evidence supporting the positive correlation between social capital and happiness is also overwhelming (Dolan et al. 2008; Leung et al. 2011; Matsushima & Matsunaga 2015; Tsuruta et al. 2019). Since happiness is a complex and multi-dimensional phenomenon with many interacting factors, the relationship between social capital and happiness is influenced by other variables, these variables explain the correlated changes shown by the two phenomena (Helliwell and Putnam 2004, Scheffler et al. 2007, Smith and Christakis 2008). This also inspires us to question whether the impact of sports participation on residents' subjective well-being can be influenced by social

capital factors such as social interaction and social trust. Due to the social nature of sports participation, sports participation is often an effective tool to promote positive social and psychological outcomes (Berg et al. 2015). However, at present, there are relatively few studies combining sports participation and social capital on subjective well-being. Previous studies tend to ignore the relationship between social and psychological outcomes and regard them as the results of two independent and unrelated sports participation, and the research groups involved are narrow, mostly focusing on students and the elderly (Chen Zhangyuan & Yu Peng, 2015; Zheng Yuannan, 2019). Second, research results remain inconsistent and fragmented due to a lack of empirical research (Webb et al. 2017). Third, although many empirical analyses have proved that sports participation can significantly improve individual happiness, the mechanism of sports participation affecting happiness is still unresolved, which is an important area for future research (Ruseski et al., 2014; Balish et al., 2016).

To sum up, it is still of great significance to study the influence of sports participation and social capital on subjective well-being from the perspective of integration. Sports is not only an essential part of a prosperous country, but also an important part of a healthy and happy life for the people. With the arrival of well-off society in China in 2020, the economic abundance and leisure time have given people more opportunities to participate in physical exercise. As one of the individual lifestyles, sports participation integrates fitness, education, entertainment, recreation, aesthetics and motivation. It is closely related to the individual's healthy life and happy life and has become a lifestyle highly related to happiness. Sports has been included in the "Five happiness industries" by the Chinese government in 2016. The promulgation of the National Fitness Plan (2021-2025) in 2021 further highlights the importance of the Party and the government to sports work in the new era, and regards physical exercise as an important means to improve people's health and meet people's yearning for a better life, which also gave birth to the proposition that "the development of sports is related to people's happiness". It is urgent to deepen the practical research. Therefore, this study takes subjective well-being, social capital and sports participation behavior as the theoretical basis and relationship analysis point, and analyzes the impact of sports participation and social capital on subjective well-being by preparing questionnaires and carrying out questionnaires to explore the relationship mechanism among the three. Then, according to the results of the analysis of the relationship among sports participation, social capital and subjective well-being, The study developed a detailed intervention plan, carried out an 8-week intervention experiment, and conducted a comparative analysis with the control group to verify the intervention effect of sports participation behavior on their subjective well-being.

#### 2. Research Problem

(1) There are many studies on happiness, but few studies on the relationship between sports participation and happiness (B.R Humphreys et al.,2014; Moradi et al. 2014; Liu,2016; Kuykendall et al.2018; Liu Xin, 2022), and the research mainly focuses on students and the elderly (Chen Zhangyuan & Yu Peng, 2015; Zheng Yuannan, 2019).

(2) The overall analysis of different age groups is still less, and the understanding of subjective well-being of different gender and age groups is not comprehensive.

(3) In the process of sports participation affecting subjective well-being, there are relatively few discussions on social capital such as social communication and interpersonal trust, which cannot fully reflect the role of sports participation in people's acquisition of well-being (Lei,2020; Zhang,2021). Whether social capital has mediating effect between sports participation and subjective well-being needs further research.

(4) The mechanism of sports participation affecting happiness is still unresolved and needs further research (J.Eski et al.,2014; S. Balish et al.,2016; Thunder, 2020; Wang et al.,2021). In addition to its direct effect, whether sports participation can indirectly affect subjective well-being through influencing other mediating variables needs to be further deepened.

(5) Due to the lack of empirical studies, the current research results are still inconsistent and fragmented (Webb et al., 2017). Domestic studies on the impact of sports participation on residents' subjective well-being rarely involve empirical research and data analysis (Liu Xin, 2022).

#### 3. Objectives of the study

(1) Through literature research, a comprehensive questionnaire on sports participation, social capital and subjective well-being was compiled to provide an operable measurement tool for subsequent research.

(2) Through the questionnaire survey, the basic status of sports participation, subjective well-being and social capital of residents at the current stage, as well as the differences between different gender and different age groups were analyzed.

(3) Through the intervention experiment study, the difference between the experimental group and the control group after 8-week sports participation intervention was compared to verify the intervention effect of sports participation behavior on subjective well-being.

#### 4. Research Questions

(1) What are the levels of residents' sports participation, social capital and subjective well-being at this stage?

(2) Does sports participation have a positive impact on residents' social capital and subjective well-being?

(3) Does 8-week sports participation intervention have an impact on residents' social capital and subjective well-being?

#### 5. Hypothesis of Research

Sports participation has a significant positive impact on individual subjective wellbeing. 8-week sports participation intervention can effectively improve subjects' subjective well-being, and the comparison results between the experimental group and the control group are significantly different.

#### 6. Significant of Study

Theoretical significance:

In recent years, happiness research has become a hot spot in philosophy, sociology, psychology, economics and other disciplines, and shows the characteristics of interdisciplinary research, but also highlights the importance of happiness to people. From the perspective of sports participation, this paper discusses how residents' sports participation is internalized into individual happiness. From a theoretical point of view, the research on this issue not only helps to analyze the internal mechanism of physical exercise intervention on happiness, but also helps to deepen our understanding of the significance of the "national fitness" sports policy and the importance of seeking happiness for the Chinese people, promoting sports power and building a harmonious society.

#### Practical significance:

By studying the relationship between sports participation and residents' subjective well-being, firstly, we can find out the impact of physical exercise on participants' subjective well-being, enhance individuals' awareness of the importance of physical exercise, and help individuals change their sports participation behaviors and improve their well-being. Second, at present, sports has become one of the five happiness industries in China. Studying the internal mechanism of physical exercise's impact on happiness has strong practical significance for improving the government and society's attention to physical exercise and individual happiness, and taking effective concrete measures to further guide and promote the development of national fitness and improve the subjective well-being of the general public.

## 7. Scope of study Population and sample

(1) In the first stage, 9 experts were consulted by letter. Two rounds of evaluation and correction were carried out on the draft questionnaire by using project-objective consistency index (IOC) test. Too few experts will make the results less authoritative, while too many experts will bring great difficulties to the result processing and data analysis, and may lead to a low response rate (Zeng Zhaoyun et al., 2016). Some researchers suggest that the expert evaluation team should have at least 7 members (Linstone, 1978), and the number is generally 8 to 20 (Xu Guoxiang, 2005). All in all, the reliability of expert survey results depends on the professional level of experts, and the number of representatives should be determined by the quality of experts rather than the number of experts (Hasson, Keeney, & Mckenna,2000; Powell,2003; Thangaratinam & Redman, 2005). In the selection of experts, participants should have relevant research background and experience on the subject to be consulted (Sandford, 2007). Based on this, in this stage, objective sampling method and snowball sampling method were used to collect data from the population where data was available (Saunders et al., 2009). A total of 9 experts were selected to conduct projectobjective consistency index (IOC) test on the draft questionnaire, so as to ensure the consistency between the questionnaire and the research objectives and effectively serve the follow-up research.

In addition, in order to test the quality of the questionnaire design, ensure that the questions are clear and perceptible to the respondents, and provide actionable measurement tools for subsequent research, a pre-test was conducted before the formal survey. The sample size of the pre-test is determined by the number of items in the questionnaire subscale. Some researchers believe that in order to successfully validate the questionnaire, the number of pre-test subjects should be 3-5 times the number of "subscales" containing the most items in the questionnaire (Yin Bo, 2009). The subscale containing the most items in this questionnaire is the subjective well-being scale, with a total of 20 questions. Therefore, the sample size at this stage should not be less than 60 people. Scholar Yang Jun (2008) believes that theoretically speaking, the larger the survey sample, the more helpful it is to eliminate the random error that is difficult to avoid by measurement means, so as to make the research results convincing. Therefore, 200 people over 18 years old were randomly selected for questionnaire pre-test in this stage.

(2) In the second stage, Shaanxi Province was taken as an example. According to the stratification of regional economic development, 1200 residents over 18 years old from 6 regions were randomly selected for sampling questionnaire survey. This paper

analyzes the influence of sports participation and social capital on subjective wellbeing, and discusses the relationship mechanism among them. (The geographical location of Shaanxi Province has been very important since ancient times. In ancient times, it was once a political and cultural center with profound cultural heritage. At present, it is a new economic strategic zone of the country, and the formation of people's subjective well-being is itself influenced by economic and cultural development. Therefore, this study chooses the residents of this province as an example in the questionnaire survey stage.)

The sample size of the survey was selected according to: In this study, there were 7 indicators of social demographic characteristics, 7 indicators of sports participation, 4 indicators of social capital, 10 factors of subjective well-being, and a total of 28 statistical analysis variables. According to Kendall's sample estimation method, that is, the number of observed samples is at least 10 times the number of variables, which is 280 people. It is assumed that the effective recovery rate of samples is 90%, so the minimum sample size should be 312 people. Because theoretically speaking, the larger the survey sample, the more help to eliminate the measurement means to avoid random error, so that the research results are convincing. Therefore, in this stage, Shaanxi Province was taken as an example, and according to the stratification of regional economic development, 1,200 residents over 18 years old (200 residents in each region) were randomly selected from 6 regions (2 regions in each of the three levels of high, medium and low economic development level) as the research samples in this stage.

(3) In the third stage, 80 male college students aged 18-25 in Ankang College were taken as examples (representing the male group aged 18-25, mainly based on the research reality, controllability and rigor. If one group can be realized, then other groups can also be verified by this method if conditions permit). The 80 subjects were randomly divided into experimental group and control group, 40 in each group. Through the intervention experiment, to verify the intervention effect of sports participation behavior on their subjective well-being.

The sample size is chosen based on the Small sample theory, which was proposed by statistician William Seely Gossett in the early 20th century, in which the small sample size is less than 50(some specify less than 30). Although a sample size smaller than 30 can be used to estimate some parameters, the error is relatively large, in order to obtain more accurate results, according to statistical requirements, the sample size should be greater than 30, because researchers have found that for most population distributions, when the sample size is greater than 30, the sampling distribution of the sample mean is essentially very close to the normal distribution. In addition, considering the actual operation, manpower, time and other factors of the intervention experiment, the experimental subjects in this stage were 80 male college students aged 18-25 (representing the male group aged 18-25), and 80 subjects were randomly divided into the experimental group and the control group, with 40 people in each group.

#### Scope of research content

This study is an empirical study of investigation and intervention to analyze the mechanism of sports participation and social capital on residents' happiness.

#### Variables used in the study

The selection of research variables in this study is based on the needs of the research theme and the results of literature research, and the selection of relevant research variables for reference.

Independent variables: (1) Sports participation; 2 Social capital.

Dependent variables: subjective well-being.

Control variables

The control variables of this study include: gender, age, education level, marital status, income, working status and other socio-economic characteristics of population variables.

#### 8. Related concepts and definitions

(1) Subjective well-being

There are different expressions of happiness in English, such as happiness, wellbeing, welfare, eudemonia, psychological well-being, SWB (subjective well-being), etc. Among them, SWB (subjective well-being) is the most commonly used and most recognized expression by psychologists. Psychologists in our country translate it as "subjective well-being" and refer to "happiness". It is the positive and satisfying states that individuals experience in their lives. It is formed by the comprehensive influence of objective environmental factors, human needs, values and other factors, and can be subdivided into 10 dimensions. In terms of measurement, SWBS-CC20 can be used to measure the Subjective well-being of Chinese residents, so as to realize the operability and scientific rationality of variable observation.

(2) Sports participation

As a part of human social behavior, sports participation interprets the internal relationship between social structure characteristics and physical movement, and has been paid much attention by the academic community. However, as for the definition of "sports participation", there is still no accurate definition in academia and official media. Considering the purpose of this study, as well as the limited time and human resources, the analysis of sports participation in this paper mainly refers to direct sports participation, including the following aspects: (1) sports participation. (2) The act or state of participating in a physical activity with others. (3) Frequency of sports participation. (4) The intensity of sports participation. (5) Duration of movement.

The amount of individual physical exercise was examined from the three aspects of the frequency of physical exercise, the duration of exercise and the intensity of exercise, and the degree of physical exercise was measured by the amount of physical exercise. The physical Exercise Rating Scale PARS-3 was used for the measurement and evaluation.

#### (3) Social capital

Social capital is an intangible resource that exists relative to tangible capital. It is invisible and untouchable but real, and has an important impact on the operation of society and people's behavior. There is no consensus on the definition of social capital, and different scholars hold different views on it. Combining the research objectives and the results of previous studies, this paper mainly measures social capital from the dimensions of social participation, norms, trust and social support.



#### **CHAPTER II**

#### **REVIEW OF RELATED LITERATURE**

According to the needs of the research purpose and direction, the literature and materials on sports participation, social capital and subjective well-being were consulted mainly through the Internet. Domestic research literature retrieval mainly relied on bbs.chinatopfit.com, Baidu Academic, CNKI, Wanfang Digital resources and other databases, while foreign research literature retrieval mainly relied on PubMed and Web of Science database systems. Read books related to sports psychology, happiness economics and sports sociology to provide theoretical reference for the topic selection and writing of this study. This part mainly reviews the relevant literature involved in this research, reviews the previous research, systematically understands the current research status, clarifies the research problems, and clarifies the research ideas. It provides theoretical basis, advanced research trend and research method for this study.

#### 1. Theoretical basis

#### 1.1 Happiness theory

#### 1.1.1 Concept of subjective well-being

There are different expressions of happiness in English, such as happiness, wellbeing, welfare, eudemonia, psychological well-being, SWB (subjective well-being), etc. Among them, SWB (subjective well-being) is the most commonly used and most recognized expression by psychologists. Psychologists in our country translate it as "subjective well-being" and refer to it as "happiness". The philosopher Aristotle was the first to address the question of how best to understand happiness in philosophical literature (Juste Luko? eviciute,2022). In his research, American sociologist William Fielding Auger first proposed the term subjective well-being, arguing that happiness is measured by people's subjective indicators (Qu Xixia, 2014; Chen Haonan, 2015), with relatively strong subjectivity. Since the 1960s, with the rapid accumulation of economic development and material wealth, and the gradual increase of people's spiritual needs, research on subjective well-being has gradually become the focus of Western academic circles.

Many scholars have conducted comprehensive discussion and in-depth research on the concept and connotation of subjective well-being from the perspectives of various disciplines, including philosophy, sociology, economics, psychology, ethics and so on. Because different disciplines have different definitions of subjective well-being, there is no completely unified standard for the definition of subjective well-being. At present, the definition of subjective well-being by western scholars can be roughly divided into three viewpoints.

The first view is mainly represented by Bradburn. In his research, emotion is divided into positive emotion and negative emotion, which are not two aspects of the same dimension, but two independent dimensions related to subjective well-being and can exist at the same time. An individual's happiness depends on the balance of the two over time, and the happier they are if they experience more positive emotions than negative ones.

The second view is mainly represented by Diener. According to Diener, subjective well-being refers to an individual's overall evaluation of his or her quality of life according to certain standards. It is a comprehensive psychological indicator to measure the quality of his or her life, reflecting the social function and adaptation state of the subject, and an evaluation of whether or not an individual is satisfied with his or her quality of life. It has three characteristics: subjectivity, relative stability and integrity (Diener, 1984), which is also the most representative and most accepted view (Peng Jingyang, 2021).

The third view, mainly represented by Ryff, believes that the experience of happiness is not only the acquisition of happiness, but also contains higher-level content, such as the perfect feeling and experience through giving full play to one's potential, so that the happiness obtained through the embodiment of self-worth is more intense. This paper expounds the concept of subjective well-being from the perspective of the significance of individual psychological development, and holds that individual's self-acceptance, autonomy, life purpose, environment adaptability and self-growth are the main contents that determine subjective well-being.

On the basis of western research, Chinese scholars have also actively explored the concept of subjective well-being. Some localized concepts of subjective well-being are proposed. For example, Liu Rengang (1998) pointed out that subjective well-being is evaluated by individuals themselves and consists of three dimensions: life satisfaction, negative emotion and positive emotion. Xin-hua ding et al. (2004) Song Jialong, qian zhang & xin-hua ding. (2010). Research college students' achievement motivation and subjective well-being relationship.

Xin-hua ding. (2007). The condition of college students' social support and subjective well-being of the related research. It is believed that subjective well-being can not only reflect the quality of individual psychological happiness, but also reflect the happiness degree of individual life, and is an important indicator to evaluate the

quality of individual life. Zeng Hong and Guo Siping (2012) believe that subjective well-being is an individual's comprehensive evaluation of all aspects of life and life satisfaction, and the resulting positive emotions dominate the healthy mental state. Zhang Xiaoyu (2022) believes that subjective well-being should be divided into cognitive and emotional components, with life satisfaction as cognitive components and positive emotions as emotional components.

On the definition of subjective well-being, researchers have different understandings. As for the definition of the concept of subjective well-being, although scholars are contending, they all have the following three basic characteristics: subjectivity, which is based on the evaluation criteria of the subject itself, rather than the evaluation of others. Stability is a long-term measure of subjective well-being, rather than a reflection of short-term emotions, and a relatively stable number. Wholeness is a comprehensive evaluation, including a comprehensive evaluation of people's emotional response, cognitive judgment and other aspects. Therefore, this paper adopts the viewpoint of scholar Cheng Zhanjun (2002), that is, subjective wellbeing is a positive and satisfied state experienced by individuals in life, which is formed by the comprehensive influence of objective environmental factors, human needs, values and other factors.

Since Chinese researchers came into contact with and began to explore subjective well-being relatively late, such studies were only tested in specific groups, and were not extended to other age groups. As a result, the research on subjective well-being was carried out slowly and with strong limitations.

#### 1.1.2 Influencing factors of subjective well-being

Social factors: The first is economic factors. The economic level of a country or region affects people's subjective well-being to a certain extent. Especially when the economic imbalance, unemployment rate and inflation are serious, the economic depression will lead to the decline of social welfare level, and then lead to the reduction of residents' subjective happiness. D.gudmundsdottir (2013) used multiple linear regression to analyze the relationship between economic factors and happiness, and found out the extent to which economic factors, population factors, health and social relations could explain the variance and change of happiness. The results showed that income and unemployment did not predict happiness, but economic hardship did. After the economic crash, people's happiness declined. Liu Junqiang (2013) concluded through empirical research that economic growth is an important positive factor for residents' subjective well-being. The second factor is social development, which involves distribution fairness, public services, social welfare, and trust in the

government. Yuan Zheng, Zheng Huan et al. (2013) pointed out in their research on the relationship between distribution equity and happiness that residents' happiness is significantly negatively correlated with income inequality. Ding Shulei (2016) pointed out in the article "The Impact of Public Service on Residents' Happiness" that the improvement of public service level can significantly increase residents' happiness. Yuan Shuhua et al. (2017) found through empirical research that social welfare is one of the important factors affecting subjective well-being; By analyzing the impact of urbanization on residents' happiness, Fan Nana (2017) found an inverted U-shaped relationship between the development of urbanization and residents' happiness, showing that urbanization can improve residents' happiness to a certain extent, but it will reduce residents' happiness when cities are overcrowded. When analyzing the phenomenon of national happiness, Shi Lei (2018) pointed out that from the perspective of substantive democracy, substantive democracy has a positive effect on residents' subjective happiness. Xiong li et al(2019) empirically studied the impact of government quality on entrepreneur happiness by using CGSS data. The research shows that the improvement of government quality can significantly improve entrepreneurs' self-rated happiness, but the effects of these three dimensions are different, and only the public goods supply index has a significant impact. From regional and city level analysis, government quality has a significant impact on entrepreneur happiness in less developed non-eastern and non-provincial cities, but not in eastern and provincial cities.

At the micro individual level, scholars' theoretical analysis and empirical research have proved that gender, age, ethnicity, religious belief, marital status, education level and behavior habits all have a certain impact on individual subjective well-being. It is generally found that the subjective well-being of married people is higher than that of unmarried and widowed people, healthy people are higher than those with poor health conditions, and the happiness of the group with higher education is higher than that of the group with lower education level, and the higher the income of residents, the stronger the happiness of residents (Hayo, 2007). Makiko Hori & Yoshinori Kamo(2017) used the East Asian Social Survey Health module to investigate the relationship between important population variables and happiness in four East Asian regions: China, Japan, South Korea and Taiwan. The study found that there are gender differences in the determinants of happiness in East Asia. Marital status is also an important indicator of happiness, especially for men, But not necessarily for women. Moreover, in China, full-time work is positively associated with happiness for men, while in Japan, full-time work is negatively associated with happiness for women. Finally, social support was positively correlated with personal happiness, especially for women. Of course, these results may vary depending on the country or region surveyed. Hsin-Yu An et al. (2020) recruited 2345 healthy adults who were divided into young,

middle-aged, and elderly groups according to age, with physical activity classified as high, medium, and low. The study on the relationship between physical activity and life satisfaction and happiness showed that, after controlling for demographic characteristics, participants with high and moderate levels of physical activity had significantly higher life satisfaction and happiness than participants with low levels of physical activity in the total population and in three age groups.

K.Ng (2022) discusses human needs and Happiness in the article Happiness --Concept, Measurement and Promotion, and points out that many factors may affect happiness, including how our needs are met. There is a personal level of faith, form/health, family and friends. It also includes social aspects such as environmental quality, equality and trust.

#### 1.1.3 Measurement methods of subjective well-being

According to existing studies, there are roughly two methods of measuring subjective well-being.

#### (1) Single dimension measurement

The subjective well-being level of the subjects is evaluated by subjectively describing their own state or experience. Abdel-Khalek (2006) pointed out that individual subjective well-being can be measured with one question: Generally speaking, do you think you are happy? (China General Social Survey uses this question to assess residents' subjective well-being). Although it only contains one question, this scale is highly correlated with other widely used happiness measurement scales, so this single-dimension measurement is considered reliable and effective and widely accepted by the academic community (Brown et al., 2011). In addition to the Chinese General Social Survey using this method to assess residents' happiness, the American General Social Survey also uses a single-dimensional question to assess happiness: "All things considered, how do you feel about your life these days?" . However, scholars often adopt different grading methods according to their own research needs in their analysis, usually using Likert three-point scale, five-point scale or seven-point scale. For example, Liu (2016) divided residents' self-reported happiness into seven levels from "very unhappy" to "very happy", with "7" being the highest level, It means "very happy". Based on the survey data of CSS2019, Zhang (2022) used factor analysis to extract and analyze the factors of public subjective well-being. Research on residents' subjective well-being uses 5-point Likert scale to set question options, which is divided into 5 levels: 1 means very agree, 2 means more agree, 3 means not very agree, 4 means very disagree, and 5 means hard to say.

Because single-dimension measurement method is simple to apply, low cost, and can be compared across countries or regions, it is widely used in large sample objects, cross-time period comparative studies, and various social surveys. From the literature reviewed, almost half of the studies used a single indicator to assess subjective well-being (Juste Lukoseviciuteet al., 2022).

#### (2) Multidimensional assessment

Because of the complexity of subjective well-being, subjective feelings vary according to emotion, situation and time. Based on these complexities, some scholars have proposed that the measurement of a single question may not be accurate enough, so it is necessary to design multidimensional questions related to life and obtain the final measurement value of subjective well-being by synthesizing scores of multiple questions.

Foreign representative subjective well-being scales include the following: (1) Happiness Index scale: This scale was compiled by Campbell et al. The higher the overall score, the higher the happiness of the respondents. (2) Memorial University of Newfoundland Happiness Scale: This scale is compiled by Kozma and Stones according to the "emotional balance" theory, which is often used to measure the subjective well-being of the elderly. (3) Overall Happiness Scale: Compiled by Fazio, this scale has a total of 33 items and has good reliability and validity. (4) Life satisfaction Scale: compiled by Diener, there are 5 items, the higher the score, the higher the level of happiness. (5) Oxford Subjective Well-being Questionnaire: Compiled by Hills and Argyle in 2002, it has 29 questions and mainly measures general well-being.

Although these scales may have considerable stability in terms of internal consistency reliability and construct validity, it is doubtful whether these measurement tools obtained from Western subjects can be applied to Chinese subjects, especially to test subjective well-being which is greatly influenced by cultural values. Therefore, the localization of measurement tools is very important in the research process of subjective well-being in our country.

After the 1980s, domestic psychologists created a scale suitable for measuring the subjective well-being of Chinese people on the basis of learning from foreign subjective well-being scales and combining with China's actual conditions. For example, Duan Jianhua (1996) revised the global well-being Scale and tried it on college students. Liu Rengang and Gong Yaoxian (1999) experimented with the Happiness scale of Memorial University of Newfoundland. Li Jing and Zhao Yujin (2000) conducted a trial study on Campbell's Happiness Scale among college students. However, this kind of research is limited to a specific age group, and there are considerable limitations in generalizing to

other age groups. Subsequently, Miao Yuanjiang (2003) compiled the Comprehensive Happiness Questionnaire, which included 9 dimensions and 50 questions. The higher the total score, the higher the level of subjective well-being. Xing Zhanjun (2003) compiled the Subjective Well-being Scale of Chinese Urban Residents, which included 54 questions in 10 dimensions. Later, on this basis, a Brief version of the Subjective Well-being Scale of Chinese Urban Residents was compiled, with a total of 20 questions, each question scored 1-6 points, and the higher the total score, the higher the level of subjective well-being.

In addition, some domestic researchers also use non-scale multi-item questionnaire to evaluate subjective happiness as a whole. For example, Zhang Li (2015) used CLHLS data to analyze the subjective well-being of the elderly to comprehensively evaluate subjective well-being by answering eight questions, including "How do you evaluate your current life?", "Do you always see the positive side of life?", "Are you as happy now as you were when you were young?" and "Do you often feel nervous and afraid?" Chen Dong & Zhang Yuyang (2015) used CGSS data to study the impact of different pension models on the subjective well-being of the elderly. How do you rate the living standard of your own family? ", "How do you feel about your health?", "How often do you feel happy recently?" and "How often do you feel depressed recently?" are the answers to seven questions to measure subjective well-being.

The multidimensional scale or questionnaire contains multiple components of subjective well-being, reflecting its constituent elements and internal logic, so it provides more comprehensive information. However, due to the large number of questions included, the difficulty of answering them is higher, and the higher requirements are put forward for the respondents, so the collection cost is higher. At present, scholars in various fields have not given a definitive conclusion on whether single-dimension assessment or multi-dimension assessment is more appropriate. However, self-report is still the most widely used method to assess residents' subjective well-being, and it is because of its high apparent validity and ease of implementation and statistics that it has been widely recognized and adopted by domestic and foreign experts.

Considering that the object group of this study is people over 18 years old, and the age span makes the object group of this study include both students and the elderly. Taking a comprehensive consideration, this study adopts the "Chinese Urban Residents Subjective Well-being Scale Brief" compiled by Professor Xing Zhanjun, with a total of 20 questions, and each question is scored with 1 to 6 points. The higher the total score, the higher the level of subjective well-being, and the scale has been proved to

have good homogeneity reliability, criterion validity and construct validity (Xing Zhanjun, 2003).

#### 1.1.4 Relevant theories of subjective well-being

With the evolution of western cognitive psychology, it has gradually developed into the main trend of Chinese and Western happiness research based on modern psychological theory and focusing on individual subjective well-being. Western subjective well-being research is fruitful, the main theories involve the following:

#### (1) The theory of personal-environment interaction

Diener E. et al. (1995) believe that the balance level of subjective well-being is affected by relatively stable personality traits, so subjective well-being has both similar characteristics and situational characteristics. Later studies have found that if personality is not the best predictor of subjective well-being, at least it is one of the most reliable and powerful predictors, and the interaction between personality and environment will affect subjective well-being. Diener E. et al. proposed three interactive models of subjective well-being, namely, the additive model of interaction, the more complex dynamic model of interaction, and the model in which personality influences the situation to increase or decrease subjective well-being. According to the addition model of interaction, the occurrence of positive events will bring more intense happiness, which can only be produced by the combination of personality and environment. The more complex interactive dynamic model holds that personality and situation are two independent and dependent variables with two-way causal relationship, and individuals choose the situation according to their personality traits. Models in which personality influences situations to increase or decrease subjective well-being suggest that personality-situation congruence is less important than personality-specific participative behavior congruence in determining emotions. Therefore, the interaction of environmental characteristics, individual behavior and personality characteristics affects subjective well-being.

# (2) Goal theory: Goal is an important reference standard for emotional system

Goals can influence emotions, subjective desires and happiness, and examining them can be a good way to understand behavior. Brunstein et al. (1998) believe that subjective well-being will increase only when a person can pursue a goal in a way of intrinsic value and independent choice and reach a feasible degree, that is, goals must be compatible with people's intrinsic motivation needs to improve subjective wellbeing. For example, students with strong achievement values will increase their subjective well-being when they have excellent grades, and students with strong social values will feel happy when they are satisfied with interpersonal communication.

## (3) Social psychology theory: including social comparison theory and expectation theory.

The basic idea of social comparison theory is that individuals are happy if they are superior to others in comparison to those around them. The process of social comparison is first to obtain social information, second to think about social information, including the comparison of others and oneself, and third to respond to the results of social comparison. In the process of social comparison, the influence of personality traits is particularly important, optimists tend to pay attention to people who are worse than themselves, in order to evaluate their position in a certain group, and thus "content", pessimists are the opposite. With the development of modern life, people's living standards continue to improve, and the levels of needs become more diversified, which makes the information for comparison also present diversity.

The basic idea of expectation theory is that the gap between expectation and actual achievement is related to subjective well-being. Whether expectations and realistic conditions are consistent with external resources (power relations, social relations, economic status, etc.) and internal resources (temperament, appearance, etc.) determines the level of subjective well-being. The process of approaching expectations rather than the achievement of the final goal is the most important for happiness. They also feel satisfied because they are in the process of reaching their goals, and the content of their expectations is more important than the likelihood of their fulfillment in determining their subjective well-being. Estimation of the possibility of achieving internal expectations (personal development) is positively correlated with SWB, while estimation of the possibility of achieving external expectations (fame, money) is negatively correlated with SWB (Wu, 2000).

## 1.2 Sports behavior theory 1.2.1 Concept of behavior and sports behavior theory

Behavior is an objective activity that is carried out in accordance with certain norms and achieves certain results under the control of people's consciousness in a certain environment (mainly social environment), and behavioral science refers to a discipline group that studies the laws of human behavior in natural and social environment with scientific methods (Liu, 2001). Behavioral science, formed in the 1930s, is a new science to study human behavior, and has been applied to various disciplines. It is precisely because of the generation, promotion and application of behavioral science, as well as the existence of human sports behavior, so scholars in order to better understand the characteristics, influencing factors and development laws of this kind of sports behavior. In order to effectively control and predict such behavior, the theory of sports behavior was put forward (Liu, 1990). Since then, sports behavior science should also develop. It builds a bridge between sports science and behavioral science, which not only improves the lack of behavioral science theory, but also fills the blank of sports science system. At the same time, sports behavior is not only a simple combination of behavioral science and sports science, but also a comprehensive interdisciplinary discipline that conducts comprehensive research on sports behavior, involving psychology, sociology, methodology, management, philosophy and other disciplines. In the field of sports science, the theory of sports behavior will explain how to predict and stimulate people's sports behavior mechanism, so as to effectively guide and regulate sports behavior, promote sports participation, and improve people's living conditions.

#### 1.2.2 "Need" is the fundamental source of people's behavior

With the economic development and social progress, sports has become one of the indispensable ways of social activities for human beings. Sports sociologists believe that the social environment people live in has an important impact on people's sports behavior. They form sports behavior in order to adapt to the environment and form good social capital. Of course, this is also the process of sports socialization. Sports psychologists believe that the sports behavior formed by people is closely related to their own motivation, and the motivation to achieve a certain goal is an important factor to promote the implementation of sports behavior. The source of motivation is "need", the American psychologist Maslow divided "need" into physiological needs, security needs, social needs, respect needs and self-realization needs five levels, and when a "need" into "advantage needs", "need" becomes the motivation of human behavior. "Need" is the fundamental source of people's behavior, and sports behavior is the same. People may have sports behavior when they have fitness needs, social needs, health needs, or competition needs.

#### 1.2.3 Concept of sports participation

The term "participation" was first used in organizational management and behavior to describe the presence or absence of individuals in group activities. With the rapid development of society and the increasing attention of society to sports disciplines, "participation" has also begun to penetrate into sports disciplines, known as sports participation (Kong Xiangjiu, 2020). Sports participation was first proposed by American scholar Kenyon and used to discuss the role division of sports participants. Du Wei pointed out that participation includes both physical and psychological input (Du Wei, 2002).

As for the definition of "sports participation", there are two kinds of definitions used in the field of sports research. First, sports participation is defined as the activities that use sports methods and means to achieve sports goals, including sports participation, as well as sports organization, management, publicity, viewing and other behavioral activities. Gong Qingbo et al., 2021 used this definition in an empirical study on the relationship between college students' sports environment perception, sports participation and sports gains (Gong Qingbo et al., 2021). Second, sports participation refers to people's conscious and planned sports behavior by means of physical exercise, recreational sports or bodybuilding sports in order to achieve physical and mental health, active cultural atmosphere and strengthen social communication. Dong Depeng (2021), Zhang Yong (2021) and other researchers used this definition in their research.

In addition, in many dissertations, researchers define the concept of "sports participation" according to their own research. For example, Li Pei (2017) showed that sports participation refers to a purposeful physical activity that is beneficial to physical and mental health under the premise of participation environment and inner driving force. Li Ruizhen (2018) defined sports participation as the behaviors and attitudes of all people who participate in sports activities directly or indirectly.

The analysis of sports participation in this study includes the following aspects: (1) Sports participation. (2) The act or state of participating in a physical activity with others. (3) Frequency of sports participation. (4) Duration of exercise, including the duration of each exercise and the number of years of exercise. (5) The intensity of sports participation.

# 1.2.4 Relevant theories of sports behavior(1) Social cognitive theory

Social cognitive theory was proposed by Bandura in 1986. According to this theory, besides individual factors, environmental factors and social factors are also involved in behavior change (FIG. 1). The model holds that human behavior, cognition and other subject factors and the environment constitute a dynamic interaction and determination relationship, and the intensity and mode of the two-way interaction between any two factors will change with different behaviors, individuals and

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environments. The mutual determination between the subject and its behavior means that: on the one hand, the subject factors such as the outcome expectation, belief, goal, intention and emotion of the individual affect or determine his behavior; On the other hand, the internal feedback and external results of behavior in turn partially determine his thoughts, beliefs and emotional reactions. Similarly, in the mutual determination of behavior and environment, although the environmental condition, as the object or realization condition of behavior, determines the direction and intensity of behavior, behavior also changes the environment to adapt to the needs of people. The mutually determined relationship between subject and environment indicates that although individual personality characteristics and cognitive function are products of environmental effects, the existence and function of environment are not absolute, but potential, and depend on the cognitive grasp of subject.



Figure 1 Causal model of tripartite reciprocal decision in social cognitive theory

When applied to the study of health behavior, Bandura(2004) divided psychosocial factors affecting health behavior into four categories. The first category is self-efficacy, which reflects an individual's judgment of their own performance of a specific health behavior. The second category is outcome expectations, which reflect an individual's perception of the likely outcome of successful completion of a specific health behavior. The third category is self-regulating behavior, which is used to locate and control healthy behaviors. The fourth category is perceived barriers, which are the individual's perceived barriers to completing a specific health behavior.

Self-efficacy is considered to be the first major determinant of social cognitive theory and one of the social psychological indicators most closely related to physical exercise. Self-efficacy is the level or demonstrated ability of an individual to organize and perform a certain goal activity. The individual must believe that he is capable of performing a certain action (i.e. the individual must have a sense of self-efficacy). It has nothing to do with the skills a person has, but everything to do with people's judgments about what they can do with the abilities they have. Therefore, a person with
great ability will also have bad performance if he doubts his ability. Social cognitive theory emphasizes the influence of individual, society and environment on individual participation in physical exercise, which is a relatively comprehensive model so far. This theory is widely used in health promotion and the improvement of bad behavior. Second, social cognitive theory emphasizes individuals' beliefs and their role in their behavior.

## (2) Health belief model

Health belief model is an important theoretical model to explain health-related behavior by social psychology. According to the principles of cognitive theory, it first emphasizes the subjective psychological process of the individual, that is, the leading role of outcome expectation, thinking, reasoning, belief, etc. Health beliefs are the key for people to accept advice, change bad behaviors, and adopt health-promoting behaviors.

The core part of this model includes four factors that affect the occurrence and maintenance of an individual's health behavior: (1) perceived disease susceptibility, that is, the overall harm that an individual thinks the unhealthy behavior will bring to him, and the probability and possibility that the behavior will cause his own disease; (2) the perceived severity of the illness, i.e. the extent to which the individual believes that the illness resulting from the unhealthy behavior will cause him physical, psychological and social harm; (3) The perceived benefits of behavior change, that is, the individual's understanding and evaluation of the benefits brought by changing the bad behavior;Perceived barriers to behavior change, i.e. the physical, psychological, and monetary consequences of an individual's perceived behavior change.

According to the health belief model, individuals generally do not actively change their behavior unless they perceive the harm of the bad behavior, perceive that the benefit of changing the behavior is great, perceive that the barrier to change the behavior is small, or have a certain level of motivation to engage in healthy behavior. With the publicity and promotion of the national fitness movement in China, the concept of sports promoting healthy development has gradually been deeply rooted in the hearts of the people, and the continuous improvement of public sports services has created a good social atmosphere and fitness environment for the people's sports and fitness. The enthusiasm of the people for sports and fitness is high, and the figure of the people's fitness can be seen everywhere, which lays a good practical condition for carrying out the research on the behavior of public sports participation.

#### 1.2.5 Tasks of sports behavior and their results

The important task of sports behavior is to make people form sports needs, exert influence, adjust and stimulate such needs to become long-term needs, and promote people to form good sports behaviors and participate in them, so as to improve people's quality of life and serve the ultimate goal of human development. Of course, the science of sports behavior is based on such a task, and has achieved obvious results. For example: (1) Due to the improvement of public sports resources investment, publicity and technical guidance services of sports organizations, it not only meets people's sports participation needs, but also promotes people's enthusiasm to participate in sports activities to a certain extent, thus serving the healthy physical and mental development of human beings and improving the overall function of human beings; (2) People's sports behavior can promote the development of their social communication, thus making them an important medium for the formation of social networks and social capital. Therefore, sports behavior not only promotes their physical and mental health, but also coordinates interpersonal relations and improves the positive role and application value of sports behavior in the social system. (3) People's sports behavior satisfies their self-realization and gets due respect. For example: Due to their own defects, disabled people have various difficulties and psychological obstacles in the process of integrating into the social group. However, some social organizations make them actively participate in sports through sports publicity and intervention. Through sports participation, the degree of disease is reduced, social communication is expanded, and self-worth is gradually realized. Recognized by the society, they experience the happiness and fun brought by sports, but also make them realize the social integration well (Dai Zhipeng & Zhang Sheng, 2023; Ye Linmao, 2023; Zhong Qibin, 2021; Li & Jiang Hongyu, 2017).

It can be seen that sports behavior has a good effect on the improvement of the overall function of human body, the integration of social network, the improvement of social capital, the realization of self-worth and the acquisition of social respect. It is based on this theoretical basis that this study puts forward the hypothesis that sports participation has a significant positive impact on individual subjective well-being and based on empirical survey data. Correlation analysis and multiple regression model were used to analyze the impact of sports participation on residents' subjective well-being.

# 1.3 Social capital theory1.3.1 Origin and development of the concept of social capital

"Capital" is a basic concept in economics, which only represents a kind of material capital. As people explore capital more deeply and widely, it is found that social capital in the form of non-monetary capital can also bring greater influence and power. Hanifan first proposed the concept of "social capital" in his book Village School Community Center. In his description, social capital is based on personal relationships within the family and community, and is something that makes tangible things (such as material property) more valuable (such as trust). However, Coleman's research shows that the economist Lowry was the first to use the concept of social capital, and Lowry proposed that besides physical capital and human capital, there is a third form of capital, namely social capital (Yang Yi, 2022). After the research and promotion of Coleman (1988) and Putnam (2001) and other scholars, scholars in different research fields in the academic circle began to pay attention to and gradually accept the nature of capital or resource in social relations.

Social capital is an intangible resource that exists relative to tangible capital. It cannot be seen or touched, but it really exists, and has an important impact on the operation of society and people's behavior (Li Huibin & Yang Xuedong, 2000). Although difficult to measure social capital, because based on trust, social participation, social support and social networks on social capital can not only help residents have more social resources, improve the ability to respond to emergencies, but also can promote the long-term economic development, promoting the welfare of the society as a whole, so more and more scholars begin to pay close attention to social capital (zhang, 2014).

At present, the academic circle has made fruitful achievements on the classification and measurement of various dimensions of social capital. From the dimension of social capital, scholars at home and abroad have different emphasis on the meaning of social capital, and there is no completely unified standard. Researchers show great differences in the setting of various dimensions of social capital and the selection of indicators (Jia Yajuan, 2021). Putnam (1993) pointed out that trust, network and norms of social capital are the main characteristics of social organization. Ostrom (2003) argues that norms, knowledge, rules and expectations are the core dimensions of social capital of a group or organization. Fukuyama (2016) believes that mutual trust between individuals is a kind of social capital. As he said in his book Trust: Social Virtue and Creating Economic Prosperity, if people in a society trust each other, it can effectively promote social and economic prosperity and great development. Because the social environment with high trust can reduce unnecessary waste and save costs in

many aspects, such as reducing the number of searching and checking information, so as to achieve the purpose of reducing transaction costs in economic operation. Moreover, the social environment with high trust can fill the defects and deficiencies of some formal systems to a large extent. Domestic scholars Lu Qian & Wang Xin (2012), Miao Shanshan (2014) and Wang Jing (2018) believe that the core elements of social capital include network, trust, reputation and participation; Han Hongyun et al. (2016), Han Yaqing et al. (2017), Shi Yuxing et al. (2018,2019) divided social capital into three dimensions: network, trust and norm. Yan Tingwu et al. (2016) believe that social capital includes three main dimensions: trust, reciprocity norms and participation in the network. Shi Hengtong et al. (2018) pointed out that social capital consists of network, trust and participation; Zhang Jianwei (2014) used trust, interpersonal relationship, social participation, social support and moral norms to measure the social capital owned by Chinese residents, and then explored the impact of social capital on residents' subjective well-being. Shen Xiu et al. (2023) pointed out in their study that social capital refers to the state and characteristics of the close connection between people, which is manifested in social network, norms, trust, authority, action consensus and social morality. On the whole, researchers basically believe that social participation, trust and reciprocity norms are the core evaluation dimensions of social capital.

Based on a comparative analysis of the definition and measurement of social capital dimensions by Berkman & Kawachi(2000), Han Hongyun et al. (2016), Han Yaqing et al. (2017), Shi Yuxing et al. (2018,2019) and Jia Yajuan (2021), this paper combines research objectives and data accessibility. Combined with the development of existing social capital theories and the needs of sports participation from the perspective of research, social capital is mainly measured from the dimensions of social participation, norms, trust and social support.

## 1.3.2 Mediating effect of social capital

At present, the researches on sports and social capital mainly focus on Europe and the United States, and the relevant literature believes that the social capital of sports players can be enhanced through interpersonal interaction during sports. Coalter(2007) argues that physical activity can foster new friendships and social connections, which help to build and maintain social networks across age, race, religion, and economic differences. According to Barrett et al. (2009), sports participation plays a significant role in social support, including respectful support, informational support, and friendship support. In domestic research, Huang(2019) used a sample of 22,048 adults in the 2014 Chinese Family Tracking Survey to explore the impact of sports participation on the generation of social capital from the perspectives of individual social capital and collective social capital. The study found that the higher the frequency of sports participation, the higher the score of interpersonal self-evaluation, that is, sports participation significantly promoted the generation of individual social capital.

According to the positive emotion extension theory, individuals' positive emotional experience can construct and enhance their own social capital, and thus obtain more positive emotional experience (Shen et al., 2023). Physical exercise can not only directly improve happiness, but also indirectly affect happiness through social capital. Barreto (2014) found that physical activity is indirectly related to happiness, and that happiness is mediated by social functioning and health status. Zhang (2022) adopted a multi-stage systematic random sampling method to collect 1198 valid data from 8 provinces (municipalities) in China, and conducted an empirical analysis on the relationship among sports participation, social capital and quality of life of urban residents in China. The results show that sports participation can directly improve the quality of life of urban residents; Social capital has a mediating effect on the influence of sports participation on the quality of life. Through physical exercise, residents' social interaction and social participation are enriched, and social trust is significantly enhanced. Physical exercise indirectly improves happiness through the transmission of social participation, social trust and social support.

At present, with the vigorous development of national fitness, the participation of the masses in sports has been greatly improved, which also increases the social interaction between people and provides a good opportunity to improve the content of social capital. By summarizing the relevant information in the existing literature (" social capital of sports participants can be enhanced through interpersonal interaction during sports ", "social capital has a mediating effect in the influence of sports participation on quality of life"). Therefore, this study proposes the hypothesis that social capital is one of the important mechanisms affecting the relationship between sports participation and individual subjective well-being, and the influence of sports participation on individual subjective well-being is weakened when social capital variables are controlled. 5160

## 1.4 Sports health promotion theory

Health promotion is to achieve the purpose of maintaining health through the intervention of health constraints. Sports health promotion is to maintain and improve health through the intervention of sports behavior and the formation of sports lifestyle, which is a part of health resources and should benefit every citizen. Sport and other health promotion tools can improve people's health because health is a dynamic concept. This dynamic change is reflected in two aspects: on the one hand, the connotation of health changes with the development of society, because people are in different environments and conditions, the understanding of health is also different. The traditional view of health holds that "no disease is health", regards the absence of disease as the judgment standard of health, and understands health simply as "no disease, no disability, no injury". With the progress of human civilization, people's understanding of health and disease has gradually deepened, and now a holistic and modern view of health has been formed. The definition of "health is a sound state of physical, psychological and social adaptation, rather than the absence of disease and weakness" proposed by the World Health Organization has been widely recognized worldwide.

On the other hand, this dynamic change is reflected in the dynamic change of people as the bearer of health. In the continuous life process from birth to death, the state of health is constantly changing; In addition, the multi-dimensional nature of health determines that in any period of life, health is restricted by a variety of factors, whether it is in physical, psychological or social adaptability in any aspect of the "intact state", then it can not be called healthy. It can be seen that the concept of modern health has at least the following three characteristics: first, it breaks through the narrow and negative health concept of "disease-free health"; Second, the interpretation of health has expanded from "biological man" to "social man". Linking health to people's social interaction and interpersonal relationships, it also emphasizes the influence of social environment on health. The dynamic health concept emphasizes the harmonious coexistence between people and the environment, requires people to actively coordinate the relationship between human body and the environment, and maintain a high degree of unity between human health and the social environment and the material environment, so that the human body can maintain or trend to this "intact state" for a long time.

Health is not the goal of human life, but a resource for daily life, not only for individuals, but also for society. Therefore, people should be responsible not only for their own health, but also for society. Maintaining and maintaining health resources is not only the responsibility and obligation of individuals, but also the responsibility of society. The WHO also states in the Declaration of Alma-Ata that "health is in fact a human right. Achieving the highest possible level of health is an important social goal worldwide." This fully reflects that health is a basic human need and right, and is also an important symbol and potential driving force for social progress, requiring people to attach importance to the value of health, and establish the correct concept of "health for all, health for all". Health issues should be regarded as the cause of the whole society and the whole people, as a basic element of human survival and development. As a fundamental human right, everyone should have the right to basic health. Similarly, all

resources that contribute to health should be used by people. In order to guide people to actively participate in sports, make sports life, promote the healthy development of people, in each period, strengthening the people's physique is always the focus of our country's sports work, is the main melody of our mass sports policy.

At present, the national fitness as a national strategy, highlights the Chinese nation self-improvement, hard work and upward sports spirit, to help the construction of sports power. The general secretary Xi Jinping pointed out that "we must adhere to the people as the center, adhere to the people first, focus on 'developing sports, enhancing the people's physical fitness', implement the national strategy of national fitness, constantly improve the people's health, and build sports into a cause of happiness for the people."

#### 2. Research Evident

## 2.1 Research on the impact of sports participation on subjective well-being

Through consulting relevant literature, it is found that there are few studies on the relationship between sports participation and subjective well-being at present, while there are many studies on the relationship between physical exercise and subjective well-being, which has a similar meaning to sports participation. Since the 1970s, there have been some studies on the relationship between physical exercise and subjective well-being at home and abroad. Different gender, different age, different occupation, different income groups and other fields are involved. According to the literature review results, the most concerned groups belong to the elderly group and the student group. In addition, there may be some different target groups.

Paul Downward & Simona Rasciute (2011) analyzed sports participation and subjective well-being of people aged 16 or above using data from a three-year crosssectional survey commissioned by the Department for Culture, Media and Sport and conducted by the UK Market Research Bureau. The results showed that: Sports participation has a positive effect on the subjective well-being of the population, and this effect is even greater when social interactions are taken into account.

Howard Morrison et al. (2012) based on sample data from Statistics Canada's biennial longitudinal survey of households in primary health care services across the country. A study of physical activity and well-being development in participants aged 12 and older found that physical activity was associated with lower odds of unhappiness two and four years later. People who did not exercise for two consecutive cycles were more than twice as likely to be unhappy two years later than those who exercised for

both cycles. People who don't exercise are also more likely to be unhappy than those who start exercising.

Liu (2013) pointed out through theoretical research that physical exercise, as one of the daily recreational activities of urban residents, has an important impact on the subjective well-being of urban residents.

Jane E.Ruseski et al. (2014) pointed out that people who participate in physical exercise have a higher life happiness index, that is to say, physical exercise can help improve personal subjective happiness index.

Barreto (2014) found that physical activity is indirectly related to happiness, and that happiness is mediated by social functioning and health status.

Zhai (2014) investigated and studied the basic situation of residents' participation in physical exercise in Changchun and its impact on residents' happiness through questionnaire survey. The results show that more than 90% of the residents believe that physical exercise is one of the important means to obtain health and happiness. It is suggested to pay more attention to the residents' happiness, strengthen the social guidance function, fully carry forward the function and charm of sports, and make positive contributions to the construction of a harmonious society.

Jane E. Ruseski et al. (2014) Based on data from a 2009 population survey in Rheinberg, Germany, IV estimated that people who participate in sports have a higher happiness of life. The results showed a U-shaped relationship between age and selfreported well-being. Higher income is associated with higher self-reported well-being, with men less happy than women and single people less happy than non-single people.

Justin Richards et al. (2015) analyzed the Eurobarometer data from 15 countries in 2002. Using a six-point scale to assess self-well-being, and using IPAQ-short to collect physical activity data (i.e., walking, moderate, vigorous) for analysis, the study found a positive dose-response relationship between the amount of physical activity and well-being compared with people who did not exercise, with "a lot" of family physical activity and "some" professional physical activity having the strongest association with well-being.

A study by Khazaee-Pool et al. (2015) found that physical activity programs can help improve well-being in older adults. Older adults who participated in the 8-week physical activity program experienced a significant increase in well-being, while a control group who did not participate showed no change in well-being. Based on the data of the Sixth World Values Survey (2014), SM.Balish et al. (2016) used the stratified Bernoulli model to analyze the well-being of participants in different sports activities and self-reported well-being. Research shows that participation in sports is positively correlated with happiness. Although causation is unclear, the study established a positive correlation between well-being and physical activity. Future studies should focus on the mechanism of this effect.

Lera-Lopez et al. (2017) found that leisure physical activity is positively correlated with the well-being of the elderly, and perceived health moderates this association.

Sukkyung You & Kyulee Shin (2017) conducted a survey of 402 adults aged between 40 and 59 in South Korea. The results showed that although men and women exercised for different reasons, sports participation led to an increase in the subjective well-being of middle-aged men and women.

Wiese et al. (2017) systematically analyzed the relationship between recreational physical activity and positive emotion, negative emotion and life satisfaction, and found that physical activity participation was positively correlated with positive emotion and life satisfaction , while it was positively correlated with negative emotion had no correlation. Therefore, the effect of physical activity participation on subjective well-being was mainly reflected in the two aspects of "positive emotion" and "life satisfaction".

Stefano Testoni et al. (2018) reviewed the current status of the impact of sports on subjective well-being and argued that sports can help improve individual and social well-being, but it is not completely equal because everyone's preferences are different.

Zhang (2018) pointed out that there has been a positive correlation between physical activity and happiness. Future research suggests exploring the mechanisms of how physical activity affects well-being and determining the optimal dose and type of physical activity to obtain health benefits.

Gregory A Panza et al. (2019) studied the relationship between physical exercise and subjective well-being in adults, and pointed out that physical exercise of different intensities was positively correlated with mental health and negatively correlated with depression.

CM Tejero-González (2020) surveyed 2,378 participants between the ages of 18 and 92. The interaction between sports participation, religious practice and happiness is analyzed. Found that people who do not participate in sports or practice religion have statistically lower levels of happiness (M= 6.979) than other groups: religious people who do not participate in sports (M=7.135); People who participate in sports but are not

religious (M=7.478); And those who participate in both sports and religion (M = 7.717). Studies have shown that well-being is associated with physical activity and religious activity, although the effect sizes are small or very small (p< 0.050;  $\eta$ 2p is between 0.008 and 0.020).

Hsin-Yu An et al (2020) recruited 2345 healthy adults. Participants were divided into young, middle-aged, and old demographic characteristics, and physical activity was divided into three categories of physical activity: high, moderate, and low, and after controlling for demographic characteristics, participants with high and moderate levels of physical activity reported significantly higher well-being than those with low levels of physical activity.

Lei (2020) used the survey data of JSNET (Social Network and Professional Experience) in 2014 to establish a regression model and showed that the higher the frequency of physical exercise, the richer the social capital content of an individual, which is manifested by the higher social capital content, social participation degree and social trust level, all of which are conducive to improving individual happiness. The test results using Bootstrap method also show that social capital has an intermediary effect between physical exercise and happiness.

Zhang & Li (2021) pointed out through research that the higher the degree of physical exercise, the stronger the subjective well-being; Social interaction and physical health played a partial mediating role in the relationship between participation in physical exercise and subjective well-being.

Hu (2021) takes the relationship between physical exercise and subjective wellbeing of middle-aged people as the research object, and samples the main urban area of Ningshan County. Middle-aged people between 40 and 60 years old in the main urban area of Ningshan County are selected as the survey objects respectively, with subjective well-being as the dependent variable and physical exercise as the independent variable, and social support as the "bridge" to explore the intricate relationship between the two . Research results: Exercise more than 3 times a week, each exercise 60-120 minutes, choose moderate intensity exercise with more than one person is the best choice for middle-aged people to improve subjective well-being. Physical exercise has no direct influence on SWB, but indirectly influences SWB through social support and other factors as mediating variables.

Wang & Zhang (2021) pointed out that participating in physical exercise has a significant positive impact on improving residents' subjective well-being, and participating in physical exercise can improve residents' physical and mental health.

Bhina Patria(2022) is based on a nationally representative sample of Indonesian adults. The data was compiled from face-to-face interviews with 12,051 adults. The structural equation model (SEM) was used to determine the relationship between physical activity, health, etc., and happiness. The results show that physical activity regulates the influence of happiness through health status.

Liu (2022) conducted an empirical study on the impact of sports participation on residents' subjective well-being by using literature, logical analysis and mathematical statistics. The results show that the sports participation of Chinese residents is on the rise, and sports participation has a significant positive impact on the subjective well-being of Chinese residents. Based on this, the following suggestions are put forward: taking into account the satisfaction of sports participation of different social groups; Improve public sports facilities, improve the public sports service system, and constantly enhance the enthusiasm and enthusiasm of the public to participate in sports, and constantly improve their subjective well-being.

Chao et al. (2023) empirically tested the relationship between sports participation and happiness by using a large scale nationwide representative data in China. Studies have shown that a higher frequency of exercise participation is positively associated with happiness. The findings also show that physical activity significantly reduces depression, improves self-rated health and reduces the frequency of health problems.

## 2.2 Research on the impact of health on happiness

Liao (2008) conducted a stratified random sampling survey on 9485 college students with SCL-90 and SWLS scales. There was a significant negative correlation between SWLS scores and SCL-90 scores in 564 college students. There is a positive correlation between college students' mental health and subjective well-being.

Wang et al. (2014) discussed the relationship between physical health and happiness in the context of Chinese culture. A total of 5165 non-student adult subjects from 31 provinces and cities (excluding Hong Kong, Macao and Taiwan) were investigated by using China Urban Happiness Index questionnaire and self-designed questionnaire including physical health and religious belief. The results show that physical health has a significant impact on happiness. The worse the physical health, the lower the happiness; In the process of physical health affecting well-being, religious belief has a significant buffering effect on individuals with many physical health problems, while it does not have a significant buffering effect on individuals with few physical health problems.

Zhao et al. (2016) used general health scale, death anxiety scale and happiness scale to investigate a random sample of elderly people. The results showed that the health level of the elderly had a significant predictive effect on happiness, and death anxiety played an intermediary role between health level and happiness.

Li (2020) uses the 2015 survey data of China General Social Survey (CGSS) in ethnic areas and the orderly Logit model to control variables such as gender, ethnicity, age, marital status and education level, and focuses on analyzing the health status and happiness of residents in ethnic areas. The study found that both physical health and mental health had a positive impact on the well-being of residents in ethnic areas. The more physically or mentally healthy, the higher the well-being.

Based on the 2015 data of China General Social Survey (CGSS), Wang &Zhang et al. (2021) found that :1) Participation in physical exercise can improve residents' physical and mental health. 2) Self-perceived physical health and self-perceived mental health can significantly improve residents' subjective well-being. 4) Self-perceived physical health and self-perceived mental health play a partial mediating role in the impact of residents' participation in physical exercise on their subjective well-being, that is, participation in physical exercise can improve residents' self-perceived physical and mental health, and thus enhance residents' subjective well-being, and the mediating effect of self-perceived mental health is larger. It is suggested that the government should attach importance to stimulating the interest of residents in participating in physical exercise, promoting the healthy development of residents' physical and mental health, and thus enhancing their happiness.

## 2.3 Research on the impact of social capital on happiness

At present, social capital has also become one of the important factors in the study of subjective well-being. However, the relationship between social capital and subjective well-being has not reached a complete consensus, and scholars' research findings in different countries are different due to the influence of values, cultural geography and other factors.

Ram (2007) found that social capital had no significant impact on the subjective well-being of people in the Middle East, North Africa and Latin America.

Bartolini & Bilancini (2007) found that social capital can have a positive impact on Americans' subjective well-being.

Chang(2009) used the 2003 Taiwan Social Development Trend Survey data to study the impact of social capital on the well-being of Taiwan residents, and the results showed that social capital, including non-profit organizations, volunteer organizations, social and community participation, and trust, had a significant impact on the well-being of residents.

Francesco Sarracino's (2009) study on 11 European countries also concluded that social capital has a significant positive correlation with residents' happiness.

Tokuda et al(2010) studied the relationship between happiness and social trust of residents in 29 Asian countries, and found that individual social trust has a significant impact on individual happiness, and people living in a society with high overall social trust are happier than those living in a society with low trust. Some studies have shown that social capital does not have a significant impact on residents' happiness at all times.

Ram(2010) made use of transnational survey data and found that the influence of social capital on residents' happiness really emerged only when the country's economic development reached a certain level and income no longer significantly affected residents' happiness.

Bartolini et al. (2013) conducted an empirical study on social capital and the happiness of American citizens, and found that the decrease of social capital was an important reason for the decrease of the happiness of American citizens, and there was a significant positive correlation between social capital and the happiness of American citizens.

Stefano Bartolini & Francesco Sarracino(2015) analyzed the data from the World Value Survey and concluded that the reduction of social comparison and social capital explained the reasons for the decline in happiness, and analyzed the predictors of the trend of life satisfaction in China.

Wang (2016) empirically tested the relationship between social capital and residents' happiness by using rural micro-survey data. The results show that social capital has a significant positive impact on the subjective well-being of rural residents. At the individual level, social relationship network and organizational trust are positively correlated with happiness, and relationship harmony also plays a role in promoting farmers' happiness. This indicates that social capital can promote rural residents' happiness, which has important implications for promoting people's livelihood happiness and building a harmonious rural society.

Anjing (2017) argues that social capital such as trust, mastery of social norms, and community participation all have a significant impact on promoting Russian residents' subjective well-being.

Fu Liping & Jia Caimaojia (2017) found that the influence of social capital on individual subjective well-being has exceeded the influence of economic factors, and social capital is an important factor affecting individual subjective well-being.

Xiao et al. (2021) empirically analyzed the impact of social network, social trust and social mutual assistance on the well-being of migrant workers based on CLDS 2016 data. It is found that social network, social trust and social mutual assistance have positive effects on the well-being of migrant workers, among which social trust has the greatest impact. Education can improve the life happiness of migrant workers, but there is an "inverted U-shaped" structure; Working in the county has a positive effect on happiness, and the happiness of women is significantly higher than that of men. Therefore, it puts forward some policy suggestions such as developing rural compulsory basic education, encouraging migrant workers to participate in the activities of community organizations, establishing good neighborhood relations, broadening the social network of migrant workers, and improving the level of social capital of employees.

Liu et al. (2022) empirically analyzed the impact of social capital on farmers' subjective well-being by using the ordered Probit model based on the data of rural household survey in Jiangxi in 2021. The results show that social capital has a significant positive impact on farmers' subjective well-being, and the better the neighborhood relationship, the higher the subjective well-being of farmers.

Sun (2022) takes the rural elderly as investigation objects and analyzes whether social capital will affect their happiness. The research results show that: social capital has a significant positive impact on the happiness of the rural elderly. The higher the social capital, the happier the rural elderly; Social capital has a significant positive impact on the health status of the rural elderly. The higher the social capital, the better the health status of the rural elderly; Health status plays a partial mediating role in the relationship between social capital and happiness. Social capital can improve the happiness of rural elderly people by improving health status.

Based on the data of China's Health and pension tracking survey, Gao & Wang (2022) used hierarchical linear model (HLM) to investigate the impact of social capital on the subjective well-being of rural middle-aged and elderly people, and found that: Social capital can significantly improve the subjective well-being of rural middle-aged and elderly people. In terms of impact degree, community social capital has the greatest

impact on the subjective well-being of rural middle-aged and elderly people, followed by individual social capital and family social capital.

Huang & Luo (2022) used the survey data of 510 migrant children in Guangzhou to explore the direct impact of migrant children's social capital on their subjective wellbeing, and found that: grade, school nature and whether parents live together are related to migrant children's subjective well-being; Family social capital, school social capital and community social capital directly affect their subjective well-being. We understand that social support plays an intermediary role between family social capital, school social capital and subjective well-being.

Alma Kudebayeva et al. (2022) examined how social capital affects subjective well-being in three Central Asian countries, Kazakhstan, Kyrgyzstan, and Uzbekistan, based on data from WVS (Wave 6). It found that social capital was an important predictor of subjective well-being in all three countries. Trust has a positive impact on the SWB of Kyrgyzstan, while social participation has a positive impact on the SWB of Kazakhstan and Uzbekistan.

## 2.4 Research on the impact of sports participation on individual social capital

Toepoel (2013) found that physical activity can significantly predict the social connection of the elderly and promote their social capital development.

Qiu (2018) conducted a questionnaire survey on 1229 migrant children with physical exercise scale, social capital scale and social integration scale to study the impact of physical exercise on social capital and social integration of migrant children. The results show that physical exercise is positively correlated with migrant children's social integration and social capital. Social capital has a mediating effect on the relationship between physical exercise and social integration, and social capital is the mediating variable of the influence of physical exercise on the social integration of migrant children.

Huang et al. (2019) used a sample of 22,048 adults in the 2014 China Family Tracking Survey to explore the impact of sports participation on the generation of social capital from the perspectives of individual social capital and collective social capital. The findings are as follows :1) The higher the frequency of sports participation, the higher the score of interpersonal self-evaluation, that is, sports participation significantly promotes the generation of individual social capital; 2) The higher the frequency of sports participation, the easier it is to significantly increase people's likelihood of reciprocity, and the likelihood of political and organizational participation is also significantly increased.

Zhang et al. (2019) used the 2014JSNET(Social Network and Occupational Experience 2014) survey data from eight cities to explore the role of physical exercise in improving social capital. The results show that physical exercise can improve both individual social capital and collective social capital, but most of the measures of physical exercise and social capital show an "inverted U-shaped" relationship, and the people with moderate frequency of exercise get the most social capital. At the same time, physical exercise has "Matthew effect" when increasing social capital content. It is suggested that physical exercise can be used as a way to cultivate social capital, but attention should be paid to the balanced development of sports resource allocation.

Based on CGSS2013 data, Zhu (2020) adopted Logit model for analysis and found that physical exercise has certain positive effects on the accumulation of social capital, which is manifested in the change of individual life attitude and the increase of social support, especially emotional support, thus promoting the enhancement of social relations. The relationship between social capital and physical activity was not affected by the type of exercise, but the relationship varied by age level.

Bian (2020) expounds the dialectical relationship between social capital and mass sports in his research, and holds that the theoretical guiding significance of social capital for mass sports is embodied in the aspects of conceptual framework, explanation mechanism, measurement innovation, etc. Mass sports is an important field in the construction of social capital, because mass activities have rich interpersonal and group connections, and can continuously produce and reproduce social capital at the individual level and the collective level.

Based on the review of the above literature, it is found that as a social individual, people's subjective happiness experience is influenced by various factors, whether it is macro social and economic development, or micro population characteristics and behavior habits, which have a significant impact on residents' subjective happiness to some extent. Different scholars have made their own explanations on the impact of residents' subjective well-being from their respective disciplines, and these research results have also laid an important foundation for the smooth conduct of this study.

At present, the national fitness as a national strategy, highlights the Chinese nation self-improvement, hard work and upward sports spirit, to help the construction of sports power. As a way of life for individuals, sports participation is not only related to the healthy development of individuals, but also can promote the all-round development of people, and also affect the well-being of individuals. As for the relationship between sports participation and subjective well-being, some studies believe that different physical exercise methods, exercise intensity, exercise time, etc., have a direct impact on individual subjective well-being, and some studies use one or several intermediate variables to explore the relationship between the two and the relationship between the three... In these studies, whether it is based on the relationship between the two pairs or the intermediary influence between the three, all confirm the promotion effect of sports participation on individual subjective well-being to a certain extent, which lays the research foundation for this study.

At present, with the transition from a subsistence society to a developing society, Chinese people have higher expectations for the happy life they pursue. At the same time, on the basis of the close relationship between sport and happiness, as well as the research carried out in the field of sport and psychology, as well as the fact that some of our policy documents, planning Outlines and speeches by Party and State leaders have linked sport with people's aspirations for a better life and regard sport as a source of happiness and happiness for people, This has given birth to the proposition that "the development of sports is related to people's happiness", and the research on the effect and mechanism of sports participation on individual subjective well-being has become one of the most attractive hotspots in the field of sports science research.

So, through what path does sports participation promote people's subjective wellbeing? Previous studies mostly focused on the impact of individual physical exercise behavior on subjective well-being, and relatively few studies were conducted on social capital such as social communication and interpersonal trust, which could not fully reflect the role of sports participation in people's acquisition of well-being. Moreover, the object groups of studies were mostly the elderly and students, although there were also studies on the well-being of other groups. But the proportion is relatively small.

To this end, this study took the group over 18 years old as the survey object, and compiled a comprehensive questionnaire on sports participation, social capital and subjective well-being on the basis of literature study and IOC assessment by experts, so as to provide measurement tools for the research. Secondly, through questionnaire survey and mathematical statistics, the relationship between sports participation, social capital and subjective well-being was analyzed, and the differences in sports participation behavior, social capital and subjective well-being of different gender and age groups were analyzed, so as to provide a basis for the development of intervention programs. Finally, according to the results of the analysis of the relationship among sports participation, social capital and subjective well-being, a detailed intervention training plan was developed and an 8-week intervention experiment was conducted, and a comparative analysis was conducted with the control group to verify the intervention effect of sports participation behavior on subjective well-being, so as to deepen the understanding of the relationship between sports and well-being. To improve the understanding of the significance of the implementation of national fitness sports policy, and to provide reference for people to promote subjective well-being through physical exercise participation.

## 3. Research conceptual framework

The selection of research variables in this study is based on the needs of the research theme and the results of literature research, and the selection of relevant research variables for reference. The research concept frame diagram is as follows:



#### **CHAPTER III**

#### **RESEARCH METHODS**

This study is a survey and empirical study, mainly studying the impact of sports participation and social capital on residents' subjective well-being, and the mechanism of sports participation on subjective well-being.

#### **Research Design**

This study mainly studied the impact of sports participation and social capital on residents' subjective well-being through literature, questionnaire, experiment, correlation analysis, multiple regression analysis and other methods.

The study was divided into three stages.

(1) By using the literature method and 9 experts on the project-goal conformity index (IOC) test, a comprehensive questionnaire on sports participation, social capital and subjective well-being was prepared to provide an operable measurement tool for subsequent research.

(2) Take Shaanxi Province as an example. (Shaanxi Province's geographical location has been very important since ancient times. In ancient times, it used to be the political and cultural center, so it has profound cultural heritage. The stratification of economic development is large and representative to a certain extent, so this study chooses the residents of this province as an example in the questionnaire survey stage.) According to the stratification of regional economic development, 1200 residents (200 residents in each region) were randomly selected from 6 regions (2 in each of the three levels of high, medium and low economic development level) to conduct a questionnaire survey. With the help of descriptive statistical methods, difference analysis, correlation analysis and regression analysis, this paper analyzes the overall situation of current residents' sports participation, social capital and subjective well-being, as well as the relationship between sports participation, social capital and subjective well-being.

(3) In this stage, 80 male college students aged 18-25 in Ankang College were taken as examples (representing the male group aged 18-25), and the 80 subjects were randomly divided into the experimental group and the control group, with 40 in each group. According to the analysis results of the relationship among sports participation, social capital and subjective well-being, a detailed 8-week intervention program was

developed to verify the intervention effect of sports participation behavior on subjective well-being through intervention experiments.

The content of each phase is described in detail in the following sections.

The technical roadmap of the study is as follows:



Figure 3 Research technology roadmap

In this study, convenience sampling in non-probability sampling was used for investigation. Non-probabilistic sampling is useful for gathering information, especially for exploratory purposes and qualitative surveys (Turner, 2019). Prior to conducting this investigation, permission was obtained from the Human Ethics Committee of Mahasarakan University on January 17, 2024, and the permission letter is attached in the appendix.

#### **Population**

The survey object of this study is residents over 18 years old. During the research, a certain amount of research samples will be randomly selected for research and analysis according to the different needs of the three stages.

#### Phase 1

#### 1. Objective

A comprehensive questionnaire on residents' sports participation, social capital and subjective well-being was prepared to provide an operational measurement tool for follow-up research.

#### 2. Participants

(1) With 9 experts as the correspondence objects, the project - objective consistency index (IOC) test was conducted on the draft questionnaire to ensure the consistency between the questionnaire and the research objectives and effectively serve the follow-up research.

(2) A random sample of 200 residents over the age of 18 was selected to conduct a pre-survey to test the rationality of the comprehensive questionnaire on residents' sports participation, social capital and subjective well-being, that is, the validity and reliability of the scale. Ensure respondents have a clear and discernable view of the problem, providing actionable measurement tools for subsequent research.

#### 2.1 Sample size

Nine experts and a random sample of 200 residents aged over 18 participated in this stage of the investigation.

#### 2.2 Sampling Procedure

(1) The IOC assessment objects of the questionnaire were selected according to the experts' research field, academic level, years of work, professional title and educational level, and the purpose sampling method and snowball sampling method were used to select experts.

Expert inclusion criteria: 1) Be familiar with the theory and practice of physical exercise, and have published relevant academic literature in domestic and foreign journals as the first author or corresponding author; 2) Engaged in the professional work for 10 years or more; 3) Associate senior or above professional title or doctor's degree; 4) The number of experts in the same unit does not exceed 1 person; 5) Voluntarily participate in this study and be willing to complete two rounds of expert consultation. Table 1 lists the selected experts.

Name	Country	School	Professional title	<b>Research direction</b>
Dr.Shao	China	SXNU	Prof.	Psychology of sports
Dr.Yu	China	BUAS	Prof.	sports Training
Cha	China	XUAS	Prof.	Sports Sociology
Dr.Liu	China	XJTU	Prof.	Psychology of sports
Dr.Wan	China	SNNU	Prof.	Sports Training
Dr.Zhou	China	XPEU	Prof.	Sports Education and Training
Qiu	China	SNUT	Prof.	Psychology of sports
Dr.Chang	China	TJUS	Prof.	Psychology of sports
Feng	China	AKU	Prof.	Sports Training

Table 1 List of Evaluation Experts

(2) The pre-survey subjects were randomly selected 200 residents over 18 years old from Hanbin District, Ankang City, Shaanxi Province by random convenient sampling method. The questionnaires were distributed by the researchers and filled out by each respondent. Before the questionnaire is issued, the reasons for the survey, filling requirements and precautions will be explained to ensure that the respondents can fill in the questionnaire correctly, and the filling time is about 5-10 minutes. Questionnaires were distributed in person and collected in person.

#### 3. Steps to create a research tool

## 3.1 Research tools are created by means of literature

(1) on www.Pubmed.net, www.cnki.net, a Web of Science, chinatopfit.com and baidu academic. Taking "sports participation, social capital, subjective well-being" as key words and subject headings, relevant literature and data were consulted and collected to provide theoretical basis and methodological reference for questionnaire selection and compilation.

(2) Combined with the purpose of the research, the author mainly studied and understood the experience and methods of previous researches through the method of literature data. On this basis, the author prepared questionnaires on residents' sports participation, social capital and subjective well-being in accordance with the scientific requirements of questionnaire preparation.

The questionnaire design consists of four parts. The first part mainly investigates the basic information of the respondents (gender, age, education level, marital status,

income, occupation and other variables of social and economic characteristics of the population), health status and social interaction frequency.

The second part of the questionnaire is mainly based on the theory of sports behavior, to investigate the residents' sports participation behavior and exercise motivation.

As a part of human social behavior, sports participation interprets the internal relationship between social structure characteristics and physical movement and has been paid much attention by the academic community. However, as for the definition of "sports participation", there is no accurate definition in the academic circles and official media at present (Chen Geng, 2023). Sports participation was first used by American scholar G. Kenyon in his argument for the role of sports in 1969, and he believed that sports participation is direct participation in sports and participation in sports activities. Lu Yuanzhen (2019), a domestic researcher, classified sports participation, including direct and indirect forms. Direct sports participation refers to actual participation in sports activities, such as physical exercise; Indirect sports participation is expressed as interest and love for sports and sports events, but only as a spectator or consumer, such as watching sports games, buying sports goods, reading sports news, etc. He made it clear that sports participation is a way for people to achieve physical and mental health, to enrich folk life, to strengthen social interaction, and to help users to engage in outdoor activities, recreation or fitness exercises through planned sports behavior. In addition, some scholars define sports participation from the level of sports cognition and emotion and propose that sports participation is not only direct participation and indirect participation. It also includes the cognitive level of sports and the emotional tendency level (Zeng Yinlian, 2008).

Considering the purpose of this study, as well as the limited time and human resources, the analysis of sports participation in this paper mainly refers to direct sports participation, including the following aspects: (1) sports participation. (2) The act or state of participating in a physical activity with others. (3) Frequency of sports participation. (4) The intensity of sports participation. (5) Duration of movement.

The amount of individual physical exercise was examined from the three aspects of the frequency of physical exercise, the duration of exercise and the intensity of exercise, and the degree of physical exercise was measured by the amount of physical exercise. The physical Exercise Rating Scale PARS-3 was used for the measurement and evaluation. Physical exercise amount (physical exercise participation degree) = exercise intensity  $\times$  (exercise time-1)  $\times$  exercise frequency. This scale was developed by Masao Hashimoto from Japan and revised by Liang Deqing from Wuhan Physical Education University, and has high reliability (retest reliability is 0.82) (Ding Ying, 2021). Among them, the measurement questions of physical exercise behavior are: (1) the intensity of your physical exercise is: (1) light exercise: (2) small intensity not too tense exercise; ③ Intense sustained exercise of moderate intensity; Rapid breathing, sweating a lot of heavy intensity, but not sustained exercise: (5) rapid breathing and sweating a lot of heavy intensity of sustained exercise. (2) When you carry out the above intensity physical activity, the duration of a time is: 1 less than 10 minutes; 211 to 20 minutes; 321 to 30 minutes: 431 to 59 minutes; 5 More than 60 minutes. (3) How many times a month do you engage in the above sports activities: 1 less than once a month; (2) 2 to 3 times a month: (3) 1 to 2 times a week; (4) 3 to 5 times a week: (5)About once a day. Score is given according to the scale, each question is divided into 5 options, the score of the first and second questions is 1-5 points, the score of the third question is 0-4 points.

The exercise motivation survey was carried out using the simplified version of Exercise Motivation Scale-MPAMR, mainly for the following reasons: Although the Physical Activity Motivation Measure (MAM-R) compiled by Ryan et al. is a common tool for studying exercise motivation, it is an exercise motivation scale designed on the basis of cognitive evaluation theory and self-determination theory, and lists a series of motivations for people to participate in physical exercise and physical activities (for example, because I want to improve my physical fitness). Participants were asked to rate the strength of these motivations. The scale is a second-order factor structure that includes five motivational dimensions: health motivation, competence motivation, fun motivation, appearance motivation, and social motivation (Ryan,1997). In recent years, many foreign studies on exercise motivation have proved that the scale has good reliability and validity (Frederick, 1993; Christina,2003). As well as the Chinese version of the Exercise Motivation Scale, which was translated and compiled by relevant domestic studies, the scale is composed of 30 questions, which has good

reliability and validity (Chen Shanping, 2006). However, due to the large number of questions, the complete use of this scale may make the questionnaire very long in some surveys involving more research content, which will exceed the patience of the respondents to complete the questionnaire. At the same time, the contents of some questions in the original scale are repeated, which is easy to cause the impatience of the survey object and affect the quality of the survey. Therefore, the simplified version of Exercise Motivation Scale (see Table 2) was selected for this survey on exercise motivation. The simplified version of Exercise Motivation Scale is divided into 5 dimensions: health motivation, ability motivation, fun motivation, appearance motivation and social motivation, with a total of 15 questions. The scale is measured by Likert 5 levels, with motivation intensity ranging from "no" to "very strong".

Table 2	Exercise	Motivation	Scale

No.	Topic <mark>conten</mark> t	1	2	3	4	5
1	I want to have a strong body					
2	I want to control my weight					
3	I want to do something entertaining					
4	I want to acquire new motor skills					
5	I want to maintain good social relationships					
6	I want to keep my mind and body healthy					
7	I want to keep or improve my body shape					
8	I want to be happy					
9	I want to improve my current motor skills					
10	I want to enhance my feelings and friendship with my friends					
11	I want to live a healthy life					
12	I want to make my appearance more attractive	0				
13	I want to enjoy a happy life					
14	I want to keep my current motor skills					
15	I want to maintain good social relationships					

The reliability and validity of the simplified Chinese version of exercise motivation scale reached the psychometric standard. The simplified scale uses fewer questions to comprehensively measure the test content and theoretical structure reflected in the exercise motivation scale, which is a more efficient measurement tool (Chen Shanping, 2013). He Jiangyuan (2015), Zhu Congxian (2021), Li Chenglong (2020) and many other researchers used this scale to carry out research investigations and published a series of research results.

The third part of the questionnaire mainly investigates the social capital of residents.

The concept of capital originates from economics (Mankiw NG,2014). In economics, the word capital is commonly used to describe asset investment to create profits, while social capital is an intangible resource that exists relative to tangible capital. It cannot be seen or felt, but it really exists and has an important impact on the operation of society and people's behavior (Li Huibin & Yang Xuedong,2014). 2000). With the continuous development of society, social capital is gradually active in various fields of social development and has become the focus of academic research.

The academic community has not reached a consensus on the definition of social capital, and different scholars hold different opinions on it (Sun Qian, 2022). Social capital is multi-dimensional. At present, the research on the classification and measurement of social capital has achieved fruitful results. From the dimension of social capital, scholars at home and abroad have different emphasis on the meaning of social capital, and there is no completely unified standard. Researchers show great differences in the setting of various dimensions of social capital and the selection of indicators (Jia Yajuan, 2021). Putnam (1993) pointed out that trust, network and norms of social capital are the main characteristics of social organization. Ostrom (2003) argues that norms, knowledge, rules and expectations are the core dimensions of social capital of a group or organization. Domestic scholars Lu Qian & Wang Xin (2012), Miao Shanshan (2014) and Wang Jing (2018) believe that the core elements of social capital include network, trust, reputation and participation; Han Hongyun et al. (2016), Han Yaqing et al. (2017), Shi Yuxing et al. (2018,2019) divided social capital into three dimensions: network, trust and norm. Shi Hengtong et al. (2018) pointed out that social capital consists of network, trust and participation; Yan Tingwu et al. (2016) believe

that social capital includes three main dimensions: trust, reciprocity norms and participation in the network.

On the whole, researchers basically believe that social participation, trust and reciprocity norms are the core evaluation dimensions of social capital. Therefore, based on a comparative analysis of the definition and measurement of social capital dimensions by Berkman & Kawachi (2000), Han Hongyun et al. (2016), Han Yaqing et al. (2017), Shi Yuxing et al. (2018,2019) and Jia Yajuan (2021), this paper combines research objectives and data accessibility. Combined with the definition of social capital theory and the research perspective of sports participation, this study mainly measures social capital from the dimensions of social participation, norms, trust and social support. On the basis of literature review and analysis, a specific social capital assessment questionnaire was compiled, and then 9 experts were consulted by letter. Two rounds of project-goal consistency index (IOC) tests were conducted on the draft questionnaire, so as to ensure the consistency between the questionnaire and the research objectives and effectively serve the follow-up investigation.

The fourth part of the questionnaire mainly investigates the subjective well-being of residents according to the happiness theory.

The definition of subjective well-being is the main basis for drawing up the index system of residents subjective well-being. Subjective well-being is a positive and satisfied state experienced by individuals in life, which is formed by the comprehensive influence of objective environmental factors, human needs, values and other factors. The questionnaire adopts the Chinese Residents Subjective Well-being Scale (SWBS-CC20) compiled by Xing Zhanjun (see Table 3). The reliability and validity of SWBS-CC20 are 0.8475 and 0.972 (Xing Zhanjun, 2003).

There are 20 questions in the scale, which are divided into 10 dimensions: contentment experience, mental health experience, social confidence experience, growth and progress experience, goal value experience, self-acceptance experience, physical health experience, mental balance experience, interpersonal adaptation experience, and family atmosphere experience. Each question is scored with 6 points. Score 1 to 6 points from "strongly disagree, disagree, somewhat disagree, somewhat agree, agree, strongly agree", with 4, 5, 6, 9, 10, 11, 13, 15, 17, 18, 20 points in reverse. Previous research (Yanan Liu & Jingrui Yu, 2015; Guo Xueling et al.,2016) classified

subjective well-being as high with a score of >4.5, medium with a score of 2.5-4.5, and low with a score of <2.5. That is, the total score of subjective well-being >90 (91-120) is a high level, 50-90 is a medium level, and <50 (20-49) is a low level (Li Shuang,2018; Mei Tan,2019).

Dimensionality	No.	Topic content		
Social confidence	1	Society offers people more and more ways out		
experience,	16	I believe that society will continue to develop		
Growth and progress	2	As I grow older, I have learned many lessons from life, which		
experience		have made me more determined and capable		
	19	I am glad that my ideas have matured over the years		
Goal value experience	3	Most of the goals I set in my life inspire me rather than		
		disc <mark>ourage</mark> me		
	5	I don't know what the meaning of what I've done in my life is		
Self-acceptance	4	I often feel like I'm just trying to get through the day		
experience	12	I am more satisfied with my character		
Physical health		I often feel uncomfortable in certain parts of my body		
experience	10	I am very distressed about my health		
Abundance experience	7	Compared to the person next to me, I was content		
	8 <	I am satisfied with my family's financial situation		
Mental health	9	I often worry about trifles		
experience	18	When I meet unpleasant things, I can't cheer up for a long time		
Interpersonal	11	I often find it difficult to form friendships with others		
adaptation experience,	13	I feel like most people have more friends than I do		
Family atmosphere	_14	I feel very happy when I am with my family		
experience	20	1 sometimes find it difficult to communicate with my family		
12800		(including parents, children, lovers, etc.)		
Mind-balance	<b>c</b> 15	I had worse luck than others		
experience	17	Compared with others, I feel I am at a disadvantage		

 Table 3 Chinese Residents Subjective Well-being Scale (SWBS-CC20)

This scale has been widely used in the research of subjective well-being by Chinese scholars. Wang Jingjing (2022), Tan Mei (2019), Zheng Li (2019), Jia Siyue, Zhang Bei, Hua Yinan, Yang Xing & Zhang Hongjie (2017), Deng Yunlong, Liu Yan, Xu Shaorong, Zhao Min, Li Junping & Xiong Yan (2016), Dong Kou, Zhang Li & Zhang Jingjing (2014), Wang Cong & Xing Zhanjun (2023); Chu Lei & Xing Zhanjun (2022) and other researchers published a series of research results.

3.2 Questionnaire design

(1) Principles of questionnaire design

Questionnaire survey is one of the more commonly used data collection methods in the field of social science (Li Xiangrong, 2023). Numerous studies have shown (Easterlin, 1974,2003; Liu Junqiang, Xiong Mulin & Su Yang, 2012) : Happiness measurement based on questionnaire survey is robust, repeatable and comparable, and can accurately reflect individual happiness status.

In this study, questionnaire survey method was used to obtain research data for analysis. The main body of the questionnaire is composed of closed items, and corresponding answers are listed for respondents to choose, so as to facilitate subsequent data processing and statistical analysis.

In order to ensure the scientificity, rigor and standardization of the questionnaire, this study adopts the combination of self-designed questionnaire and general mature scale to jointly design the questionnaire. Based on the research purpose and combined with the previous domestic and foreign reviews on the impact of sports participation and social capital on subjective well-being, the questionnaire content was preliminatively determined.

#### (2) The basic requirements of questionnaire design

Designing a scientific and reasonable questionnaire is the premise and basis to ensure the reliability and validity of the research results. Questionnaire design has strict specifications and requirements, and it is necessary to follow the relevant principles of questionnaire design to improve the quality of questionnaires. Professor Li Dan and Professor Li Huaizu proposed that the following principles should be followed in questionnaire design:

(1) Simplicity: The general principle of questionnaire design should be as simple as possible to facilitate respondents to answer and arouse respondents' interest in filling out the questionnaire.

(2) Clarity: the questionnaire should only contain questions that are directly related to the purpose of the research, and there should be obvious differences between the alternative answers.

(3)Non-inducement: the questions mentioned in the questionnaire should mainly maintain the principle of neutrality in terms of words, and should not be biased, so as to avoid inducing and encouraging the respondents to make certain biased answers.

④Sequence: the items should be arranged in the corresponding order, first simple and then complex. In order to ensure the scientificity and rationality of the questionnaire and obtain effective and true data, this study follows the above principles when designing the questionnaire.

(3) The process of questionnaire design

The design process of the questionnaire in this study is as follows:

(1)Literature review was carried out to summarize the assessment methods and item design of the impact of sports participation and social capital on subjective wellbeing;

(2) Based on the problems studied in this paper and the core variables to be measured, the preliminary draft of the questionnaire was prepared with reference to the existing maturity scale;

(3) After the draft questionnaire is formed, 9 experts are invited to conduct project-objective consistency index (IOC) test on the draft questionnaire to determine whether items need to be deleted or added, and revise and adjust the draft questionnaire according to the feedback results and suggestions of experts;

④ Optimize and polish the wording of the questionnaire, and finally form a formal questionnaire.

3.3Preparation of questionnaire for IOC assessment

3.3.1 Selection of evaluation experts

With the help of expert survey method, a group of experts in this field are selected and consulted on a certain issue. After multiple rounds of survey feedback, expert opinions are gradually concentrated, which is one of the effective ways to obtain consensus opinions (Yu Xueyun et al.,2016; Qin Yibing et al., 2017). Early experiments have shown that population error decreases and conclusions become more reliable with the increase of expert population size, but there is no actual evidence to prove the relationship between the two (Murphy et al., 1998). The available literature on the number of experts ranges from a few to 1685 (Grisham, 2009; Skulmoski et al., 2007; Williams et al., 2010). Too few experts will make the results less authoritative, while too many experts will bring great difficulties to the result processing and data analysis, and may lead to a low response rate (positive coefficient) (Zeng Zhaoyun et al., 2016). Some researchers suggest that the expert evaluation team should have at least 7 members (Linstone, 1978), and the number is generally 8 to 20 (Xu Guoxiang,2005). All in all, the reliability of expert survey results depends on the professional level of experts, and the number of representatives should be determined by the quality of experts rather than the number of experts (Hasson, Keeney, & Mckenna,2000; Powell,2003; Thangaratinam & Redman, 2005). Therefore, in the selection of experts, participants should have relevant research background and experience on the issues to be consulted (Sandford,2007).

Based on this, at this stage, the purpose sampling method and snowball sampling method are used to collect data from the population where data is available (Berg, 2001; Creswell,2012; Saunders et al.,2009). A total of 9 experts were selected to conduct project-objective consistency index (IOC) test on the draft questionnaire, so as to ensure the consistency between the questionnaire and the research objectives and effectively serve the follow-up research.

3.3.2 Procedures for expert consultation

(1) Design expert letter questionnaire

Under the guidance of the supervisor, with the help of CNKI, Wanfang, VIP and PubMed databases, we collected and collated the measurement and evaluation tools of subjective well-being and social capital, as well as research literatures on sports participation (physical exercise) and subjective well-being, combined with previous research results and experience, and designed the preliminary draft of the questionnaire, which was used as a research tool in this study.

The letter questionnaire mainly includes two parts: 1) Questionnaire description, explaining the background, purpose and function of the research to the experts; 2) The survey tool IOC evaluation table, including 3 first-level indicators (sports participation, subjective well-being, social capital) 38 question items, experts need to evaluate each item.

(2) Expert correspondence questionnaire distribution and recovery

Draw up a list of experts and seek their consent before formal correspondence. The questionnaires were distributed and collected in the form of electronic questionnaires, which were sent via wechat or email. Two rounds of correspondence were conducted with the experts from January 20 to February 8, 2024. After the first round of consultation, after sorting and analyzing the results of the consultation, combined with expert opinions, questions were added and deleted, and the question expression was modified to form the second round of expert consultation questionnaire, which was investigated and collected in the same way. The second round of expert opinions reached consensus and concluded the letter consultation.

3.3.3 Results of expert IOC evaluation

The panel evaluated the consistency of the design of the questions in the questionnaire with the purpose of the study. In the evaluation form, "-1" indicates that the problem design is inconsistent with the research purpose; "0" means uncertain and open to debate; "1" indicates that the problem design is consistent with the research purpose. Nine experts scored the design based on the IOC value. When the IOC value is greater than or equal to  $0.5(\geq 0.5)$ , the project is valid (Ronna C. Turner & Laurie Carlson, 2003).

In the first round of assessment, the score of Q16 was 0.44. Experts suggest that the survey of motivation can use a special survey scale for more accurate assessment; The score of Q29 is only 0.33, experts suggest deleting this question, and there is a certain repetition of another question. Although the score of Q9 is higher than 0.5, some experts have put forward modified opinions, suggesting that specific items should not be listed for exercise items, because there are many sports items, and everyone has different choices. For the feasibility of the study, it is suggested to use the category of items to set the options, so as to facilitate the research operation. Following the recommendations of the expert group, the questionnaire was subsequently redesigned and modified.

After the modification, the second round of IOC evaluation was carried out on the questionnaire. The results of the second round of IOC evaluation are as follows:

I	No.	Items	Action Taken	Result of Round1	Result of Round2
	1	Sex:	Keep it	1	1
		A. Male B. Female		I	1
	2	Age:			
		A.<18 years old	Keep it	0.88	0.88
		B.18-25 years old C.26-45 years old		0.00	0.00
		D. 46-60 years old E. >60 year <mark>s o</mark> ld			
	3	Education:			
		A. Junior high School or below			
		B. Senior high School or tech <mark>nical</mark>			
		secondary school	Keen it	1	1
		C.Junior college	Keep n		
		D.Undergraduate			
		E. Graduate			
	4	Monthly income:			
		A.2500 Yuan and below			
		B.2501 yuan to 5000 yuan		0.88	0.88
		C.5001 yuan to 8000 yuan D.8001	Keep it	0.00	0.00
		to 10000 yuan			
		E.10000 yuan and above			
	5	Marital status:			
		A. unmarried B. Married			
		C. Divorce or separation	Keep it	1	1
	9	D. The loss of a spouse			
		E. The loss of a child	6	360	
	6	Physical health status:	61		
		A. Health B. General 4	Keep it	1	1
		C. Sub-health D. Sick, not healthy			

Table 4 The IOC Results of the Questionnaire

No.	Items	Action Taken	Result of Round1	Result of Round2
7	How often you engage in social			
	entertainment with friends:			
	A. never			
	B. Several times A year or less	Keep it	0.88	0.88
	C. Several times a month			
	D. Several times a week			
	E. Almost every day			
0				
8	Do you play sports?			
	A. Never	Keep it		
	B. Occasionally		0.78	0.78
	C. More frequent participation			
	D. Regular participation			
	Your options for physical exercise are:			
	A. Running B. Martial Arts			
0	D. Aerobics D. Swimming			
9	E. Table tennis F. Basketball			
	G. Football H. Badminton I.			
	Tennis J. Volleyball K.	Modify	0.55	
	Fitness Walking L. Cycling M.			
	Archery N. Strength exercises O.		516	0
	Rock climbing P. Mountaineering Q.	201		
	Yoga R. Sports with regional			
	characteristics S. other			

Table 4 The IOC Results of the Questionnaire (Continued table)

No.	Items	Action Taken	Result of Round1	Result of Round2
	What are your preferences when you			
	exercise:			
	A. Speed and strength type: such as			
	sprinting, weightlifting, throwing,			
	strength equipment exercises, etc			
10	B.Endurance type: such as long-distance			
	running, long-distance swimming, race			
	walking, fitness walking, cycling, etc	Jawly addad		
	C. The performance of difficult beauty	iewiy added		
	type: such as yoga, martial arts (Tai Chi),			
	aerobics dance, gymnastics, etc			1
	D. Accurate skills: such as shooting,			
	archery, etc			
	E. Anti-net type: such as table tennis,			
	badminton, tennis, volleyba <mark>ll, etc</mark>			
	F. Match type: such as basketball,			
	football, rugby, ice hockey, hockey, etc			
	G. Combat type: such as fencing, judo,			
	wrestling, boxing, etc	17-		
	H.Other: such as sports activities with			
	regional characteristics			
11	Your form of physical exercise:			
	A. Exercise alone		516	3
	B. Exercise in a group (with family or	Keep it	1	
	friends)	0.		

Table 4 The IOC Results of the Questionnaire (Continued table)

No.	Items	Action Taken	Result of Round1	Result of Round2
12	Exercise intensity when participating			
	in physical exercise:			
	A. Light exercise			
	B. Light and not too intense exercise C.			
	Moderately intense and sustained exercise	Keep it	1	1
	D. Heavy, but not lasting exercise that			
	involves heavy breathing and sweating E.			
	heavy, sustained exercise that involves			
	heavy breathing and sweating			
13	How long does each physical exer <mark>cise</mark>			
	last:			
	A.Less than 10 minutes			
	B.11 to 20 minutes	Keen it	0.89	0.89
	C.21 to 30 minutes	Ксери		
	D.31 to 59 minutes			
	E.More than 60 minutes			
14	Frequency of participation in physical			
	exercise:			
	A. Once a month or less	Keep it		
	B. 2-3 times a month	I	1	1
	C. 1-2 times a week			
	D. 3-5 times a week			
	E. Almost every day			
15	How long have you maintained the			
	above exercise behavior?			
	A. Less than six months	Keep it	516	9
	B. Less than six months to one year	56		1
	C. Less than one to two years	N 64.		
	D.Within 2-3 years			
	E. more than 3 years			

Table 4 The IOC Results of the Questionnaire (continued table)
ur motivation to participate in ysical exercise is: I want to have a strong body I want to maintain or improve my dy shape to make myself more ractive want to keep a happy mood and live a althy life through physical exercise want to maintain and improve my rent motor skills and learn new ones I would like to enhance my friendship h my friends, make some new friends I maintain good social relations ough sports activities ercise motivation was investigated ng Exercise Motivation Scale - PAMR simplified version u have your own circle that you hang	Eliminate Newly added Keep it	0.44	1
ysical exercise is: I want to have a strong body I want to maintain or improve my dy shape to make myself more factive want to keep a happy mood and live a althy life through physical exercise want to maintain and improve my rent motor skills and learn new ones I would like to enhance my friendship h my friends, make some new friends al maintain good social relations ough sports activities ercise motivation was investigated ng Exercise Motivation Scale - PAMR simplified version u have your own circle that you hang with	Eliminate Newly added Keep it	0.44	1
I want to have a strong body I want to maintain or improve my dy shape to make myself more ractive want to keep a happy mood and live a althy life through physical exercise want to maintain and improve my rent motor skills and learn new ones I would like to enhance my friendship h my friends, make some new friends I maintain good social relations ough sports activities ercise motivation was investigated ng Exercise Motivation Scale - PAMR simplified version u have your own circle that you hang	Eliminate Newly added Keep it	0.44	1
I want to maintain or improve my dy shape to make myself more ractive want to keep a happy mood and live a althy life through physical exercise want to maintain and improve my rent motor skills and learn new ones I would like to enhance my friendship h my friends, make some new friends I maintain good social relations ough sports activities ercise motivation was investigated ng Exercise Motivation Scale - PAMR simplified version u have your own circle that you hang	Eliminate Newly added Keep it	0.44	1
dy shape to make myself more ractive want to keep a happy mood and live a althy life through physical exercise want to maintain and improve my rent motor skills and learn new ones I would like to enhance my friendship h my friends, make some new friends I maintain good social relations ough sports activities ercise motivation was investigated ng Exercise Motivation Scale - PAMR simplified version u have your own circle that you hang	Eliminate Newly added Keep it	0.44	1
want to keep a happy mood and live a althy life through physical exercise want to maintain and improve my rent motor skills and learn new ones I would like to enhance my friendship h my friends, make some new friends I maintain good social relations ough sports activities ercise motivation was investigated ng Exercise Motivation Scale - PAMR simplified version u have your own circle that you hang	Eliminate Newly added Keep it	0.44	1
althy life through physical exercise want to maintain and improve my rent motor skills and learn new ones I would like to enhance my friendship h my friends, make some new friends I maintain good social relations ough sports activities ercise motivation was investigated ng Exercise Motivation Scale - PAMR simplified version u have your own circle that you hang	Eliminate Newly added Keep it		1
want to maintain and improve my rent motor skills and learn new ones I would like to enhance my friendship th my friends, make some new friends a maintain good social relations ough sports activities ercise motivation was investigated ng Exercise Motivation Scale - PAMR simplified version u have your own circle that you hang	Newly added Keep it		1
rent motor skills and learn new ones I would like to enhance my friendship h my friends, make some new friends I maintain good social relations ough sports activities ercise motivation was investigated ng Exercise Motivation Scale - PAMR simplified version u have your own circle that you hang	Newly added Keep it		1
I would like to enhance my friendship h my friends, make some new friends a maintain good social relations ough sports activities ercise motivation was investigated ng Exercise Motivation Scale - PAMR simplified version u have your own circle that you hang with	Newly added Keep it		1
h my friends, make some new friends d maintain good social relations ough sports activities ercise motivation was investigated ng Exercise Motivation Scale - PAMR simplified version u have your own circle that you hang	Newly added Keep it		1
I maintain good social relations ough sports activities ercise motivation was investigated ng Exercise Motivation Scale - PAMR simplified version u have your own circle that you hang	Newly added Keep it		1
ough sports activities ercise motivation was investigated ng Exercise Motivation Scale - PAMR simplified version u have your own circle that you hang	Newly added Keep it		1
ercise motivation was investigated ng Exercise Motivation Scale - PAMR simplified version u have your own circle that you hang	Newly added Keep it		1
ng Exercise Motivation Scale - PAMR simplified version u have your own circle that you hang	Newly added Keep it		1
PAMR simplified version u have your own circle that you hang	Keep it		-
u have your own circle that you hang	Keep it		
, with		1	1
u have some influence in the social cle.	Keep it	0.89	0.89
u are an active member of a local	Keep it		
anization or club, such as a football		0.89	0.89
ociation, yoga association, dance			
ociation, calligraphy association, etc.			
u enjoy living with people who have	Keep it	0.89	0.89
ferent lifestyles.			
nen you go to an event, you say hello	Keep it	0.89	0.89
others.			
u can meet new people through	K oon it		1
vities	Ксери		
ivities		en	
can consciously comply with	6 0	20	
nagement requirements and activity	Keep it	- 1	
es			
	cle. u are an active member of a local ganization or club, such as a football ociation, yoga association, dance ociation, calligraphy association, etc. u enjoy living with people who have ferent lifestyles. then you go to an event, you say hello others. u can meet new people through visical fitness activities and leisure ivities nen participating in various activities, a can consciously comply with nagement requirements and activity es.	cle. u are an active member of a local Keep it anization or club, such as a football ociation, yoga association, dance ociation, calligraphy association, etc. u enjoy living with people who have Keep it ferent lifestyles. then you go to an event, you say hello Keep it others. u can meet new people through vsical fitness activities and leisure Keep it ivities hen participating in various activities, a can consciously comply with nagement requirements and activity es.	cle. u are an active member of a local Keep it anization or club, such as a football ociation, yoga association, dance ociation, calligraphy association, etc. u enjoy living with people who have Keep it 0.89 ferent lifestyles. hen you go to an event, you say hello Keep it 0.89 others. u can meet new people through vsical fitness activities and leisure ivities hen participating in various activities, a can consciously comply with nagement requirements and activity es.

Table 4 The IOC Results of the Questionnaire ( continued table)

No.	Items	Action Takon	Result of Round1	Result of Round?
		Такеп	Roundi	Round2
25	You think it's important to follow social norms of behavior.	Keep it	1	1
26	When people around you (people you know) do not follow the code of conduct, you will alert and stop.	Keep it	0.89	0.89
27	When you see strangers not obeying the code of conduct, you will alert and stop.	Keep it	0.78	0.78
28	You have a lot of trust in the circles and groups that you regularly participate in.	Keep it	1	1
29	Do you agree or disagree that in general social interactions/contacts that do not directly involve pecuniary interests, there are more people who can be trusted among relatives, neighbors, colleagues, classmates and good friends	Eliminate	0.33	
30	Generally speaking, do you agree that the vast majority of people in this society can be trusted?	Keep it	0.89	0.89
31	this society, if you are not careful, others will try to take advantage of you?	Keep it	0.89	0.89
32	You think it's safe to walk the streets after dark.	Keep it	1	1
33	In social interactions, you often ask for your partner's opinion or the opinion of others.	Keep it	0.89	0.89
34	In life, I can easily get the information I need.	Keep it	1	1
35	When I have trouble, I can easily find someone to talk to.	Keep it	1	1
36	In life, when I encounter difficulties, I can get support and help from others.	Keep it	1	1
37	In life, I am very willing to help others.	Keep it	516	1
38	The subjective well-being survey was conducted by using the Chinese Residents Subjective Well-being Scale (SWBS- CC20) compiled by Xing Zhanjun	Keep it	1	1

Table 4 The IOC Results of the Questionnaire (continued table)

As can be seen from the table above, the scores of each item in the second round of IOC evaluation were all greater than or equal to  $0.78 (\ge 0.78)$  after the modification suggested by experts, which also indicated that the questionnaire item design had good content validity.

#### **3.4 Investigate tool pretesting**

In order to ensure the quality of the questionnaire, a small pre-survey was carried out before the formal questionnaire was issued and data collection was implemented. The purpose of the pre-survey was to timely adjust the unreasonable points in the questionnaire before the formal investigation, ensure the accurate expression of the question stem and item, and avoid misunderstandings, and modify and adjust the questions in the research tool. To ensure the validity and reliability of the questionnaire (Bernard, 2000), at the same time, it can also understand the response of the respondents during the answer, so as to better conduct effective data screening in the later stage.

A total of 200 residents over 18 years old were randomly selected from Hanbin District, Ankang City, Shaanxi Province. The pre-test was completed in Ankang City, Shaanxi Province from February 15 to February 20, 2024, and the investigation sites were mainly Xing 'an Square, Wuyue Square, Ankang City, Xinghua Name Community, Ankang City, etc. Participants in the prediction met the inclusion criteria for this study.

In this stage, offline questionnaire survey was adopted. In order to ensure the accuracy of the research objects, before the investigation, the respondents were asked whether they were over 18 years old. If the respondents answered "yes", follow-up research could be carried out. If the other party answers "no", there is no need to continue the investigation. A total of 200 questionnaires were sent out, 198 were recovered, and after eliminating invalid data (incomplete questionnaires and regular answers), 183 were left, with an effective rate of 92.42%, which met the needs of research and analysis. American sociologist Bobby (2000) pointed out: "The questionnaire recovery rate of at least 60% is considered to be good; And 70 percent is pretty good." (Wind Laughing Day, 2007). SPSS 23.0 analysis software was used to analyze and statistic the valid questionnaires, and it was found that the demographic distribution of the participants in the pre-survey showed the following characteristics.

Variable	group	Number of people	percentage
	male	91	49.73%
sex	female	92	50.27%
	18-25 years <mark>ol</mark> d	75	40.98%
	25-45 years <mark>o</mark> ld	54	29.51%
age	46-60 years <mark>ol</mark> d	37	20.22%
	Over 60 years old	17	9.29%
	Exercise alone	92	50.27%
Participation form	Group exercise	91	49.73%

Table 5 Demographic Information of Pre-survey

Reliability analysis can test the consistency and stability of the results measured by questionnaire tools (Qiu Haozheng,2009). At present, there are four main methods for reliability analysis: retest reliability method, duplicate reliability method, split half reliability method and Cronbach reliability coefficient method (Zheng Ying, 2013). In consideration of various studies, Cronbach's alpha is often used to reflect the consistency and stability of measurement (Field, 2005). Previous studies have shown that Cronbach's alpha coefficient should be discarded if it is between 0.60 and 0.65; Cronbach's alpha coefficient range between 0.65 and 0.70 is the minimum acceptable value; Cronbach's alpha coefficient range is fairly good between 0.70 and 0.80; Cronbach's alpha coefficient range between 0.80 and 0.90 is very good. That is, when Cronbach'sa is greater than 0.7, it indicates that the questionnaire has good internal consistency.

Therefore, Cronbach reliability coefficient method is also used in this study to test the reliability of the questionnaire. From the feedback of the questionnaire predictive test and the results of reliability and validity analysis, Cronbach's alpha coefficient of each dimension of the questionnaire used in this study ranged from 0.817 to 0.921, all of which exceeded 0.7, indicating that the internal items of the questionnaire had good consistency, and the questionnaire passed the reliability test. Applicable to different sports participants, there is no need to delete or change any items. Table 6 lists the confirmatory factor analysis and reliability analysis results of the questionnaire.

	χ²/df	CFI	NFI	GFI	RMESA	Cronbach'sa
Sports participation	2.812	0.912	0.927	0.917	0.043	0.843
Social capital	1.437	0.9 <mark>61</mark>	0.933	0.964	0.063	0.817
Subjective well- being	2.886	0.99 <mark>1</mark>	0.984	0.906	0.051	0.921

Table 6 Confirmatory factor analysis and reliability analysis

## 4. Data Collection Procedure

The research proposal was submitted to the Advisory Committee of the Graduate School of Mahasarakan University and permission was obtained from the Human Ethics Committee of Mahasarakan University to conduct the data survey collection.

The survey will be carried out through the combination of online and offline investigation methods. During the expert evaluation, the interviewed experts will first be contacted by phone and WeChat to briefly introduce the research purpose and evaluation content of the project, and the appropriate method, place and time will be agreed with the interviewed experts so that the interviewed experts can better carry out evaluation.

A pre-survey was conducted before normal data collection. The purpose of the presurvey is to ensure the validity and reliability of the questionnaire, modify and adjust the questions in the research tool (Bernard, 2000), and estimate the time to answer the questionnaire. Some researchers believe that in order to successfully validate the questionnaire, the number of pre-test subjects should be 3-5 times the number of "subscales" containing the most items in the questionnaire (Yin Bo, 2009). The prediction questionnaire of this survey consists of 1 basic information questionnaire and 3 subscales, with 15 questions, 15 questions, 19 questions and 20 questions respectively. Based on the above considerations, the number of predicted subjects in this study was selected as 200. In the pre-survey, 200 respondents were given a brief explanation of the study and notes for completing the questionnaire. Respondents were informed that when they participated in filling out and submitting the questionnaire, they would be considered to have voluntarily agreed to participate in the study. They have the right to withdraw from the study at any time, their information will be kept confidential and will not be used for any purpose other than analyzing the data from this study. The survey takes about 5-10 minutes.

In expert evaluation, some researchers suggest that the expert evaluation team should have at least 7 members (Linstone, 1978), and the number is generally 8 to 20 members (Xu Guoxiang,2005). Therefore, at this stage, 9 experts in sports-related fields are selected to evaluate and modify the questionnaire, which is in line with the requirements of the study.

The online questionnaire directly uses the questionnaire star to carry out the original data statistics, while the offline survey carries out face-to-face surveys by entering communities, schools and households, and then timely input the questionnaires filled by the respondents into the statistical system, so as to pay timely attention to the distribution of samples in various regions and groups and promote the follow-up survey activities in a targeted manner.

#### 5. Statistical Analysis

In this study, SPSS 23.0 data statistical software was used to analyze the survey data. After the draft questionnaire was formed, the project-objective consistency index (IOC) was used for two evaluations, and the opinions of evaluation experts were solicited. The scores of the revised questionnaire items were all greater than or equal to 0.78. In addition, after the pre-survey, Klombach reliability coefficient method was used to test the reliability of the questionnaire. The results showed that: Cronbach's alpha coefficient of each dimension of the questionnaire used in this study ranged from 0.817 to 0.921, all of which exceeded 0.7, indicating that the internal items of the questionnaire had good consistency, the questionnaire passed the reliability test, and the respondents could clearly identify the problems. The questionnaire could provide an operable measurement tool for subsequent research.

## Phase 2

## 1. Objective

Data was obtained through questionnaire survey to analyze the relationship among residents' sports participation, subjective well-being and social capital at the present stage. With sports participation and social capital as explanatory variables, a regression model was built to analyze the impact of sports participation and social capital on subjective well-being and explore the relationship mechanism among the three, based on controlling other factors affecting individual subjective well-being. And differences between different groups.

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#### 2. Participants and Sample size

At this stage, the sample size is calculated according to the minimum requirements of CFA, that is, it is recommended that the sample size should be at least 5 times the number of items on the scale, and 10 times or more is the best, and in general, the sample size should not be less than 200 (Yang Wenyan, 2014; Yin Jinyu et al., 2023). Kendall (1994) proposed the sample size estimation method for multiple linear regression as follows: the sample size should be at least 10 times the number of variables. In addition, some experts also suggest that, considering the stability of the model, the sample size should be greater than 200 (Boomsma, 1982); Ollerenshaw, J. A. and Creswell, J. W. (2002); Ollerenshaw, J. A. & Creswell, J. W. (2002) believed that the number of samples should be defined according to the attributes of questionnaires. In general questionnaires, the number of formal samples should be above 350 people. Meanwhile, based on 95% confidence level, the minimum sample size is 384 (Eagy & Mingmin, 2006). In this study, the questionnaire designed in this study contains 69 questions, and at least 690 people are required for the analysis and research with 95% confidence. assuming that the effective recovery rate of samples is 90%, that is, the minimum sample size should be 767 people. Scholar Yang Jun (2008) believes that theoretically speaking, the larger the survey sample, the more helpful it is to eliminate the random error that is difficult to avoid by measurement means, so as to make the research results convincing. Therefore, in order to improve the confidence interval of the analysis results and reduce the unnecessary margin of error, the study decided to increase the number of participants.

This study takes Shaanxi Province as an example. According to the stratification of regional economic development, 1,200 residents (200 residents in each region) from 6 regions (2 regions in each of the three levels of high, medium and low economic development level) are randomly selected as the research samples in this stage. The sample size of the study meets the requirements of the above statistical methods, which can meet the needs of analysis and make the research results convincing to a certain extent.

The inclusion criteria of the survey subjects in this study were: 1) male and female residents over the age of 18; 2) Obtain the informed consent of the respondents and voluntarily accept the survey; 3) The volunteers have clear consciousness, can communicate normally, have a certain Chinese foundation, and can complete the questionnaire independently.

The exclusion criteria of the subjects in this study were: 1) under the age of 18; 2) The volunteers were not interested in the study, explicitly refused and did not cooperate with the investigators. 3) The volunteers had physical deformity or mental disorder, could not communicate normally, and could not complete the questionnaire independently.

### 3. Research Instrument

The research tool in this stage is the questionnaire of residents' sports participation, social capital status and subjective well-being completed in the first stage of this study. The questionnaire has been evaluated by experts and tested for reliability and validity. It has good reliability and validity and can be used for investigation and research.

## 4. Research methods and data collection

### 4.1 Research process

(1) Before collecting questionnaire data, the questionnaire should be translated first. Since the data collection place is Shaanxi Province, China, and the language used in this region is Chinese, considering that the survey questions can be accurately identified by the respondents, the questionnaire was first translated into Chinese, and an expert in English translation of Ankang University was asked to compare and check and revise the Chinese and English versions of the questionnaire, so as to ensure the accuracy of the language expression and ensure the accuracy of the expressions of the questions in the questionnaire.

(2) Conduct questionnaire surveys, establish record tables, and record all kinds of survey data

(3) Conduct statistical analysis of the data obtained from the investigation.

(4) The main issue of research ethics is the fair selection of survey subjects. Survey subjects have knowledge of the research, voluntarily accept the survey, the questionnaire should be anonymous and confidential, and no harm should be caused to the respondents, and the original data should be respected in statistical analysis, and no arbitrary alteration should be made.

### **4.2 Data Collection Procedure**

(1) Taking Shaanxi Province as an example to select survey objects, based on the geographical division of Shaanxi Province's administrative regions -- southern Shaanxi, Northern Shaanxi and Guanzhong, and the economic development status of each region, six regions were randomly selected as sample survey areas according to stratified sampling, and 200 people were randomly selected as survey objects in each region.

(2) The researcher will contact residents over 18 years old who meet the requirements of this study and introduce the purpose of the questionnaire survey and

the precautions for filling out the questionnaire. After obtaining the consent of the respondents, the researcher and the data collection assistant will personally collect the data.

(3) Questionnaire survey will be conducted through the combination of online and offline survey methods. In the offline survey, considering the accuracy of the target group, when introducing the purpose of the questionnaire survey and the precautions for filling out the questionnaire to the interviewees, it should be emphasized that the participants should be over 18 years old. Only after the interviewees meet the age of the target group and are willing to participate in the questionnaire survey can the survey continue.

The online survey was conducted with the help of Question star software, which can effectively communicate with the target population through online questionnaires (Garton, Haythornthwaite, & Wellman, 1999). Secondly, online survey also reduces the cost of data collection and improves the time efficiency of the data collection process (Bachmann, Elfrink, & Vazzana, 1996).

(4) The acquired data is screened. The first step, when using an online questionnaire, takes into account the accuracy of the target population, the first question is "How old are you?" If the answer is "under 18 years old", it does not meet the target population of this study, so the software program will automatically terminate the collection and directly submit to complete. If the answer to that question is something else, then the next question will automatically appear, continuing the survey. In the research screening, the questionnaire data of "under 18 years old" should be selected for this question to be deleted. In the second step, for those who answered less than 90 seconds, the questionnaire was deleted according to the answer time. The third step is to delete regular answers and incomplete questionnaires.

## 5. Statistical Analysis

SPSS 23.0 statistical software was used to analyze the survey data, and descriptive statistics, correlation analysis, difference analysis and multiple regression analysis were used to analyze the sports participation, social capital and subjective well-being of 1200 samples, so as to explore the relationship mechanism among the three and the differences among different groups.

### Phase 3

### 1. Objective

An 8-week controlled experiment was conducted to verify the effect of sports participation on individual subjective well-being.

Based on the analysis results of the relationship among sports participation, social capital and subjective well-being, a detailed 8-week intervention plan was developed for men aged 18-25 years, and the intervention experiment was conducted from April 9, 2024, to June 4, 2024, and the 8-week controlled experiment was completed. By comparing the results of the experimental group and the control group, the intervention effect of sports participation behavior on the subjective well-being of the group was verified.

To implement the program by this following (Figure 4):



Figure 4 Experimental thinking of implementing sports participation to interfere with subjective well-being

## 2. Research Instrument

2.1 Questionnaire of residents' sports participation, social capital status and subjective well-being

The first research tool in this stage is the questionnaire of residents' sports participation, social capital status and subjective well-being completed in the first stage of this study. The subjects were investigated and measured by questionnaires before and after the experiment, and the measured data were tested by T test using SPSS 23.0.

2.2 Sports participation intervention training program

The second research tool in this phase was the sports participation intervention training plan developed based on the results of the Phase II analysis of the study, which was tested by five experts for project-goal consistency index (IOC) before application.

### 2.2.1 Content design of intervention training plan

First, the results of the second stage provided a realistic basis and variable control basis for this stage of the experiment (see Table 7). Secondly, the researcher and his assistant have more than 20 years of college physical education teaching experience and rich experience. Finally, in order to make the research protocol plan more targeted,

the experimental intervention plan was tested by five experts for project-to-objective Consistency Index (IOC) before application.

Characteristic dimension	Feature subdivision	Number	percent
Participation form	solo exercise	125	43.3
	group exercise	164	56.7
	once a month or less	45	15.6
	2-3 times a m <mark>on</mark> th	78	27.0
Exercise frequency	1-2 times a w <mark>ee</mark> k	97	33.6
	3-5 times a week	47	16.3
	almost ever <mark>y day</mark>	22	7.6
	A.Light exercise	25	8.7
	B.Light and not too intense exercise	93	32.2
Exercise intensity	C. Moderate exercise	110	38.1
	D.Shortness of breath, heavy sweating	55	19.0
	E.Heavy exercise that involves heavy	6	2 1
	breathing and sweating	0	2.1
Duration of exercise	Less than 10 minutes	19	6.6
	11-20 minutes	42	14.5
	21-30 minutes	118	40.8
	31 to 59 minutes	61	20.1
	More than 60 minutes	49	17.0
	speed strength type	31	10.7
Types of exercise items	endurance type	48	16.6
12998	performance difficult beauty type	6 26	9.0
5 4	skill accuracy type	3	1.0
	mesh resistance type	119	41.2
	the same field resistance type	27	9.3
	fighting resistance type	2	0.7
	others	33	11.4

 Table 7 Sports participation behavior characteristics of sample population aged 18-25 years

According to the second stage survey, the physical exercise behavior of 18-25 years old group is mainly grouping exercise, 1-2 times a week, within 30 minutes each time, moderate intensity physical exercise against the net. Accordingly, the 8-week (twice a week) sports intervention plan is designed, as shown in Table 8:

Week	moving target	Main activity design
1	Understanding the promotion of	1. Explain health knowledge and physical
	physical education to health;	exercise knowledge;
	Motivate participation.	2.Organize on-site discussions and
		consultations.
	Stimulate participation interest in	1. Explain exercise knowledge;
	learning; Get an exercise	2. Organize exercise activities;
	experience	
2	Enhance trust and promote the	1. Explain the arrangement of the activity;
	development of interpersonal	2. Warm-up preparation activities; 3.
	relationships: Help the subjects	Sports mini-games:
	improve their motor skills and get a	4 Organize exercise activities:
	good exercise experience	5 Share your learning experience
3	Promote the development of	1 Warm-up preparation activities: 2
5	interpersonal relationships: Help	Sports mini-games:
	subjects develop sports skills	3.Organize exercise activities;
	through guided exercises.	4. Share your learning experience.
4	Enhance the development of	1. Warm-up preparation activities;2.
	interpersonal trust; Help subjects	Sports mini-games;
	get a good exercise experience.	3.Organize exercise activities;
. 9		4. Share your learning experience.
5	Conduct self-evaluation of exercise	1. Explain the content of this activity; 2.
	behavior and exercise effect	Organize group discussions;
	Enhance	1. Warma un granamation pativitiasi
	relationships: Help subjects get a	1. warm-up preparation activities, 2.
	good exercise experience	3 Organize exercise activities
6	Promote the development of	1. Explain the arrangement of the activity.
~	interpersonal relationships; Guide	2. Warm-up preparation activities; 3.
	exercises to help subjects get a	Sports mini-games;

Table 8 Brief table of sports intervention programs

	good exercise experience and	4. Organize exercise activities.
	strengthen sports participation	
	behavior.	
7	Promote the cooperation among the	1. Warm-up preparation activities; 2.
	subjects and promote the	Sports mini-games;
	development of interpersonal	3.Organize exercise activities;
	relationship; Help subjects improve	4. Share your learning experience.
	motor skills and strengthen sports	
	participation behavior.	
8	Help subjects understand and use	1. Explain exercise knowledge.
	social sports resources to do	2. Organize group discussions.
	physical exercise, and know the	3. Organize exercise.
	potential harm of lack of physical	
	exercise. Encourage the subjects to	
	implement the exercise goals and	
	strengthen exercise management	

Physical exercise activities implementation steps: physical exercise activities are divided into preparation part, basic part, end part. Carry out physical exercise activities through the corresponding physical exercise content. Among them, the preparation part includes free hand exercise and dynamic stretching; The basic part is set for the exercise content of the class; In the end, the participants were mentally relaxed and physically stretched through the guidance of soothing music and language.

2.2.2 The IOC Results of the Experiment plan

(1) In this stage, the purpose sampling method and snowball sampling method are used to collect data from the population where data is available (Berg, 2001; Creswell,2012; Saunders et al.,2009). A total of 5 experts were selected to conduct project-goal consistency index (IOC) test on the prepared sports intervention training plan to ensure consistency with the research objectives and effectively serve the follow-up experimental research.

Name	Country	School	Professional title	<b>Research direction</b>
Dr.Chen	China	XJTU	Prof.	Psychology of sports
Dr.Wen	China	HSNU	Prof.	Sports Training
Gao	China	XPEU	Prof.	Sports Training
Dr.Chang	China	TJUS	Prof.	Psychology of sports
Wang	China	WNU	Prof.	Sports Training

Table 9 List of Evaluation Experts

(2) The panel evaluated the consistency of the intervention design with the purpose of the study. In the evaluation form, "-1" indicates that the intervention plan is inconsistent with the purpose of the study; "0" means uncertain and open to debate; "1" indicates that the intervention plan is consistent with the purpose of the study. The evaluation was performed by five experts and the IOC value was used to judge the validity of the item design. When the IOC value was greater than or equal to  $0.5(\geq 0.5)$ , the item was valid (Ronna C. Turner & Laurie Carlson, 2003). In the first round of evaluation, the scores of interventions from week 1 to week 8 all exceeded 0.6, which met the requirements of the study. However, some experts suggested that the time of each sports intervention should be extended from 30 minutes to 40 minutes in order to ensure more effective fitness effects and fit in with the time setting of physical education in China. According to the learning and mastering of the physical exercise program, in the weeks after the sports intervention, in addition to collective exercises, it is suggested to increase individual independent exercise, and fully consider the diversity of sports participation interests of the subjects. Following the recommendations of the expert group, the research plan was subsequently redesigned and modified. After the modification, the second round of IOC evaluation was carried out on the questionnaire. The results of the second round of IOC evaluation are as follows:

No.	Items	Action Taken	Result of Round1	Result of Round2
	Time: 5:00-5:30 pm on Monday,	Modify	0.6	
1	Thursday, lasts 30 minutes.			
	Time: 5:00-5:40 pm on Monday,	Keep it		1
	Thursday, lasts 40 minutes.			
	Instrument			
	1. The school has a quiet classroom that			
•	can accommodate 50 people, with	·		
2	multimedia equipment such as	Keep it	1	1
	computers, projectors, microphones,			
	etc. 2. School			
	playground, and all kinds of exercise			
	equipment for easy operation. Such as			
	vonues and equipment			
	A stivity form		_	
	1. The experimental researcher and			
3	assistant explain sports knowledge			
5	activity arrangement and precautions to	Keen it	1	1
	the subjects.	inop ii	Ť.	1
	2. The experimental researchers and			
	assistants organize the subjects to			
	exercise.			
	3.Experimental researchers and			
	assistants organized group discussions			
	for subjects and shared their exercise			
	feelings.			
	พหูน ปณุ ส	120	216	3

Table 10 The IOC Results of the Experiment plan

No.	Items	Action Taken	Result of Round1	Result of Round2
	Intervention process(Week 1 -1)			
	1. With the help of multimedia, explain the			
	connotation of modern health and measure			
	the standard of health to the envoys. The			
	importance of health to the individual. (5			
	minutes)			
4	<b>2.</b> Organize the subjects to analyze their			
-	own health problems or behaviors tha <mark>t h</mark> ave			
	an impact on healthy development			
	according to the health standards. (5	Keep it	0.8	0.8
	minutes)			
	3. Explain the health promotion of sports			
	and other benefits of physical exercise			
	through videos and pictures. (15 minutes)			
	<b>4.</b> Explain how to participate in physical			
	exercise scientifically and effectively and			
	the problems that need attention. (10	L		
	minutes)			
	5. Organize the subjects to discuss and			
	communicate and express their views. (5			
	minutes)			
	Intervention process(Week 1 -2)			
	1. Stimulate participation interest by			
	playing short videos and pictures of			
_	physical exercise. (5 minutes)			
5	2. Explain the main content of this exercise	Keep it	0.8	0.8
	and the problems that need attention during			
	exercise. (2 minutes)			
	3. Organize the subjects to warm up			
	activities to avoid injury problems during		di	3
	physical exercise. (8 minutes)	60	20	
	4. Instruct the subjects to do physical	761		
	exercise (badminton). (20 minutes)			
	5. Organize subjects to organize and relax			
	activities. (5 minutes)			

No.	Items	Action Taken	Result of Round1	Result of Round2
	Intervention process(Week 2)			
6	1. Explain the main content of this			
	exercise and the problems that need			
	attention during exercise. (2 minutes)	Keen it	0.8	0.8
	2. Organize warm-up activities	p		
	(5 minutes)			
	3. Sports games: Unbrace let game/Call			
	and count (8 minutes)			
	4. Guide the subjects to exercise and			
	learn sports (badminton). <b>(20 minutes)</b>			
	5. Organize subjects to organize and			
	relax activities. (2 minutes)			
	6. Organize the subjects to share their			
	feelings about this exercise. (3 minutes)		- 11	
	Intervention process(Week 3)			
	1. Explain the main content of this	Keep it	0.8	0.8
7	exercise and the problems that need			
	attention during exercise. (2 minutes)			
	2. Organize warm-up activities			
	(5 minutes)			
	3. Sports games: Sit up/Head-on relay			
	(8 minutes)		di	3
	4. Guide the subjects to exercise and	รด	016	
	learn sports (Table tennis). (20 minutes)	67.		
	5. Organize subjects to organize and			
	relax activities. (2 minutes)			
	6. Organize the subjects to share their			
	feelings about this exercise. (3 minutes)			

No.	Items	Action Taken	Result of Round1	Result of Round2
	Intervention process(Week 4)			
	1. Explain the main content of this exercise			
	and the problems that need attention during			
8	exercise. (2 minutes)			
0	2. Organize warm-up activities <b>(5 min<mark>ut</mark>es)</b>			
	3. Sports games: Invincible Hot wheels/ big			0.0
	foot board (10 minutes)		0.8	0.8
	3. Guide the subjects to exercise and learn	Keep it		
	sports (Table tennis). (15-18 minutes)			
	5. Organize subjects to organize and relax			
	activities. (2-5 minutes)			
	6. Organize the subjects to share their			
	feelings about this exercise. (3 minutes)			
	Intervention process(Week 5-1)			
	1. Summarize the previous four weeks of			
9	exercise and share your gains in the exercise			
	process (10 minutes)			
	2. Watch exercise videos to build a healthy			
	and positive exercise image and confidence.			
	(5 minutes)			
	3. Organize subjects to set short-term exercise		0.8	0.8
	goals and long-term exercise goals. (Lasts 3-	Keep it		
	5 minutes)			
	4. The subjects discussed in groups, and the			
	researchers encouraged them to move			
	forward with the goal and keep exercising. (5			
	minutes)		516	8
	5. The subjects were grouped into sports	50		
	(table tennis/badminton). (15 minutes)	64		
	6. Organize subjects to organize and relax			
	activities. (2-3 minutes)			

No.	Items	Action Taken	Result of Round1	Result of Round2
	Intervention process(Week 5-2)			
	1. Explain the main content of this exercise			
10	and the problems that need attention during	Keep it	0.8	0.8
	exercise. (2 minutes)			
	2. Organize warm-up activities (5 minutes)			
	3.Sports games: Trust back drop (10			
	minutes)			
	4. The subjects were grouped into sports			
	(table tennis/badminton). (15-18 minutes)			
	5. Organize subjects to organize and relax			
	activities. (2-5 minutes)			
	6. Organize the subjects to share their			
	feelings about this exercise. (3 minutes)			
	Intervention process(Week 6)			
	1. Explain the main conten <mark>t of this exercise</mark>			
11	and the problems that need attention during			
	exercise. (2 minutes)	Modify	0.6	1
	2. Organize warm-up activities			
	(5 minutes)		- 11	
	3. Sports games: Dry dragon boat/cooperation			
	dribble (10 minutes)			
	4. The subjects were grouped into sports			
	(table tennis/badminton). (15-18 minutes)			
	5. Organize subjects to organize and relax		516	0
	activities. (2-5 minutes)	50		
	6. Organize the subjects to share their			
	feelings about this exercise. (3 minutes)			

No.	Items	Action Taken	Result of Round1	Result of Round2
	Intervention process(Week 7)			
12	1. Explain the main content of this exercise			
	and the problems that need attention during			
	exercise. (2 minutes)	Modify	0.6	1
	2. Organize warm-up activities <b>(5 minutes)</b>			
	3. Sports games: Football pass game/t <mark>rai</mark> n			
	race(10 minutes)			
	4. The subjects were grouped into sports			
	(table tennis/badminton). <b>(15-18 minutes)</b>			
	5. Organize subjects to organize and relax			
	activities. (2-5 minutes)			
	6. Organize the subjects to share their feelings			
	about this exercise. (3 minutes)			
	Intervention process(Week 8-1)			
	1. Explain the main content of this exercise			
	and the problems that need attention during			
	exercise. (2 minutes)	Modify	0.6	1
13	2. Organize warm-up activities			
	(5 minutes)			
	3. Sports games: Invincible Hot wheels/ big			
	foot board(10 minutes)			
	4. The subjects were grouped into sports			
	(table tennis/badminton). (15-18 minutes)			
	5. Organize subjects to organize and relax		516	9
	activities. (2-5 minutes)	5.0		
	6. Organize the subjects to share their feelings			
	about this exercise. (3 minutes)			

No.	Items	Action Taken	Result of	Result of
		Такеп	Kounui	Kounu2
	Intervention process(Week 8-2)			
	1. With the help of multimedia teaching			
	equipment, explain social sports resources			
	to subjects, including public facilities	Keep it	0.8	1
	resources (including community gyms,			
14	sports grounds, etc.) and media resources			
	(video learning, etc.), and guide subjects to			
	learn to use various social sports <mark>resou</mark> rces			
	for physical exercise. (10 minute <mark>s</mark> )			
	2. Explain to subjects that lack p <mark>hysica</mark> l			
	exercise will lead to potential ris <mark>ks, suc</mark> h as			
	obesity, chronic diseases and poor body			
	shape. (5 minutes)			
	3. Encourage participants to move toward			
	their goals and keep exercising. (5			
	minutes)			
	4. The subjects took exercise			
	independently. (15 minutes)	7		
	5. Organize subjects to organize and relax			
	activities. (5 minutes)			
	Starting from the 6th week, in the exercise			
15	links of sports events, in addition to		516	
	badminton and table tennis group exercises,	Newly		1
	independent exercise activities were added	added		
	to fully consider the diversity of			
	participants' sports participation interests			

As can be seen from the table above, the scores of each item in the second round of IOC evaluation are greater than or equal to 0.8 after the modification suggested by experts, which also indicates that the intervention training plan is highly consistent with the purpose of the research and suitable for application in intervention experimental research.

### 3. Sample size

In order to further verify the impact of sports participation on subjective wellbeing, based on the second stage study, this stage study formulated corresponding intervention plans according to the relationship between the effects of various dimensions of sports participation on subjective well-being, and conducted experimental research with 18–25-year-old males as an example.

The small sample theory was proposed by statistician William Seely Gossett in the early 20th century, where the small sample size is less than 50(some specify less than 30). According to the requirements of statistics, in order to obtain accurate results, the sample size should be greater than 30, because a sample size smaller than 30 can be used to estimate some parameters, but the error is relatively large. The researchers found that for most population distributions, the sampling distribution of the sample means is essentially very close to a normal distribution when the sample size is greater than 30. In addition, considering the actual operation, manpower, time and other factors of the intervention experiment, the experimental subjects in this stage were 80 male college students aged 18-25 (representing the male group aged 18-25), and 80 subjects were randomly divided into the experimental group and the control group, with 40 people in each group.

The inclusion criteria of the survey subjects in this study were: 1) male aged 18-25 years; 2) The volunteer is interested in the study and signs a consent form; 3) The volunteers were healthy and able to participate in sports activities normally; 4) Volunteers can complete the questionnaire independently and answer the questions; 5) Volunteers must be able to participate in and complete the entire experiment process.

The exclusion criteria of the subjects in this study were: 1) the volunteers were not between 18 and 25 years old; 2) Women; 3) Volunteers were not interested in the study and resisted participation; 4) The volunteers could not exercise or complete the questionnaire independently; 5) Physical deformities or mental disorders; 6) Underlying diseases, including musculoskeletal, nervous system and cardiopulmonary diseases; 7) The volunteers were unable to complete the 8-week exercise intervention. The organizer of the experiment must meet the following conditions :1) The person in charge of the study must have the physical education teacher qualification certificate or the social sports instructor qualification certificate; 2) More than 2 years of experience in physical education teaching; 3) Must have high organizational and interpersonal communication skills to ensure the smooth conduct of the experiment; 4) Must be able to participate in and complete the whole experiment process.

Shedding standard and treatment: 1) Shedding standard and treatment: (2) If the total number of interventions is less than 2/3 of the total number of interventions, it is considered as withdrawal. (3) Those who have adverse reactions during the intervention and cannot continue to participate after observation will withdraw from the experiment, and the previous data will be regarded as invalid. (4) Participants who voluntarily quit and did not complete the intervention will be considered to have quit, and the previous data will be considered invalid. (5) During the experiment, the data of the control group with the same dimensions of sports participation as the experimental group will be considered invalid. (6) During the experiment, the data of volunteers who encounter major events and have great changes in mood and life will be excluded.

### 4. Research methods and data collection

(1) According to the results of the second stage analysis, the susceptibility of residents' subjective well-being to sports participation was different, and a detailed 8-week intervention program was developed.

(2) Two rounds of project-goal alignment Index (IOC) evaluation were conducted on the developed sports intervention program with five experts as the target group.

(3) Taking 80 male college students aged 18-25 years old from Ankang College as an example (representing the male group aged 18-25 years old), 80 subjects were randomly divided into the experimental group and the control group, each with 40 subjects. The intervention experiment lasted for 8 weeks. Recruitment is permitted by Ankang College, and researchers participate in recruitment. Before recruitment, the researcher will explain to the volunteers the reasons for recruitment, the requirements for participation and precautions to ensure that the volunteers can complete the experiment.

(4) After the recruitment of the target population, the pre-intervention test data were collected.

(5) Establish a record table to record the survey data before the experiment.

(6) Organize experimental intervention according to the physical exercise intervention program.

Among them, the weekly sports participation items, methods, frequency, duration, etc. of students in the experimental group in the intervention program were arranged strictly with reference to the options selected by the number of men aged 18-25 in each sports participation dimension obtained from the analysis of the second stage study, so as to further verify the results of the previous stage study through the experiment. To verify the intervention effect of sports participation on subjective well-being of this group. In the control group, students continued their daily life. The physical activity of the experimental group was investigated once every two weeks. The physical activity of the experimental group could not be guaranteed as required, those who were absent more than three times, and those who were similar to the physical activity of the experimental group in terms of participation style and frequency, and those who encountered major events during the experiment and had great changes in life and mood were excluded in the analysis.

(7) The purpose of the experiment is to explore how the change of the dependent variable will be caused by the manipulation of the independent variable. Therefore, it is necessary to control for all other variables that may affect changes in dependent variables (McLeod, s.a.2012). The following methods were used to control participants in this study: 1) Group leader monitoring. The leader of the experimental group supervised the participants to ensure that they completed the controlled experiment according to the requirements of the experiment; 2) On-site supervision. At the experiment site, the researcher conducted understanding and supervision through observation, inquiry and conversation, and reminded the subjects to follow the requirements. 3) Participants' self-monitoring records. The participants recorded their performance during the experiment and whether there was a special time to affect mood change. 4) Return visit supervision. The researchers communicated with the participants by phone, WeChat, conversation and other means to remind them to follow the requirements.

(8) After the end of the experiment at the 8th week, the post-test data of the intervention experiment was collected.

(9) Conduct statistical analysis of the data obtained from the investigation.

(10) The main issues of research ethics are the fair selection of survey subjects. Survey subjects have knowledge of the research, voluntarily accept the survey, keep the questionnaire anonymous and confidential, do not cause harm to the respondents, and respect the original data in statistical analysis, and do not alter it at will.

(11) In this stage, the questionnaire survey of the pre-test and post-test were distributed and recovered on-site, and the data were manually counted and entered.

## 5. Statistical Analysis

Independent sample T test and paired sample T test were used to analyze the differences in the subjective well-being of the experimental group and the control group before and after the experiment, so as to verify the intervention effect of sports participation behavior on subjective well-being.



#### **CHAPTER IV**

### RESULTS

The overall goal of this study is to analyze the effects of sports participation and social capital on residents' subjective well-being. In order to achieve this goal, the research is divided into three stages. The first stage is to compile a comprehensive questionnaire on sports participation, social capital and subjective well-being to provide a practical measurement tool for the follow-up study. The second stage is to analyze the relationship among sports participation, subjective well-being and social capital of residents at this stage through a questionnaire survey. With sports participation and social capital as explanatory variables, and on the basis of controlling other factors affecting individual subjective well-being, a regression model is built to analyze the impact of sports participation and social capital on subjective well-being and the differences among different groups. The third stage is to verify the intervention effect of sports participation behavior on subjective well-being through experimental comparison.

### Phase 1

The purpose of this stage is to compile a comprehensive questionnaire on sports participation, social capital and subjective well-being, so as to provide an operational measurement tool for subsequent research.

#### **1.Preparation of questionnaire items**

At this stage, in order to ensure the scientificity, rigor and standardization of the questionnaire, this research adopts the combination of self-designed questionnaire and general mature scale to jointly design the questionnaire. This paper mainly studied and understood the experience and methods of previous researches through the method of literature data. On this basis, the questionnaire of residents' sports participation, social capital and subjective well-being was compiled in accordance with the scientific requirements of questionnaire preparation. The questionnaire items are divided into three parts. The first part is the introduction and the basic information, which briefly explains the purpose, significance, content of the survey and the items related to demographic variables, including gender, age, education level, marital status, income, occupation and other socio-economic characteristics of the population variables.

The second part, based on the theory of sports behavior, investigates the residents' sports participation behavior and exercise motivation. The amount of individual physical exercise was examined from the three aspects of the frequency of physical

exercise, the duration of exercise and the intensity of exercise, and the degree of physical exercise was measured by the amount of physical exercise. The physical Exercise Rating Scale PARS-3 was used for the measurement and evaluation. Physical exercise amount (physical exercise participation degree) = exercise intensity  $\times$ (exercise time-1)  $\times$  exercise frequency. This scale was developed by Masao Hashimoto from Japan and revised by Liang Deqing from Wuhan Physical Education University and has high reliability (retest reliability is 0.82) (Ding Ying, 2021). Among them, the measurement questions of physical exercise behavior are: (1) the intensity of your physical exercise is: (1) light exercise: (2) small intensity not too tense exercise; ③ Intense sustained exercise of moderate intensity; Rapid breathing, sweating a lot of heavy intensity, but not sustained exercise: (5) rapid breathing and sweating a lot of heavy intensity of sustained exercise. (2) When you carry out the above intensity physical activity, the duration of a time is: 1 less than 10 minutes; 211 to 20 minutes; ③21 to 30 minutes: ④31 to 59 minutes; ⑤ More than 60 minutes. (3) How many times a month do you engage in the above sports activities: 1 less than once a month; 2 2 to 3 times a month: ③ 1 to 2 times a week; ④ 3 to 5 times a week: ⑤ About once a day. Score is given according to the scale, each question is divided into 5 options, the score of the first and second questions is 1-5 points, the score of the third question is 0-4 points.

The third part is mainly deconstructed according to the theoretical structure of social capital, compiled questions from four dimensions, such as social participation, norms, trust, social support, and used the five-level Likert scale to make choices on the degree of agreement (strongly disagree, disagree, general, agree, strongly agree) of the questions, respectively ranging from 1 to 5 points.

The fourth part mainly investigates the subjective well-being of residents according to the happiness theory. The questionnaire adopted the Chinese Residents Subjective Well-being Scale (SWBS-CC20) compiled by Xing Zhanjun, whose reliability was 0.8475 and validity was 0.972 (Xing Zhanjun, 2003). It is divided into 10 dimensions: contentment experience, mental health experience, social confidence experience, growth and progress experience, goal value experience, self-acceptance experience, physical health experience, mental balance experience, interpersonal adaptation experience, and family atmosphere experience. Each question uses 6 points. Score 1 to 6 points from "strongly disagree, disagree, somewhat disagree, somewhat agree, agree, strongly agree", with 4, 5, 6, 9, 10, 11, 13, 15, 17, 18, 20 points in reverse.

#### 2. The evaluation results of the questionnaire

After the first draft of the questionnaire was formed, 9 experts were invited to test the project-objective consistency index (IOC) on the first draft of the questionnaire. In the first round of assessment, the score of Q16 was 0.44. Experts suggest that the survey of motivation can use a special survey scale for more accurate assessment; The score of Q29 is only 0.33, experts suggest deleting this question, and there is a certain repetition of another question. Although the score of Q9 is higher than 0.5, some experts have put forward modified opinions, suggesting that specific items should not be listed for exercise items, because there are many sports items, and everyone has different choices. For the feasibility of the study, it is suggested to use the category of items to set the options, so as to facilitate the research operation. Following the recommendations of the expert group, the questionnaire was subsequently redesigned and modified. Subsequently, the draft questionnaire was revised and adjusted according to the feedback results and suggestions of experts. After modification, the second round of IOC evaluation was conducted on the questionnaire. After the modification suggested by experts, the scores of all items in the second round of IOC evaluation were greater than or equal to  $0.78 \ge 0.78$  (see Chapter 3 for details), which also indicates that the questionnaire item design has good content validity.

In addition, in order to ensure the quality of the questionnaire, a small scale presurvey was conducted before the formal issuance of the questionnaire and the implementation of data collection. The pre-survey objects were randomly selected from 200 residents over 18 years old in Hanbin District, Ankang City, Shaanxi Province by means of random convenient sampling. From the feedback of the questionnaire predictive test and the results of reliability and validity analysis, the Cronbach's alpha coefficient of each dimension of the questionnaire used in this study ranged from 0.817 to 0.921, all exceeding 0.7 (see Chapter 3 for details), indicating that the internal items of the questionnaire had good consistency and the questionnaire passed the reliability test. It is suitable for different groups of sports participants and can be effectively used for follow-up research.

#### Phase 2

The research purpose of this stage is to analyze the relationship between sports participation, social capital and subjective well-being of residents at this stage through questionnaire survey, and build a regression model based on controlling other factors affecting individual subjective well-being by taking sports participation and social capital as explanatory variables to analyze the impact of sports participation and social capital on subjective well-being. And differences between different groups.

516

#### 1. Questionnaire issuance and retrieval

Taking Shaanxi Province as an example, according to the stratification of regional economic development, six urban areas (Xi 'an High-tech Zone, Baoji Qishan, Hanzhong Hantai District, Ankang Langao County, Yan 'an Baota District and Yulin Fugu County) were randomly selected for sampling questionnaire survey. A total of 1360 questionnaires were collected. After excluding complete questionnaires, regular questionnaires and questionnaires with less than 90 seconds of filling time, 1182 questionnaires remained, with an effective rate of 86.91%, which met the needs of research development.

#### 2. Common method deviation test

Common method bias (CMV) is when the same method (or the same evaluator) is used to collect data, resulting in an artificial relationship between variables that affects the accuracy and confidence of the findings. The common method bias may be affected by subjects, questionnaire characteristics, questionnaire content, measurement environment, etc. Generally, as long as the variance explanation percentage of the first common factor is less than 40%, it can be considered that there is no serious common method bias.

_							
-			Initia <mark>l eigenv</mark> a	alue	Extrac	t the sum of sq	uared loads
	ingredient <sup>–</sup>	total	P <mark>ercent</mark> variance	Cumulative %	total	Percent variance	Cumulative %
•	1	26.808	30.814	30.814	26.808	30.814	30.814
	2	11.530	13.253	44.067	11.530	13.253	44.067
	3	4.529	5.206	49.273	4.529	5.206	49.273
	4	3.437	3.950	53.223	3.437	3.950	53.223
	95	2.704	3.109	56.332	2.704	3.109	56.332
	6	2.357	2.709	59.041	2.357	2,709	59.041
	7	2.098	2.411	61.452	2.098	2.411	61.452
	8	1.778	2.044	63.496	1.778	2.044	63.496
	9	1.552	1.784	65.280	1.552	1.784	65.280
	10	1.282	1.474	66.754	1.282	1.474	66.754
	11	1.243	1.429	68.183	1.243	1.429	68.183

Table 11 Common method deviation detection results

	-	Initial eigenvalue			Extract the sum of squared loads			
ingredient <sup>–</sup>	total	Percent variance	Cumulative %	total	Percent variance	Cumulative %		
12	1.141	1.312	69.495	1.141	1.312	69.495		
13	1.109	1.274	70.769	1.109	1.274	70.769		
14	1.065	1.224	71.993	1.065	1.224	71.993		
15	1.008	1.158	73.151	1.008	1.158	73.151		
16	0.958	1.102	74.253					
17	0.940	1.081	75.334					
18	0.844	0.970	76.303					
19	0.841	0.967	77.270					
20	0.784	0.901	<mark>78.</mark> 171					
21	0.768	0.882	79.053					
22	0.752	0.865	79.918					
23	0.721	0.829	80.747					
24	0.691	0.794	81.541					
68	0.138	0.158	99.923					
69	0.067	0.077	100.000					

Table 11 Common method deviation detection results (continued table)

Since all the data in this study were obtained through questionnaires and the same method was used, a common method bias test should be conducted before the study. In this paper, the Harman single factor test method was used to test the sample data. A total of 15 factors with feature roots greater than 1 were extracted from the results of unrotated exploratory factor analysis, and the maximum factor variance explanation rate was 30.814% (see Table 11), which was less than 40%. Therefore, there was no serious common method bias in this study.

## 3. The difference analysis of residents' sports participation

### 3.1 Difference analysis of sports participation in different demographics

	Demog	raphic index	Ν	М	SD	t/F	Р
	sex	male	607	29.412	22.0996	9.170	0.00
Exercis sports forms partic i-		female	575	19.191	15.8628		0**
	Exercise	Exercise alone	546	22.769	19.5771	-2.671	0.00
	forms	Group exercise	<mark>6</mark> 36	25.874	20.2167		8
		18-25years old	289	23.215	19.7001		
pation		25-45years old	<mark>34</mark> 7	25.510	19.2287	2.766	0.04
	age	46-60years old	<mark>26</mark> 3	26.612	20.3063		1*
		Over 60 years old	283	22.360	20.6467		
** •	0.5 ***	(0.01					

Table 12 Analysis of differences of sports participation in different demographics

\* p<0.05, \*\* p<0.01

Independent sample t test was used to analyze the sports participation of Chinese residents of different genders. There were significant differences between male and female P=0.000<0.01, t=9.170. Multivariate analysis of variance was used to analyze the sports participation of residents of different ages, and there were significant differences among different age groups (P=0.041<0.05, F=2.766). Possible reasons for the differences: Cultural and social factors: Traditionally, men are expected to be more active in sports, and men have more time and opportunities to participate in physical activity. Residents in the 25-45 age group are at the peak of their professional and family life, and the allocation of time and energy may affect their participation in physical exercise. Middle-aged people begin to pay more attention to health management, while the elderly may affect sports participation due to physical conditions.

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Variation source	dependent variable	SS	df	MS	F	Р
Gender * Age		411 <mark>6</mark> 3.27 0	7	5880.467	16.05 2	0.000* *
Gender * Form of exercise	sports participa- tion	353 <mark>96</mark> .54 <mark>6</mark>	3	11798.84 9	31.89 0	0.000* *
Age * Form of exercise		743 <mark>7.</mark> 363	7	1062.480	2.689	0.009*
Gender * Age * Form of exercise		47785.75 4	1 5	3185.717	8.772	0.000* *
* n < 0.05 ** n <	<0.01					

## 3.2 Multivariate analysis of variance of sports participation in demography

Table 13 Statistical table for testing the effect of sports participation between groups

\* p<0.05, \*\* p<0.01

In order to further explore the impact of the total amount of residents' sports participation on demographic interaction, a  $2 \times 2 \times 4$  (gender  $\times$  form of exercise  $\times$  age) multivariate analysis of variance was adopted. Independent variables were form of exercise (group exercise/solo exercise), gender (male/female) and age (18-25 years old /25-45 years old /46-60 years old/over 60 years old). The dependent variable was sports participation. The inter-group effect test was shown in Table13. The interaction of gender  $\times$  age, gender  $\times$  exercise form, age  $\times$  exercise form, gender  $\times$  exercise form  $\times$  age showed statistically significant differences (P < 0.01).

## 4. Difference analysis of residents' social capital

## 4.1 Analysis of the difference of social capital in different demographics

Table 14 Analysis of the difference of social capital in different demographics

				4				
	🔍 Demog	graphic index	Ν	M	SD	t/F	Р	
	SAV	male	607	24.013	5.3836	2 743	0.006**	-
Social	SCA	female	575	23.188	4.9375	2.743	0.000	
dimension	Exercise	Exercise alone	546	22.991	5.4333	2 926	0.000**	
dimension	forms	Group exercise	636	24.145	4.9052	-5.850	0.000	

		18-25years old	289	23.740	4.9144		
		25-45years old	347	24.807	4.9220	15 200	0.000**
	age	46-60years old	263	23.582	5.0304	15.388	0.000**
		Over 60 years old	283	22.042	5.5203		
	CPV	male	607	24.013	5.3836	2 743	0 006**
	John Son	female	575	23.188	4.9375	2.745	0.000
	Exercise	Exercise alone	546	22.991	5.4333	2 826	0.000**
Social	forms	Group exercise	636	24.145	4.9052	-3.830	0.000
dimension	age	18-25years old	289	23.740	4.9144		
		25-45years old	347	24.807	4.9220	15 200	0 000**
		46-60years old	263	23.582	5.0304	15.388	0.000**
		Over 60 years old	<mark>2</mark> 83	22.042	5.5203		
		male	607	15.552	3.2432		
	sex	female	575	15.249	3.3520	1.580	0.114
	Exercise	Exercise alone	546	15.168	3.4648		
Social norm	forms	Group exercise	636	15.607	3.1377	-2.282	0.023*
dimension		18-25years old	289	15.301	3.2791		
		25-45years old	347	16.357	2.7757		
	age	46-60years old	263	15.817	3.0274	31.540	0.000**
		Over 60 years old	283	13.958	3.6376		
W	299:	male	607	13.852	2.1467	3	
	sex	female	575	13.243	2.1036	4.917	0.000**
Social trust	Exercise	Exercise alone	546	13.319	2.2070		
dimension	forms	Group exercise	636	13.759	2.0735	-3.536	0.000**
	age	18-25years old	289	13.024	2.0283	39.175	0.000**

\* p<0.05, \*\* p<0.01

	Demog	graphic index	Ν	Μ	SD	t/F	Р
		Over 60 years old	283	12.767	2.0991		
		male	607	18.534	3.9895	1100	0.150
	sex	female	575	18.200	3.9786	1180	0.150
	Exercise	Exercise alone	546	18.139	4.1290	1 959	0.063
Social	forms	Group exercise	636	18.571	3.8511	-1.858	0.003
support dimension		18-25years old	289	18.315	3.8839		
unitension		25-45years old	347	19.530	3.7225		
	age	46-60years old	<mark>2</mark> 63	18.612	3.5877	26.705	0.000**
		Over 60 years old	283	16.784	4.2350		
	COV	male	607	71.951	12.9962	2 703	0.005**
	504	female	575	<mark>69</mark> .880	12.4627	2.195	0.005
	Exercise	Exercise alone	546	<mark>69</mark> .617	13.1862	2 2 2 0	0.001*
Social	forms	Group exercise	636	72.082	12.3100	-3.320	0.001
capital		18-25years old	289	70.381	11.8351		
		25-45years old	347	74.928	11.3902		
	age	46-60years old	263	72.106	11.8362	31.189	0.000**
211		Over 60 years old	283	65.551	14.1739	2	7

Table14 Analysis of the difference of social capital in different demographics (continued table)

The independent sample t test showed that there was a significant difference between male and female social capital P=0.005<0.01, t=2.793. There was significant difference between group exercise and individual exercise P=0.001<0.01, t=-3.320. Multivariate analysis of variance was used to analyze the social capital of Chinese residents of different ages. There were significant differences in social capital among different age groups P=0.000<0.01, F=31.189. Gender differences in social capital may be related to the social roles and responsibilities of men and women, and men have

more opportunities to participate in social activities, leading to differences in social capital accumulation. In addition, group exercise provides more social opportunities, enabling participants to build and maintain a broader social network, thereby increasing social capital. The 25-45 age group is usually the most active stage of career and social activities, and the individual's social network and social capital accumulation are relatively rich.

# 4.2 Multivariate analysis of variance of social capital in demography

Variation source	dependent variable	SS	df	MS	F	Р
	Social interaction	1378.497ª	7	196.928	7.610	0.000
Gender * Age	Social norm	1015.294 <sup>b</sup>	7	145.042	14.387	0.000
	Social trust	576.656°	7	82.379	19.879	0.000
	Social support	122 <mark>6.428<sup>d</sup></mark>	7	175.204	11.729	0.000
	Social interaction	885.283ª	3	295.094	11.260	0.000
Gender * Form of	Socia <mark>l norm</mark>	107.904 <sup>b</sup>	3	35.968	3.325	0.019
exercise	Soci <mark>al trust</mark>	190.368°	3	63.456	14.234	0.000
	Social support	122.682 <sup>d</sup>	3	40.894	2.584	0.052
	Social interaction	2105.283ª	7	300.755	11.907	0.000
Age * Form of	Social norm	1056.740 <sup>b</sup>	7	150.963	15.027	0.000
CACICISC	Social trust	581.450°	7	83.064	20.064	0.000
941	Social support	1400.881 <sup>d</sup>	7	200.126	13.531	0.000
132	Social interaction	2573.954ª	15	171.597	6.856	0.000
Gender * Age * Form	Social norm	1147.012 <sup>b</sup>	15	76.467	7.618	0.000
of exercise	Social trust	682.304°	15	45.487	11.144	0.000
	Social support	1502.995 <sup>d</sup>	15	100.200	6.769	0.000

Table 15 Statistical table of inter-group effect test of social capital

\* p<0.05, \*\* p<0.01

In order to further explore the impact of residents' physical exercise on demographic interaction, a  $2 \times 2 \times 3$  (gender  $\times$  exercise form  $\times$  age) multivariate analysis of variance was adopted. The independent variables were exercise form (group exercise/solo exercise), gender (male/female) and age (18-25 years old/25-45 years old /46-60 years old/over 60 years old), and the dependent variables were, The dependent variables are the four dimensions of social capital (social interaction, social norms, social trust, and social support). The inter-group effect test is shown in Table 15. Gender \* age interaction, age \* exercise form and gender \* age \* exercise form have significant differences in the four aspects of social interaction, social norms, social trust and social support of social capital, while gender \* exercise form has no significant difference in the dimension of social support social support social support social support social support soci

## 5. Difference analysis of residents' subjective well-being

### 5.1 Difference analysis of subjective well-being in different demographics

	Demog	graphic index	N	М	SD	t/F	Р
		male	607	9.316	2.1561		
	sex	female	575	9.461	1.9340	-1.211	0.226
	Exercis	Exercise alone	546	<mark>9.2</mark> 44	2.1170	2 225	0.026*
Social	e forms	Group <mark>exercise</mark>	636	<mark>9.5</mark> 09	1.9869	-2.223	0.020
confidence dimension		18-25years old	289	9.478	1.7018		
unitension	age	25-45years old	347	10.009	1.8096		
		46-60years old	263	9.525	1.9038	35.826	0.000**
		Over 60 years old	283	8.403	2.4101		
	COV	male	607	9.390	2.0386	1.145	0.235
	SCA	female	575	9.257	1.9532	1.145	0.235
911	Exercis	Exercise alone	546	9.207	2.0719	1 896	0.058
Dimension	e forms	Group exercise	636	9.428	1.9277	-1.890	0.038
of growth and	5 4	18-25years old	289	9.322	1.6761		
progress		25-45years old	347	9.980	1.6991		
	age	46-60years old	263	9.635	1.8870	47.331	0.000**
		Over 60 years old	283	8.240	2.2798		

Table 16 Analysis of the difference of subjective well-being in different demographics

p < 0.05, p < 0.01
	Demo	graphic index	N	М	SD	t/F	Р	
	COV	male	607	8.145	1.8272	0 192	0.848	
	SCA	female	<mark>5</mark> 75	8.125	1.7133	0.192	0.848	
	Exerci	Exercise alone	546	8.068	1.7222	1.015	0.004	
~	-se forms	Group exercise	<mark>6</mark> 36	8.193	1.8130	-1.215	0.224	
Goal value dimension		18-25years old	<mark>2</mark> 89	7.865	1.6809			
		25-45years old	<mark>3</mark> 47	8.524	1.8156			
	age	46-60years old	263	8.529	1.8775	22.991	0.000**	
		Over 60 years old	283	7.569	1.4892			
		male	<u>607</u>	7.745	1.7251	0.544	0.570	
	sex Exerci -se forms	female	<u>575</u>	7.689	1.6734	0.566	0.572	
		Exercise alone	<mark>546</mark>	7.683	1.6391	6.10	0.501	
Self-		Group exercise	636	7.747	1.7507	642	0.521	
acceptance		18-25years old	289	7.377	1.6201			
unitension		25-45y <mark>ears old</mark>	347	<mark>7.8</mark> 67	1.7829			
	age	46-60years old	263	8.152	1.8117	12.752	0.000**	
		Over 60 years old	283	7.477	1.4447			
		male	607	6.685	2.6924	0.500	0.555	
	sex	female	575	6.774	2.4540	-0.390	0.555	
	Exerci	Exercise alone	546	6.689	2.5676	0.401	0 (22	
Physical	-se forms	Group exercise	636	6.763	2.5892	-0.491	0.623	
health		18-25years old	289	6.682	2.4301			
dimension	49	25-45years old	347	6.695	2.8241	69		
	age	age	age	age 46-60 years old 263 6.916 2.6169 0.62	0.620	0.602		
		Over 60 years old	283	6.643	2.3707			

Table 16 Analysis of the difference of subjective well-being in different demographics (continued table)

\* p<0.05, \*\* p<0.01

	Demo	ographic index	N	М	SD	t/F	Р
	CON	male	607	8.535	2.2431	1 216	0.224
	sex	female	<mark>5</mark> 75	8.381	2.1199	1.210	0.224
	Exerc	Exercise alone	546	8.341	2.2798	1 7 4 5	0.001
Content	-1se forms	Group exercise	<mark>6</mark> 36	8.563	2.0955	-1.745	0.081
sufficiency dimension		18-25years old	<mark>2</mark> 89	8.381	2.0566		
unitension		25-45years old	<mark>3</mark> 47	8.689	2.0866		
	age	46-60years old	263	8.821	2.1246	9.642	0.000**
		Over 60 years old	283	7.926	2.3771		
		male	<u>607</u>	6.750	2.4876	0.067	0.200
	sex	female	575	6.868	2.1784	-0.867	0.386
	Exerc	Exercise alone	<mark>546</mark>	6.830	2.3451		
Mental	-ise forms	Group exercise	636	6.788	2.3411	0.307	0.759
health		18-25years old	289	6.408	2.1983		
unitension		25-45years old	347	<mark>6.7</mark> 81	2.4831		
	age	46-60y <mark>ears old</mark>	263	7.243	2.2854	5.943	0.001**
		Over 60 years old	283	6.841	2.2970		
		male	607	6.858	2.6575	0.780	0.420
	sex	female	575	6.974	2.3591	-0.789	0.430
	Exerc	Exercise alone	546	6.841	2.4752	0.025	0.250
Interperso-	- ise forms	Group exercise	636	6.978	2.5514	-0.935	0.350
nal		18-25years old	289	6.533	2.4152		
	280	25-45years old	347	6.925	2.7233	6	
	age	46-60 years old	263	7.217	2.4171	3.644	0.012*
		Over 60 years old	283	7.011	2.4064		

Table 16 Analysis of the difference of subjective well-being in different demographics (continued table)

\* p<0.05, \*\* p<0.01

	Demo	graphic index	N	М	SD	t/F	Р	
	sev	male	607	8.320	1.9062	1 108	0.286	
	JEA	female	<mark>5</mark> 75	8.197	1.9122	1.100	0.200	
	Exerci	Exercise alone	546	8.117	1.9063	2 2 9 2	0.017*	
Family	-se forms	Group exercise	<mark>6</mark> 36	8.382	1.9049	-2.382	0.01/*	
atmosphere dimension		18-25years old	<mark>2</mark> 89	7.869	1.9392			
unnension		25-45years old	<mark>3</mark> 47	8.539	1.9489			
	age	46-60years old	263	8.658	1.9548	13.259	0.000**	
		Over 60 years old	283	7.947	1.6483			
		male	<mark>607</mark>	7.094	2.7352	4 20 4	0 000**	
sex Exer	sex	female	<u>575</u>	7.723	2.3901	-4.204	0.000**	
	Exerci -se forms	Exercise alone	<mark>546</mark>	7.385	2.5947			
Mental		Group exercise	636	7.414	2.5902	-0.191	0.848	
balance		18-25years old	289	7.090	2.3758			
unnension		25-45years old	347	7.499	2.7970			
	age	46-60years old	263	7.692	2.6873	2.751	0.052	
		Over 60 years old	283	7.325	2.4190			
		male	607	78.839	13.7715	0.700	0.425	
	sex	female	575	79.449	12.4258	-0./98	0.425	
Subjective	Exerci	Exercise alone	546	78.403	12.8098		0.051	
well-being -se forms		Group exercise	636	79.764	13.3807	-1.778	0.076	
94	age	18-25years old	289	77.003	11.8273	20.351	0.000**	

Table 16 Analysis of the difference of subjective well-being in different demographics (continued table)

Independent sample t test was used to analyze the Sports participation of residents of different genders. There were significant differences between male and female P=0.000<0.01, t=9.170. Multivariate analysis of variance was used to analyze the Sports participation of residents of different ages, and there were significant differences among different age groups (P=0.041<0.05, F=2.766). Possible reasons for the differences: Cultural and social factors: Traditionally, men are expected to be more active in sports, and men have more time and opportunities to participate in physical activity. Residents in the 25-45 age group are at the peak of their professional and family life, and the allocation of time and energy may affect their participation in physical exercise. Middle-aged people begin to pay more attention to health management, while the elderly may affect sports participation due to physical conditions.

## 5.2 Demographic multivariate analysis of variance on subjective well-being

Variatio	dependent		10			
n source	variable	SS	df	MS	F	Р
	Social confidence dimension	433.1 <mark>43</mark> ª	7	61.878	16.011	0.000 **
	Dimension of growth and progress	513.823 <sup>b</sup>	7	73.403	20.519	0.000 **
	Goal value dimension	209 <mark>.682°</mark>	7	29.955	10.051	0.000 **
	Self-acceptance dimension	11 <mark>7.949<sup>d</sup></mark>	7	16.850	6.006	0.000 **
	Physical health dimension	45.199°	7	6.457	.971	0.451
Gender * Age	Content sufficiency dimension	170.146 <sup>f</sup>	7	24.307	5.221	0.000 **
	Mental health dimension	127.581 <sup>g</sup>	7	18.226	3.369	0.001 **
	Interpersonal dimension	89.478 <sup>h</sup>	7	12.783	2.031	0.048 *
W	Family atmosphere dimension	163.751 <sup>i</sup>	7	23.393	6.631	0.000 **
	Mental balance dimension	219.539 <sup>j</sup>	7	31.363	4.775	0.000 **
	Subjective well- being	11319.281 <sup>k</sup>	7	1617.040	9.870	0.000 **

Table 17 Statistical table of inter-group effect test of subjective well-being

\* p<0.05, \*\* p<0.01

	Variation source	dependent variable	SS	df	MS	F	Р
_		Social confidence dimension	28.815a	3	9.605	2.290	0.077
		Dimension of growth and progress	31.07 <mark>5</mark> Ъ	3	10.358	2.606	0.050
		Goal value dimension	11.184c	3	3.728	1.188	0.313
		Self-acceptance dimension	3.70 <mark>2d</mark>	3	1.234	.427	0.734
	Gender *	Physical health dimension	5.33 <mark>7e</mark>	3	1.779	.267	0.849
	Form of	Content sufficiency dimension	38.745f	3	12.915	2.718	0.043*
	exercise	Mental health dimension	26. <mark>213g</mark>	3	8.738	1.595	0.189
		Interpersonal dimension	10. <mark>319h</mark>	3	3.440	0.543	0.653
		Family atmosphere dimension	28 <mark>.851i</mark>	3	9.617	2.649	0.048*
		Mental balance dimension	126.402j	3	42.134	6.361	0.000**
_		Subjective well- being	1241.962k	3	413.987	2.409	0.066
		Social confidence dimension	23.209	3	7.736	2.015	0.110
		Dimension of growth and progress	30.747	3	10.249	2.894	0.034*
		Goal value dimension	3.437	3	1.146	0.385	0.764
		Self-acceptance dimension	3.049	3	1.016	0.362	0.781
	Age * Form of	Physical health dimension	33.851	3	11.284	1.698	0.166
	exercise	Content sufficiency dimension	31.452	3	10.484	2.258	0.080
		Mental health dimension	21.281	3	7.094	1.309	0.270
		Interpersonal dimension	6 21.662 6	3	7.221	1.149	0.328
		Family atmosphere dimension	11.161	3	3.720	1.058	0.366
_		Mental balance dimension	15.859	3	5.286	0.790	0.500

Table 17 Statistical table of inter-group effect test of subjective well-being (continued)

Variatio n source	dependent variable	SS	df	MS	F	Р
	Subjective well- being	47.803	3	15.934	0.097	0.962
	Social confidence dimension	11.589	3	3.863	1.005	0.390
	Dimension of growth and progress	5.118	3	1.706	0.480	0.696
	Goal value dimension	4.303	3	1.434	0.480	0.696
	Self-acceptance dimension	5.604	3	1.868	0.664	0.574
Gender *	Physical health dimension	27 <mark>.720</mark>	3	9.240	1.392	0.244
Age * Form of	Content sufficiency dimension	9.699	3	3.233	0.698	0.553
exercise	Mental health dimension	13.716	3	4.572	0.847	0.468
	Interpersonal dimension	7.964	3	2.655	0.421	0.738
	Family atmosphere dimension	3.512	3	1.171	0.333	0.802
	Mental balance dimension	14.602	3	4.867	0.740	0.528
211	Subjective well- being	222.177	-3	74.059	0.452	0.716
* p<0.05,	** p<0.01		6	6	100	

Table17 Statistical table of inter-group effect test of subjective well-being (continued)

In order to further explore the impact of residents' subjective well-being on demographic interaction,  $2 \times 2 \times 4$  (gender  $\times$  exercise form  $\times$  age) multivariate analysis of variance was adopted. Independent variables were gender (male/female), exercise form (group exercise/solo exercise) and age (18-25 years old /25-45 years old /46-60 years old/over 60 years old). The dependent variables are 10 dimensions of subjective well-being (social confidence dimension, growth and progress dimension, goal value dimension, self-acceptance dimension, physical health dimension,

contentment and abundance dimension, mental health dimension, interpersonal dimension, family atmosphere dimension and mental balance dimension). The intergroup effect test is shown in Table 17. Gender  $\times$  age interaction has significant effects on the overall subjective well-being and the dimensions of social confidence, growth and progress, goal value, self-acceptance, contentment and abundance, mental health, interpersonal relationship, family atmosphere and mental balance (P < 0.05). The interaction of gender  $\times$  exercise form had significant effects on the content abundance dimension, family atmosphere dimension and mental balance dimension (P < 0.05). The interaction of age  $\times$  exercise form had significant effect on growth and progress dimension (P < 0.05), but no significant effect on other dimensions (P > 0.05).

#### 6. Correlation analysis among variables

### 6.1 Correlation analysis of residents' sports participation and social capital

Dimension	sports participation	social interaction	social norms	social trust	social support
Sports participation	1				
social interaction	0.207**	1			
social norms	0.21 <mark>3**</mark>	0.992**	1		
social trust	0.258**	0.926**	0.944**	1	
social support	0.216**	0.998**	0.996**	0.946**	1

Table 18 Correlation analysis of residents' sports participation and social capital

\* p<0.05, \*\* p<0.01

In order to explore the relationship between residents' sports participation and social capital, Pearson correlation method was used to conduct correlation analysis. There was a significant positive correlation between sports participation and social interaction dimension (r=0.207\*\*,p < 0.01), sports participation and social norms dimension (r=0.213\*\*,p < 0.01), and physical exercise and social trust dimension (r=0.258\*\*,p < 0.01). There was a significant positive correlation between sports participation and social support (r=0.216\*\*,p < 0.01). There was a significant positive correlation between sports participation and social support (r=0.216\*\*,p < 0.01). There was a significant positive correlation between sports participation and social support (r=0.216\*\*,p < 0.01). There was a significant positive correlation between sports participation and social capital of residents (P < 0.01). Sports participation not only has a positive effect on individual physical and mental health, but also has a significant impact on various dimensions of social capital. Sports participation and Social interaction Physical exercise provides residents with a wealth

of social opportunities, through participation in various sports activities, residents are able to expand their social networks and meet new people.

## 6.2 Correlation analysis of residents' Sports participation and subjective wellbeing

Table 19 Correlation analysis of residents' Sports participation and subjective wellbeing

P .(	,	P (0.01									
Dimension	Sports participat- ion	Social confidence	Growth and progress	Target value	self- acceptance	good health	Content- ment and abundan ce	Mental health	Interper -sonal relation ship	Family atmosp here	Mental balance
Sports participation	1			2	5						
Social confidence	0.173**	1		F	K						
Growth and progress	0.203**	0.792**	1								
Target value	0.154**	0.386**	.394**	1			- 1				
self-acceptance	0.130**	0.305**	.318**	.618**	1		- 1				
good health	$0.088^{**}$	-0.153**	159**	.420**	.353**	1					
Contentment and abundance	0.165**	0.606**	.6 <mark>01**</mark>	.167**	.261**	248**	1				
Mental health	0.011	-0.121**	139**	.435**	.409**	.695**	170**	1			
Interpersonal relationship	0.020	-0.154**	145**	.441**	.392**	.690**	238**	.719**	1		
Family atmosphere	0.120**	0.365**	.348**	.487**	.490**	.299**	.278**	.441**	.359**	1	
Mental balance	0.011	-0.026	045	.419**	.392**	.568**	088**	.721**	.655**	.457**	1

\* p<0.05, \*\* p<0.01

In order to explore the relationship between sports participation and subjective well-being of Chinese residents, Pearson correlation method was used to conduct correlation analysis. As can be seen from Table 19, Pearson correlation coefficients of each dimension of sports participation and subjective well-being are  $0.173^{**}$ ,  $0.203^{**}$ ,  $0.154^{**}$ ,  $0.130^{**}$ ,  $0.088^{**}$ ,  $0.165^{**}$ , 0.011, 0.020,  $0.120^{**}$  and 0.011, respectively. It indicated that there was a positive correlation between sports participation and subjective well-being (p < 0.01). Sports participation is positively correlated with subjective well-being, indicating that with residents' active participation in physical

exercise, the amount of physical activity is constantly increasing, and their subjective well-being is correspondingly improved. This is consistent with the research results of most scholars at present.

6.3 Correlation analysis of residents' social capital and subjective well-being

Dimension	Social interaction	Social norms	social trust	social support
Social confidence	0.553**	0.66 <mark>8</mark> **	0.537**	0.663**
Growth and progress	0.558**	0.6 <mark>70</mark> **	0.529**	0.674**
Target value	0.161**	0.2 <mark>78**</mark>	0.292**	0.207**
self-acceptance	0.132**	0. <mark>213**</mark>	0.230**	0.178**
good health	0.240**	0. <mark>218**</mark>	0.109**	0.258**
Contentment and abundance	0.503**	0.506**	0.489**	0.575**
Mental health	0.213**	0.153**	0.036	0.187**
Interpersonal relationship	0.242**	0.175**	0.089**	0.223**
Family atmosphere	0.153**	0.272**	0.299**	0.275**
Mental balance	0.178**	0.077**	0.000	0.114**

Table 20 Correlation analysis of residents' social capital and subjective well-being

\* p<0.05, \*\* p<0.01

Social capital variable, subjective well-being variable and its various dimensions were selected for correlation analysis, as shown in Table 20: There was a significant positive correlation between social capital and subjective well-being (P < 0.01).

The research shows that social capital has a significant impact on residents' subjective well-being. First, frequent social interaction can increase residents' subjective well-being, because interacting and communicating with others can bring emotional satisfaction and support. Positive social interaction can effectively relieve loneliness and reduce the occurrence of negative emotions such as depression and anxiety. Second, adherence to social norms and participation in activities can enhance residents' sense of belonging and identity, which is also crucial for improving subjective

well-being. Third, a high level of social trust helps to establish a good relationship between residents, increase social support, and thus enhance subjective well-being.

## 6.4 Correlation analysis of residents' Sports participation, social capital and subjective well-being

Table 21 Correlation analysis of res<mark>id</mark>ents' Sports participation, social capital and subjective happiness

Dimension	М	SD	Sports participation	Social capital	Subjective well- being
Sports participation	25.52	19.730	1		
Social capital	3.5472	.63881	0.384**	1	
Subjective well-being	3.9742	.90403	0.400**	0.526**	1

The results showed that there was significant positive correlation between residents' Sports participation, social capital and subjective well-being ( $r = 0.384^{**}$ , P<0.01;  $r = 0.400^{**}$ , P<0.01). There was a significant positive correlation between social capital and well-being ( $r = 0.526^{**}$ , P<0.01). Physical activity provides opportunities to interact with others, helps residents build and strengthen social networks, enhances residents' social trust and support, and high levels of social capital contribute to subjective well-being. Moreover, Sports participation can enhance physical fitness, reduce the occurrence of diseases, reduce stress, anxiety and depression, improve mood, improve overall health level, and thus enhance subjective well-being.

## 7. Regression analysis among variables

## 7.1 Regression analysis of residents' Sports participation and social capital

Although we found a significant positive correlation between Sports participation and all dimensions of social capital through correlation analysis, we could not confirm whether physical exercise has a positive predictive effect on social capital. Therefore, at this stage, hierarchical regression detection is used to further explain the impact of Sports participation on residents' social capital.

	Social in	teraction	Social	norms	social	trust	social	support
	M1	M2	M1	M2	M1	M2	M1	M2
Control variable								
sex	-0.049	-0.017	-0.032	-0.004	-0.076	-0.046	-0.029	0.000
age	-0.396**	-0.388**	-0.420**	-0.413	-0.403**	-0.396	-0.251**	-0.244
Participation form	-0.005	0.013	-0.012	0.004	-0.031	-0.015	-0.055	-0.039
Explanatory variable						- 11		
Sports participation		0.149**		0.129**		0.136**		0.132**
R	0.396	0.422	0.420	0.439	0.409	0.430	0.263	0.292
R <sup>2</sup>	0.157	0.178	0.17 <mark>7</mark>	0.192	0.168	0.185	0.069	0.085
$\Delta R^2$	0.153	0.172	0.17 <mark>2</mark>	0.187	0.163	0.179	0.064	0.079
F	36.256**	41.512**	41.77 <mark>5**</mark>	<mark>44</mark> .734**	39.216**	43.092**	14.416**	23.616**

Table 22 Regression statistics of sports participation and social capital

\* p<0.05, \*\* p<0.01

from the above table, demographic variables As can be seen (gender/age/participation form) can only provide 15.3% explanation for the prediction of social interaction dimension, and when the amount of Sports participation is also placed in the hierarchical regression equation, the standardized coefficient  $\beta = 0.149$ , the explained variance increases to 17.2% (F=41.512, P < 0.01). Other dimensions of interpretation have also increased. Through hierarchical regression analysis, sports participation is confirmed as an important predictive variable, and on the basis of demographic variables, the explanatory power of various dimensions of social capital is further enhanced.

# 7.2 Regression analysis of residents' Sports participation and subjective well-being

The correlation analysis shows that Sports participation has a significant positive correlation with all dimensions of subjective well-being, but it cannot confirm whether Sports participation has a positive prediction effect on subjective well-being. Therefore, hierarchical regression detection was used to further explain the effect of Sports participation on residents' subjective well-being.

* <b>p</b> <0.05,	** <b>p</b> <0.0	01			Ũ					
	Social c	onfidence	Grov pro	vth and ogress	Targ	et value	self-ac	cceptance	good	health
	M1	M2	M1	M2	M1	M2	M1	M2	M1	M2
Control variable										
sex	022	.062	060	.024	056	.022	061	.022	035	.051
age	114**	074**	118**	077* <mark>*</mark>	107*	070*	025	.015	081**	040
Participation form	.097**	.068**	.078*	.049	.074	.047	.038	.010	.044	.014
Explanatory variable				F						
Sports participation		.343**		.347 <mark>**</mark>		.322**		.341**		.353**
R	.150ª	.363 <sup>b</sup>	.148	.3 <mark>65</mark>	.137	.339	.073	.336	.096	.353
$\mathbb{R}^2$	.022	.132	.022	.1 <mark>33</mark>	.019	.115	.005	.113	.009	.125
$\triangle R^2$	.020	.129	.019	.130	.016	.112	.003	.110	.007	.122
F	9.006**	44.622**	8.800**	45.283**	7.470**	38.262**	2.105	37.566**	3.615*	41.870**

Table 23 Hierarchical regression statistics of Sports participation and subjective wellbeing



As	can	be	seen f	from	tab	le 23,	the 1	pre	ediction	of	de	mographi	c var	riables
	Co	ontent abur	tment an 1dance	d N	Aenta	al health	Int re	erp lati	oersonal ionship	Fami	ly a	atmosphere	Ment	al balance
		M1	M2	1	<b>M</b> 1	M2	M	1	M2	М	1	M2	M1	M2
Control variable						$\mathbf{k}$								
sex	-	.033	.049		055	.0 <mark>25</mark>	02	9	.049	05	56	.027	.006	.075*
age	-	.030	.009		022	.0 <mark>17</mark>	01	3	.024	03	30	.010	035	002
Participation form	n .0	83**	.055*	k .(	050	.022	.05	3	.026	.09	3	.065*	.066*	.043
Explanatory variable	ý													
Sports participation			.334*	*		<mark>.329**</mark>			.321**			.341**		.283
R		.092	.335	.(	074	.325	.06	1	.315	.11	0	.346	.076	.283
$\mathbb{R}^2$		.009	.112	.(	006	.106	.00	4	.099	.01	2	.120	.006	.080
$\triangle R^2$		006	.109		003	.103	.00	1	.096	.01	0	.117	.003	.077
F	3.	.374*	37.209	** 2.	185	34.795*	* 1.46	54	32.481**	* 4.82′	7**	40.125**	2.302	25.566**

Table 23 Hierarchical regression statistical table of Sports participation and subjective well-being (continued table)

\* p<0.05, \*\* p<0.01

(gender/age/participation form) for each dimension of subjective well-being is lower than the explanatory power of placing sports participation in the hierarchical regression equation, such as: Demographic variables (sex/age/form of participation) provide only 0.6% explanation for the prediction of the sufficiency dimension, whereas when sports participation is placed in the hierarchical regression equation, the normalization coefficient  $\beta$  =0.334 increases the variance of interpretation to 10.9% (F=37.209, P < 0.01). Through hierarchical regression analysis, it is confirmed that sports participation is highly correlated with subjective well-being, which can directly and significantly positively predict subjective well-being. The more active sports participation, the higher the level of subjective well-being, which is consistent with previous research results.

## 7.3 Regression analysis of residents' social capital and subjective well-being

The correlation analysis shows that there is a significant positive correlation between sports participation and social capital, but it cannot confirm whether sports participation has a positive predictive effect on social capital. Therefore, hierarchical regression tests are used to further explain the impact of sports participation on residents' social capital.

	Social c	onfidence	Growth an	id p <mark>rog</mark> ress	Targ	et value	self-ac	ceptance	good	health
	M1	M2	M1	M2	M1	M2	M1	M2	M1	M2
Control variable										
sex	0.107*	0.077*	0.092*	<mark>0.064</mark> *	0.037	0.019	0.017	0.001	0.017	0.000
age	0.052	0.014	0.113**	0.078*	0.053	0.033	0.085*	0.065*	.127**	0.078*
Participation form	0.107**	0.066*	0.092*	0.062	0.037	0.015	0.017	.010	.044	.014
Explanatory variable	н						11			
Social interaction	Ш	0.171**		0.217*		0.192**	11	0.161**		-0.123*
Social norms		0.012		-0.004		-0.071	- 11	-0.022		0.021
social trust		0.123*		0.057		0.024		0.004		0.119*
social support		0.104*	P	0.124*		0.087		0.236**		0.236**
R	0.114	0.304	0.138	0.291	0.062	0.172	0.085	0.169	.096	.353
R <sup>2</sup>	0.013	0.092	0.019	0.085	0.004	0.030	0.007	0.029	.009	.125
$\triangle R^2$	0.011	0.089	0.018	0.081	0.002	0.026	0.006	0.025	.007	.122
F	8.551**	26.309**	12.658**	23.923**	2.465	7.919**	4.739*	7.594**	3.615*	41.870**
	र रा गी जी जि									

Table 24 Hierarchical regression statistics of social capital and subjective well-being

	Contentr abund	nent and dance	Mental	health	Interp relation	ersonal onship	Family at	mosphere	Mental	balance
	M1	M2	M1	M2	M1	M2	M1	M2	M1	M2
Control variable										
sex	0.148**	0.113**	0.017	<mark>-0</mark> .004	0.093*	0.051*	0.148**	0.105*	0.017	0.000
age	0.099**	0.054	0.127**	<mark>0.1</mark> 05**	0.057*	0.003	0.099**	0.034	0.1278**	0.078*
Participation form	0.137**	0.063*	0.117**	<mark>0.</mark> 059	0.107**	0.050	0.105**	0.052*	0.064*	0.014
Explanatory variable	н						11			
Social interaction	н	0.242*		0.201**		0.288**	н.	0.008		-0.123*
Social norms		0.004		-0.092*		0.038		0.158**		0.021
social trust		0.105*		0.055		0.097*		0.130*		0.119*
social support	н						н	0.087		0.236**
R	0.169	0.367	0.127	0.220	0.104	0.404	0.169	0.374	0.127	0.288
$\mathbb{R}^2$	0.029	0.135	0.016	0.048	0.011	0.164	0.029	0.140	0.016	0.083
$\Delta R^2$	0.027	0.132	0.014	0.045	0.009	0.160	0.027	0.136	0.014	0.079
F	19.150**	40.400**	10.547**	13.139**	7.095*	50.622**	19.150**	35.109**	10.547**	19.471**

## Table 24 Hierarchical regression statistics of social capital and subjective well-being (continued table)

\* p<0.05, \*\* p<0.01

After analysis, it is found that the explanatory power of demographic variables (gender/age/participation form) for the prediction of various dimensions of subjective well-being is lower than that of social capital variables after they are placed into the hierarchical regression equation, and the specific changes are shown in the table above. It is confirmed that social capital can be used as an important variable to predict all dimensions of subjective well-being.

## 7.4 Regression analysis of residents' sports participation, social capital and subjective well-being

Regressi	on equation	0	ve <mark>r</mark> all fi	it index	Significance	of
					regression coe	efficient
Result variable	predictor	R	R <sup>2</sup>	F	β	Т
Social capital	Sports participation	0.23 4	<mark>0.</mark> 055	75.353**	0.039	8.681**
Subjective well-being	sports participation	0.59 4	0.353	353.580** *	0.011	4.284**
	Social capital	_			0.388	24.512**
* p<0.05, **p<	< 0.01					

Table 25 Regression analysis of residents' sports participation, social capital and subjective well-being

Table 25 shows that sports participation can significantly affect social capital ( $\beta$  =0.039, t=-8.681, p<0.01). Sports participation and social capital significantly affected subjective well-being ( $\beta$  =0.011, t=4.284, p<0.01;  $\beta$  =0.388, t=24.512, p<0.01). Sports participation helps build stronger social capital networks and enhances subjective well-being. It can indirectly improve subjective well-being by enhancing social capital, which indicates that the influence of physical exercise on well-being is multi-level and complex, and its indirect effect on social capital should be considered.

## 8. Intermediate effect test

In order to further investigate the impact of sports participation on subjective wellbeing and test the mediating role of social capital, Bootstrap analysis was further adopted in this study, model selection 6 was adopted, and 95% confidence interval was set. The model of the influence of sports participation through social capital and subjective well-being was tested. The indirect effect sizes of each path are shown in Table 26 and Table 27.

]	Path re	lation	Sta	andard path coefficient	Standard error	C.R.	Р
Social capital	<	sports participation		0.39	0.001	13.103	***
Subjective well-being	<	Social capital		0.508	0.053	15.805	***
Subjective well-being	<	sports participation		0.216	0.001	7.947	***
· · · D (0 001		44.44					

Table 26 The mediating effect of social capital on sports participation and subjective well-being

\*\*\*P<0.001 \* p<0.05, \*\*p<0.01

According to the standard path coefficient table of the model, the coefficient of influence of sports participation on subjective well-being is 0.216, reaching the level of significance. It shows that sports participation has a significant positive effect on subjective well-being. The influence of coefficient sports participation on the standard path of social capital is 0.39, reaching a significant level. It shows that sports participation also has a significant positive impact on social capital. The standard path that influences coefficient of social capital on subjective well-being is 0.508, reaching the significance level. It shows that social capital has a significant positive impact on subjective well-being is 0.508, reaching the significance level. It shows that social capital has a significant positive impact on subjective well-being is 0.508, reaching the significance level. It shows that social capital has a significant positive impact on subjective well-being.

Table 27 The mediating effect of social capital on sports participation and subjective well-being

	wen ben	<sup>11</sup> 5			
Influence path	Effect size	95% con inte lower limit	nfidence erval Upper limit	Boot standard error	р
sports participation →Social capital Subjective well-being	0.198	0.144	0.259	0.029	0.000
**P<0.001 * p<0.05, **p<0.01			d	1	

As can be seen from Table 27, using social capital as the mediating variable between sports participation and SWB, the upper limit of Bootstrap95% confidence interval is 0.259, the lower limit is 0.144, and the confidence interval does not include 0. The results show that social capital has a significant mediating effect on sports participation and SWB. The influence path is "sports participation  $\rightarrow$  social capital  $\rightarrow$  subjective well-being"; AMOS23.0 was further used to test the degree of model fit. The results are as follows:





Figure 5 Empirical diagram of the mediating model between social capital and sports participation and subjective well-being

Fitness test indicators	Ideal	General	Model	conclusion
X²/df	1-3	<5	2.928	fit
RMSEA	< 0.06	<0.08	0.057	fit
NFI	>0.90	>0.80	0.942	fit
RFI	>0.90	>0.80	0.923	fit
IFI	>0.90	>0.80	0.957	fit
TU	>0.90	>0.80	0.943	fit
CFI	>0.90	>0.80	0.957	fit
	- 0.70		0.957	

Table 28 The mediating effect of social capital on sports participation and subjective well-being fitting index

Through the construction of the structural equation model of residents' sports participation, social capital and subjective well-being (see Figure 5), sports participation has a direct impact on subjective well-being, social capital has a direct impact on subjective well-being, and sports participation can indirectly affect subjective well-being through the mediating role of social capital. The ideal value criteria for the acceptable fitting index of the structural equation model are: X2 /df should be less than 3, Bentler and Bonett proposed that the relative fitting index NFI, CFI, TLI, CFI, etc. should be greater than or close to 0.90, and Steiger proposed that the RMSEA value should be lower than 0.06 (lower than 0.08 is also acceptable). As can be seen from the

fitting index of the mediation effect in Table 28, X2 /df=2.928<3, NFI=0.942, RFI=0.923, IFI=0.957, TLI=0.943, CFI=0.957, the above fitting index is greater than 0.90, RMSEA=0.066<0.08. It also shows that there is no serious common bias method problem in the study, and the mediation model fits well and is acceptable.

### Phase 3

## 1. Research purpose

According to study 2, sports participation can positively predict their subjective well-being, and indirectly affect their subjective well-being through social capital. Based on the previous research, this stage designed an 8-week, 40-minute sports intervention experiment twice a week to further verify the intervention effect of sports participation on subjective well-being.

### 2. Test subjects

Taking 80 male college students aged 18-25 years old in Ankang College as an example (representing the male group aged 18-25 years old), according to the pre-test data, the 80 subjects were divided into two groups with balanced and no difference, one group was the experimental group and the other group was the control group, each with 40 participants. The experimental group received physical exercise intervention, while the control group did not receive any intervention. Before the experiment, only with the permission of Ankang College can the experimental personnel be recruited. Before the recruitment, the researcher will explain the reasons for recruitment, participation requirements and precautions to the volunteers, so as to ensure that the volunteers know the specific situation and participate in the experiment voluntarily. In addition, considering the situation of students in secondary colleges of Ankang University and the opening of courses, in order to be clearer and more convenient to observe the specific changes before and after the exercise intervention, the subjects of this experiment did not include students from the physical education college, and the subjects did not have special sports background. 2163

6

## 3. Time and place of experiment

Duration: From April 9 to June 4, 2024

Experiment location: Ankang College stadium, gymnasium

#### 4. Experimental control

Independent variable: Sports participation

Dependent variable: subjective well-being

Mediating variable: social capital

Irrelevant variable control: In order to ensure the representativeness and scientificity of the experimental results, the subjects had never had any relevant physical exercise intervention before, and were fully explained with the subjects before the start of the experiment. During the whole process of the experiment, except for the exercise intervention measures specified in this study, the subjects would not receive any other exercise-related intervention treatment to avoid interference with the experimental data.

### 5. Data processing

EXCEL and SPSS 23.0 software were used for data processing and analysis, and independent sample T test and paired sample T test were used for statistical analysis of the obtained data to make the experimental results specific and clear and ensure the objectivity of the analysis of research results.

### 6. Results from the Main Study

## 6.1 Comparative analysis of pre-test results between experimental group and control group

The screening of experimental subjects is more important. Whether different groups of subjects are at the same level before the experiment directly affects the data results after the experiment. Therefore, it is very important to conduct homogeneity detection for the experimental group and the control group. The method of independent sample test is adopted in this stage. The Independent sample Test is useful for inferring whether the means of two independent populations are significantly different. In order to understand whether there were significant differences in physical exercise, subjective well-being and social capital levels between the control group and the experimental group before the experiment, the scientific progress of the experiment was ensured. The two groups were pre-tested before the experiment, and independent sample T test was used to compare whether there were differences in the pre-test results between the experimental group and the control group. The results are shown in Table 29

Description	experimental	control group	t	Р
	group	(M±SD)		
	(M±SD)			
Sports participation	36.9 <mark>7</mark> 50±19.03504	38.3750±22.89966	297	.767
subjective well-being	3.8638±0.71781	3.7350±0.89408	.710	.480
Contentment experience	4.2 <mark>50</mark> 0±1.06217	4.0375±1.16788	.851	.397
mental health experience	3. <mark>650</mark> 0±1.22055	3.4000±1.08722	.967	.336
social confidence experience	3 <mark>.962</mark> 5±1.33199	4.1125±1.15185	539	.592
growth and progress experience	4.1250±1.26972	4.1625±1.14571	139	.890
goal value experience,	4.0375±1.00248	3.8875±1.07111	.647	.520
self-acceptance experience	<mark>3.9250</mark> ±1.02875	3.7500±1.01274	.767	.446
physical health experience	3.4875±1.08892	3.4000±1.24138	.335	.738
mental balance experience	3.6250±1.22344	3.5000±1.07417	.486	.629
interpersonal adaptation	3.6125±1.27846	3.2750±1.06789	1.281	.204
family atmosphere experie <mark>nce</mark>	3.9625±1.15685	3.8250±1.05338	.556	.580
social capital	3.5813±0.5262	3.5125±0.55927	.566	.573
social participation	3.4497±0.67009	3.4315±0.66419	.122	.903
standard	4.0188±0.66117	3.8313±0.73027	1.204	.232
trust	3.3625±0.66974	3.2875±0.42195	.599	.551
social support	3.5900±1.00965	3.5500±0.64490	.211	.833

Table 29 Comparison of pre-test differences between experimental group and control group

According to Table 29, before the formal intervention, although the experimental group and the control group had differences in the amount of Sports participation, the total score of subjective well-being, the total score of social capital and their dimensions, there were no significant differences (P > 0.05), indicating that: There was no statistical difference between the experimental group and the control group in the amount of Sports participation, subjective well-being and social capital before the

experiment. The group was properly grouped and there was certain homogeneity among the members, so the experiment could be carried out normally.

## 6.2 Comparison and analysis of the measured results before and after the experimental group

The Paired Samples Test is used to take two measurements of the same group of subjects at different times or under different conditions. The two groups of data are from the same group of subjects, and the measurement values of the same group of subjects in different times or conditions are compared to test whether the difference is significant. Therefore, after the experiment, the paired sample T test was used to analyze the differences in Sports participation, subjective well-being and social capital levels of the same group of subjects before and after the experiment, and the analysis results are shown in Table 30

Description	before the	after the	t	р
Description	experiment	experiment	ť	1
	(M±SD)	(M±SD)		
Sports participation	36. <mark>9750±19</mark> .03504	50.2500±18.26549	-2.801	.008**
subjective well-being	3.8638±0.71781	4.3050±.37856	-6.203	.000***
Contentment experience	4.2500±1.06217	4.4750±.68827	-1.514	.138
mental health experience	3.6500±1.22055	4.2875±1.17608	-3.264	.002**
social confidence experience	3.9625±1.33199	4.7875±.70609	-4.464	.000***
growth and progress experience	4.1250±1.26972	4.8500±.45573	-3.652	.001**
goal value experience	4.0375±1.00248	4.1625±.96998	-1.032	.308
self-acceptance experience	3.9250±1.02875	4.5625±.98831	-3.818	.000***
physical health experience	3.4875±1.08892	4.3500±1.05125	-4.943	.000***
mental balance experience	3.6250±1.22344	3.6875±1.09596	597	.554
interpersonal adaptation	3.6125±1.27846	4.0125±1.10644	-2.327	.025*
family atmosphere experience	3.9625±1.15685	3.8750±1.06669	.764	.449
social capital	3.5813±0.5262	3.9500±.34231	-6.333	.000***
social participation	3.4497±0.67009	3.7755±.58961	-4.340	.000***
standard	4.0188±0.66117	4.3250±.61290	-3.066	.004**
trust	3.3625±0.66974	3.7000±.69384	-3.919	.000***
social support	3.5900±1.00965	4.0950±.84366	-4.505	.000***

Table 30 Comparison of before and after measurements in the experimental group

\*\*\*P<0.001 \* p<0.05, \*\*p<0.01

According to Table 30, after the intervention of physical exercise, both the subjective well-being and the total score of social capital of the experimental group were improved, and the differences were significant (P < 0.05). There were no significant

differences in the four dimensions of contentment, goal experience, mental balance and family atmosphere (P > 0.05). There were significant differences in other dimensions (P<0.05). This also shows that the designed sports intervention program can effectively improve the subjective well-being and social capital level of participants.

# 6.3 Comparison and analysis of measured results before and after the control group

Similarly, paired sample T test was used to analyze whether there were significant differences in Sports participation, subjective well-being and social capital before and after intervention in the control group. The results are shown in Table 31.

	hoforo the	oftor the		
Description	belore the		t	Р
	experiment	experiment		
	(M±SD)	(M±SD)		
Sports participation	38. <mark>3750±2</mark> 2.89966	39.4500±22.61262	231	.819
subjective well-being	3. <mark>7350±0.</mark> 89408	3.8913±.85925	856	.397
<b>Contentment experience</b>	4. <mark>0375±1.</mark> 16788	4.2375±1.20887	542	.591
mental health experience	3.4000±1.08722	3.5750±1.24833	666	.509
social confidence experience	4.1125±1.15185	4.2500±1.13228	542	.591
growth and progress	4.1625±1.14571	4.3500±1.22055	773	.444
experience				
goal value experience,	3.8875±1.07111	4.0125±1.15185	541	.592
self-acceptance experience	3.7500±1.01274	4.0000±1.01274	-1.047	.302
physical health experience	3.4000±1.24138	3.6250±1.25958	961	.342
mental balance experience	3.5000±1.07417	3.5750±1.02250	367	.716
interpersonal adaptation	3.2750±1.06789	3.3875±1.05300	502	.618
family atmosphere experience	3.8250±1.05338	3.9000±1.15581	301	.765
social capital	3.5125±0.55927	3.5700 <mark>±.48553</mark>	520	.606
social participation	3.4315±0.66419	3.4218 <mark>±</mark> .63574	.070	.944
standard	3.8313±0.73027	3.9813±.71921	883	.382
trust	3.2875±0.42195	3.3188±.52192	360	.721
social support	3.5500±0.64490	3.6500±.74386	644	.523

Table 31 Comparison of before and after measurements in control group

\*\*\*P<0.001 \* p<0.05, \*\*p<0.01

According to the above table (Table 31), although the pre-test and post-test results of the control group were different in Sports participation, subjective well-being, and

social capital, although the total score of subjective well-being also increased, there was no significant difference in statistical analysis (P>0.05).

## 6.4 Comparative analysis of post-test results between experimental group and control group

Independent sample T test was used to analyze the differences in Sports participation, subjective well-being and social capital levels between the experimental group and the control group after the experiment. The analysis results are shown in Table 32.

Description	experimental	control group	t	Р
	group (M±SD)	(M±SD)		
Sports participation	50.2500±18.26549	39.4500±22.61262	2.350	.021*
subjective well-being	4.30 <mark>50±.37856</mark>	3.8913±.85925	2.787	.007**
<b>Contentment experience</b>	4.47 <mark>50</mark> ±.68827	4.2375±1.20887	1.080	.284
mental health experience	4.287 <mark>5</mark> ±1.17608	3.5750±1.24833	2.627	.010*
social confidence experience	4.7875±.70609	4.2500±1.13228	2.548	.013*
growth and progress experience	4.8500±.45573	4.3500±1.22055	2.427	.018*
goal value experience,	4.1625 <mark>±.96998</mark>	4.0125±1.15185	.630	.531
self-acceptance experience	4.5625 <mark>±.98831</mark>	$4.0000 \pm 1.01274$	2.514	.014*
physical health experience	4.3500±1.05125	$3.6250 \pm 1.25958$	2.795	.007**
mental balance experience	3.6875±1.09596	$3.5750 \pm 1.02250$	.475	.636
interpersonal adaptation	4.0125 <mark>±1.10644</mark>	$3.3875 \pm 1.05300$	2.588	.012*
family atmosphere experience	3.8750±1.06669	$3.9000 \pm 1.15581$	101	.920
social capital	3.9500±.34231	3.5700±.48553	4.046	.000***
social participation	3.7755 <b>±</b> .58961	3.4218 <mark>±.63574</mark>	2.580	.012*
standard	4.3250±.61290	3.9813±.71921	2.301	.024*
1 trust	3.7000±.69384	3.3188±.52192	2.777	.007**
social support	4.0950±.84366	3.6500±.74386	2.502	.014*
***P<0.001 * p<0.05, **p<0.01	656	2		

Table 32 Comparison of post-test differences between experimental group and control group

According to Table 32, after the intervention of Sports participation, the scores of Sports participations, subjective well-being and social capital of the experimental group were higher than those of the control group, and there were significant differences (P<0.05).

The 8-week sports intervention experiment showed that there was no significant difference in subjective well-being and social capital between the experimental group and the control group before the experiment. However, after the experiment, the subjective well-being and social capital level of the experimental group at different stages before and after the experiment had certain changes, and there were significant differences, while the subjective well-being and social capital level of the control group had no significant differences before and after the experiment. In addition, after the experiment, there were significant differences between the experimental group and the control group in the level of subjective well-being and social capital. Before the experiment, the two groups of subjects were equal in quality, and there was no significant difference. The experiment proved that sports participation had a positive impact on individual subjective well-being, and the intervention of sports participation could improve individual subjective well-being to a certain extent.



#### **CHAPER V**

### **DISCUSSION, CONCLUSION, AND SUGGESTIONS**

Happiness is the eternal pursuit of human beings, and constantly improving the happiness of the public is also one of the basic goals of national stability and social development. However, various contradictions and conflicts brought about by the social transition also make people face happiness troubles, that is, the phenomenon of "China confusion" begins to emerge: economic growth runs counter to national happiness, that is, economic growth does not necessarily improve national happiness. This indicates that in addition to economic factors, other non-economic factors have an increasing proportion of influence on residents' subjective well-being (Zhang Guiyin, 2023). From the perspective of sports as non-economic research, this study explores the impact of sports participation on residents' subjective well-being and the mediating role of social capital in this process. In this chapter, we will summarize the results obtained through empirical research, and discuss them in connection with the actual situation, so as to find out the shortcomings and future prospects of the research, so as to enrich the research content on sports participation and subjective well-being and provide valuable references for subsequent academic research and specific practical work.

#### 1. Discussion

## 1.1 Discussion of method

In order to explore the relationship between residents' sports participation, social capital and subjective well-being, this study compiled a comprehensive questionnaire on residents' sports participation, social capital and subjective well-being based on relevant research results of domestic and foreign scholars and invited 9 experts to conduct an item-goal consistency index (IOC) test on the questionnaire. The scores of all items in IOC evaluation are greater than or equal to  $0.78 (\geq 0.78)$ , indicating that the questionnaire item design has good content validity (Turner, R.C & Carlson, L.2003). According to the reliability analysis of the pre-survey questionnaire, Cronbach's alpha coefficient of each dimension index was between 0.817 and 0.921, all of which were over 0.7, indicating a good consistency of internal items in the questionnaire (DeVellis, 1991; Field, 2005; Qiu Haozheng, 2009; Zheng Ying, 2013; Wang Yuan, 2021), which can provide reference for subsequent researchers to study the correlation between sports participation, social capital and subjective well-being.

Based on the data characteristics of the main variables analyzed, including both ordered variables and categorical variables, this study comprehensively applied

difference analysis, correlation analysis, regression analysis, structural equation analysis, etc., when analyzing the data, instead of only using T-test methods like relevant studies, such as: Li Yanling (2006), Wang Ke (2015), Li Huixuan (2021), etc., or just use regression analysis to analyze the problem, such as: Liu Mina (2016), Lei Ming (2020), Shen Xiu (2023), etc. The use of a variety of analysis methods will be more helpful to understand the internal relationship between the variable data, which is conducive to the analysis and understanding of the problem.

Finally, domestic and foreign scholars have done a lot of research on the measurement of subjective well-being. At present, there are many methods to measure subjective well-being, which have been introduced in the literature review in this paper. At present, both multidimensional measurement and single-item measurement are used in studies, but most large-scale surveys and studies use single-item scale methods, such as China General Social Survey and China Family Tracking Survey. It should be noted that although the use of a single indicator to measure residents' subjective well-being has been proved feasible by relevant studies, and a large number of studies have also adopted this method, it is undeniable that, to some extent, this method cannot comprehensively observe all dimensions of subjective well-being like the classical comprehensive scale (Lin Jie, 2019). Therefore, although the sample size of this study is relatively large, in order to better understand the specific situation of different dimensions of residents' subjective well-being and the impact of sports participation on them, The survey of residents' subjective well-being in this study adopts the Brief Chinese Residents' Subjective Well-being Scale (SWBS-CC20) compiled by Xing Zhanjun, which is also widely used in the research on subjective well-being by Chinese scholars, such as: Dong Kou et al. (2014), Deng Yunlong et al. (2016), Jia Siyue et al. (2017), Tan Mei (2019), Zheng Li (2019), Wang Jingjing (2022), Wang Cong & Xing Zhanjun (2023) all carried out research and analysis with the help of this scale and achieved a series of research results.

## 1.2 Status of sports participation, social capital and subjective well-being of residents of different genders and ages

Sports participation: There was a significant difference in the scores of physical exercise between different genders (P=0.000<0.01, t=9.170). The scores of physical exercise of males (M $\pm$ SD=29.412 $\pm$ 22.099) were higher than those of females (M $\pm$ SD=19.191 $\pm$ 15.862). The reasons for this difference were analyzed as follows: 1) Cultural and social factors: Traditionally, men are expected to be more active in sports activities, which may lead to higher participation of men in physical exercise. 2) Physical fitness and interest: Men are generally more interested in competitive sports and physical antagonistic activities, which may also lead to higher physical exercise

scores for men. 3) Time and opportunities: Due to the different division of social roles, men have more time and opportunities to participate in physical exercise in terms of work and family responsibilities.

In addition, there were significant differences in physical activity scores among different age groups (P=0.041<0.01, t=2.766). Among them, the score of 46-60 years old is the highest, and the score of 60 years old and above is the lowest. The reasons for this difference in physical exercise among different age groups are analyzed as follows: 1) Physical health and physical fitness: Residents aged 46-60 years old have better physical condition and strong physical fitness, and can participate in more physical exercise. In contrast, residents over the age of 60 May have lower participation in physical exercise due to physical health problems or decreased physical fitness. 2) Lifestyle and time: Residents in the 25-45 age group are at the peak of their professional and family life, and the allocation of time and energy may affect their physical exercise participation. Young people in the 18-25 age group had lower physical activity scores due to study pressures and lifestyle choices. 3) Exercise habits and interests: different age groups have different interests and habits in physical exercise. In middle age, people begin to pay attention to health management, while the elderly may be limited by health conditions and low participation.

Social capital: The social capital score of male (M=71.951) was higher than that of female (M=69.880). The gender difference between male and female social capital may be related to the social roles and responsibilities of male and female. In addition, under the influence of the traditional Chinese thought that men take charge of the outside world and women take charge of the inside world, women assume more responsibilities in the family and men have more opportunities to participate in social activities, which may lead to differences in the accumulation of social capital between the two. From the perspective of residents' social capital in different age groups, the 25-45 age group had the highest score (M=74.928), and the 18-25 age group had the lowest score (M=70.381). There was a significant difference among different age groups in social capital (P=0.000<0.01, t=31.189). From the perspective of various dimensions of social capital, it is also different and different. The reasons for the differences are as follows: 1) Social network development: The 25-45 years old age group is usually the most active stage in career and social activities, and the individual's social network and social capital accumulation are relatively rich. 2) Life experience and resources: Residents in the 46-60 age group are likely to have more social experience and resources, but slightly less than those in the 25-45 age group. The age group of 18-25 May have low social capital accumulation due to lack of work experience and social

resources; Social capital in the 60 + age group may be lower due to retirement, reduced social participation and other factors.

Subjective well-being: The group subjective well-being score of male (M=78.839) was slightly lower than that of female (M=79.449), but there was no significant difference between the two (P=0.425>0.01). With the development of society, women were liberated from housework and put into social labor, and the social difference between men and women became smaller and smaller. In the process of socialization, the difference between male and female thinking and concept gradually narrowed, so gender had no significant impact on residents' subjective well-being level. This research result is consistent with previous research results (Qu Lijuan, 2015). In terms of subjective well-being of different age groups, the 46-60 age group had the highest score (M=82.388), followed by the 25-45 age group (M=81.507), the 18-25 age group (M=77.003), and the 60 + age group (M=75.382). There were significant differences in subjective well-being among different age groups (P=0.000<0.01). Analysis of possible reasons for the difference: People over 60 years old have the lowest subjective wellbeing score due to their gradual withdrawal from work and decreased sense of need. In addition, as they get older, health problems increase more than those of young people, followed by 18-25 years old, this group is affected by various pressures such as study, job search, marriage and love. Although they are young and strong, their happiness is not high. Residents in the 46-60 age group have the highest score of subjective wellbeing. They are not like people in the 25-45 age group, who have the elderly and the young, and are under so much pressure from work and family. They are also not like those in the 60-plus age group, who are prone to feel lonely and unwanted due to retirement and become a little redundant. Their economic conditions, social relations and resources are relatively abundant, so the happiness is the highest.

# 1.3 Influence and mechanism of residents' sports participation on subjective well-being

It was found that sports participation was positively correlated with subjective well-being ( $r = 0.400^{**}$ , P<0.01). This is consistent with the research results of most scholars at present. Yang Jiapeng et al. (2021) showed in their study that physical exercise can positively predict happiness. The greater the amount of physical exercise, the higher their happiness. Sports participation may improve subjective well-being in the following ways: Improved physical health: Physical exercise can improve fitness, reduce the incidence of disease, improve overall health, and thus improve well-being. Improve mental health: Physical exercise can reduce stress, anxiety and depression, improve mood, enhance mental health, and improve subjective well-being. In addition, some sports involve cooperation, which requires communication with others. In the

process of communication, residents can not only experience different social roles, but also improve their communicative and adaptive abilities, which is conducive to the enhancement of individual subjective well-being.

The study also showed that there was a significant positive correlation between residents' sports participation and social capital ( $r = 0.384^{**}$ , P<0.01). Sports participation may enhance social capital in the following ways: Increased social opportunities: Sports activities provide opportunities to interact with others and help residents build and strengthen social networks. Enhanced sense of community participation: Physical activity often requires teamwork and enhances residents' sense of community participation and belonging. Enhanced social trust and support: Through shared participation in sports activities, trust and mutual support among residents are enhanced, enhancing all dimensions of social capital. There was a significant positive correlation between residents' social capital and happiness ( $r = 0.526^{**}$ , P<0.01). Social capital may influence subjective well-being in the following ways: Providing emotional support: High levels of social capital mean that residents have access to more emotional support, which contributes to happiness. Enhance social trust: Social trust can reduce feelings of insecurity and anxiety, increase life stability and security, and thus enhance happiness. Promoting social participation and belonging: Social capital enhances residents' sense of community participation and belonging, and increases life satisfaction and happiness.

Using hierarchical regression analysis, the predictive explanatory values of demographic variables (gender/age/participation form) for each dimension of subjective well-being are lower than those of the amount of physical exercise placed in the hierarchical regression equation, such as: Demographic variables (sex/age/form of participation) provide only 1.9% explanation for the growth and progress dimensions predicted, whereas when physical activity is placed in the hierarchical regression equation, the standardized coefficient  $\beta = 0.347$  increases the variance of interpretation to 13% (F=45.283, P < 0.01). Regression analysis showed that physical exercise could significantly affect social capital ( $\beta = 0.039$ , t=-8.681, p<0.01). Physical exercise and social capital significantly affected subjective well-being ( $\beta = 0.011$ , t=4.284, p<0.01;  $\beta = 0.388$ , t=24.512, p<0.01). Physical exercise can directly and significantly positively predict subjective well-being, and the more active physical exercise, the higher the level of subjective well-being, which is consistent with previous research results. The reasons may be as follows: On the one hand, residents can enhance their physical fitness, life, sports skills, fitness and fitness, improve their overall health through regular participation in physical exercise, so as to maintain a good physical level, which to a certain extent can improve the physical security of individuals, full of confidence and

recognition of life, and thus enhance their subjective well-being; On the other hand, physical exercise can improve the physical and mental state of individuals, relieve pressure, relax body and mind, and then stimulate more positive emotions and effectively inhibit negative emotions. Residents not only get a healthy physique but also form positive psychological emotions by participating in physical exercise. The external and internal interaction ultimately promotes the subjective well-being of residents. In addition, physical exercise helps to build a stronger social capital network, increase social opportunities, enhance community participation and enhance social trust. High levels of social capital bring more social support and trust, which indirectly improves residents' subjective well-being.

In order to further investigate the impact of sports participation on subjective wellbeing and test the mediating role of social capital, Bootstrap analysis was further adopted in this study to test the model of the impact of physical exercise on subjective well-being through social capital. According to the standard path coefficient of the model, the standard path influence coefficient of sports participation on subjective wellbeing is 0.216, the standard path influence coefficient of physical exercise on social capital is 0.39, and the standard path influence coefficient of social capital on wellbeing is 0.508, all of which reach the level of significance. Social capital was used as the mediating variable between physical exercise and subjective well-being. The upper limit and lower limit of Bootstrap95% confidence interval were 0.259 and 0.144. The influence path was "physical exercise  $\rightarrow$  social capital  $\rightarrow$  subjective well-being", and the effect size was 0.198, indicating significant mediating effect. These results indicate that sports participation has a significant positive impact on subjective well-being through social capital.

By constructing structural equation models of residents' sports participation, social capital and subjective well-being, X2 /df=2.928<3, NFI=0.942, RFI=0.923, IFI=0.957, TLI=0.943, CFI=0.957, according to the acceptable ideal value criteria of structural equation model fitting index. The above adaptation indexes were all greater than 0.90, and RMSEA=0.066<0.08, which met the requirements of the study. Bentler and Bonett proposed that the relative fitting index NFI, CFI, TLI, CFI, etc. should be greater than or close to 0.90, and Steiger proposed that the RMSEA value should be lower than 0.06 (lower than 0.08 is also acceptable). It shows that the mediation model fits well and the model is acceptable. Sports participation not only has direct influence on subjective well-being, but also can indirectly influence subjective well-being through the mediating effect of social capital. Previous studies have also shown that sports participation can affect subjective well-being through the effects of "direct influence" and "indirect transfer" (Du Hui, 2010; Zou Rui, 2017)For example, sports participation

can affect participants' subjective well-being by influencing their health experience, satisfaction experience and development experience. Different studies focus on different perspectives and analyze different variable relationships, but all of these contribute to deepening our understanding of the relationship between sports participation and subjective well-being.

## 1.4 Analysis of experimental effect of sports intervention on subjective wellbeing

It can be seen from the results of the experimental data analysis that before the experimental intervention, the experimental group and the control group had homogeneity in terms of physical exercise, social capital and subjective well-being and their sub-dimensions. After the eight-week sports intervention, the experimental group had a certain improvement in social capital and subjective well-being, and there were significant differences between the experimental group and the control group (P<0.05), indicating that the eight-week sports intervention could effectively improve subjects' subjective well-being. The results of this study are consistent with those of previous studies (Liu Zhaopeng, 2023; Shi Chenhao, 2022; Tian Jiaxue, 2022; Regen, 2021; Shi Jun, 2009).

Why is there some consistency rather than complete consistency? First of all, it is because these studies are based on sports as intervention means, but the specific content of the selected sports intervention project is different, and the intervention experiment period is different, but no matter the four-week (Katarzyna et al.,2021), eight-week (Liu Zhaopeng, 2023); Huang Yongchao, 2023), or 12-week (Liang Jiafeng, 2021; Wu Cui, 2019) Intervention experiment, and its findings all show that physical exercise can promote the improvement of subjects' subjective well-being.

Secondly, for the study on the influence between sports participation and subjective well-being, in addition to the analysis of its direct influence, the selected observational mediating variables are different, such as Yang Wei (2018), Sun Shuai (2021), Wang Youlin (2022), Sui Yuqing (2023), etc. The mediating variables they chose to observe in the study were psychological resilience, physical health, physical self-esteem, sleep quality, etc., while the mediating variables in this study were social capital, with different research perspectives.

Therefore, the results of this study, on the one hand, further prove the relationship between sports participation and subjective well-being; on the other hand, it also shows that sports participation can not only directly affect subjective well-being, but also indirectly affect the improvement of subjective well-being through other ways. This also suggests that the concept of happiness has always been a complex scientific system, and there are many factors affecting subjective well-being. Future research should adhere to the interdisciplinary research perspective and multi-angle thinking to explore the relationship between them. Because the benefits of exercise are widespread, regular physical activity not only physically helps our bodies, but also provides a range of mental and emotional health benefits. In exercise psychology, it is clearly pointed out that the most affordable and easy to operate health activity that is beneficial to physical and mental health at present is physical exercise (Zhu Lei, 2015), which is a resilience tool that can be used to improve positive emotions, self-confidence and overall well-being.

## 2. Conclusion

In this paper, based on the accumulation of relevant literature and theoretical basis at home and abroad, a comprehensive questionnaire on sports participation, social capital and subjective well-being was prepared for later research work. Secondly, taking Shaanxi Province as an example, a questionnaire survey involving 1360 sample people was carried out to analyze the basic status of residents' sports participation, social capital and subjective well-being at the present stage. With sports participation and social capital as explanatory variables, a regression model was built on the basis of controlling other factors affecting individual subjective well-being. This paper analyzes the influence of sports participation and social capital on subjective well-being, and discusses the relationship mechanism among the three, as well as the differences between different gender and different age groups. Finally, in order to further verify the intervention effect of sports participation on subjective well-being, an experimental study was carried out with 18-25 year old males as an example, and the influence of sports participation on residents' subjective well-being was interpreted in multiple dimensions through analysis of independent sample test and paired sample test, and the following conclusions were drawn:

(1) Based on the relevant research results of domestic and foreign scholars, this study compiled a comprehensive questionnaire on residents' sports participation, social capital and subjective well-being, and invited 9 experts to evaluate the compiled questionnaire. The evaluation results showed that the IOC evaluation score of each item design was greater than or equal to  $0.78(\geq 0.78)$ , indicating that the experts recognized the questionnaire item design. Cronbach's alpha coefficient of each dimension of the pre-survey questionnaire ranged from 0.817 to 0.921, all of which exceeded 0.7, which further demonstrated the reliability of the questionnaire design results and provided references for subsequent researchers to study the correlation between sports participation, social capital and subjective well-being.

(2) On the basis of questionnaire survey, test and analyze the hypotheses proposed above. First of all, through descriptive statistics and difference analysis, it is concluded that there is still great room for improvement in residents' sports participation at this stage. The average physical exercise of residents is 24.3015, which belongs to the medium level (19< physical exercise  $\leq$ 42). There are also significant differences between different genders and different age groups, with males being higher than females and 46-60 years old being better than other age groups. Secondly, there are significant differences in the social capital of residents of different genders and different age groups. Males are higher than females, and the 25-45 age group has the highest social capital score. Moreover, the average subjective well-being of residents at this stage is 79.144, which is at the medium level. There is no significant difference in subjective well-being among different gender groups, but there are significant differences among different age groups, among which the score of 46-60 years old is the highest, and the score of over 60 years old is the lowest. Finally, through correlation analysis, regression analysis, mediation effect analysis and structural equation analysis, it is concluded that sports participation has a positive impact on individual subjective well-being, which can not only positively predict their subjective well-being, but also indirectly affect their subjective well-being through social capital. Social capital plays an intermediary role between sports participation and residents' happiness.

(3) The IOC evaluation scores of the 5 experts on the intervention plan were all greater than or equal to  $0.8(\geq 0.8)$ , and the evaluation results indicated that the experts recognized the intervention plan design. After the intervention of moderate intensity physical exercise for 40 minutes twice a week for 8 weeks, there were no significant differences in social capital and subjective well-being between the experimental group and the control group except contentment, goal experience, mental balance and family atmosphere (P > 0.05). There were significant differences in other dimensions (P<0.05), indicating that the designed sports intervention program can effectively improve participants' subjective well-being and social capital level.

## 3. Research deficiencies and prospects

## 3.1 Research deficiencies

This study adheres to a rigorous and standardized research attitude, an objective and true empirical thought, complies with the requirements and procedures of scientific research, and flexibly uses research methods and tools to conduct a questionnaire survey with Shaanxi Province as an example to analyze the basic status of residents' sports participation, social capital and subjective well-being at the present stage, and takes sports participation and social capital as explanatory variables. On the basis of controlling other factors that affect individual subjective well-being, a structural

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analysis model is constructed to analyze the impact of sports participation and social capital on subjective well-being, and to explore the relationship mechanism among the three. Furthermore, the male group aged 18-25 is taken as the observation object to further carry out experimental verification research. From the research process and results, this study has achieved the expected purpose. However, due to the limitations of subjective ability and objective conditions, there are still many shortcomings in this study, which need to be further studied to improve.

#### (1) Limitations of samples

Due to the limitations of objective conditions and subjective ability, this study is unable to conduct a large sample and universal sampling survey. Although the combination of stratified multi-city sampling and random sampling is adopted in the research process to increase the sample size as much as possible, so as to avoid sample errors caused by different levels of economic development and thus increase the reliability of the research. However, due to the large number of selected cities, the sample size of each city is small, so the research conclusion can only be used as a reference, but the general applicability of the research conclusion remains to be discussed. In future studies, the sampling area can be expanded and the number of samples taken from each region can be increased, so as to make the reference of the research results more extensive and reliable.

### (2) Limitations of research tools

Although the survey tool used in this research has been evaluated by experts and tested for reliability, it is suitable for research development. However, it is well known that subjects are inevitably affected by subjective and objective factors when filling out questionnaires, such as the number of questions, difficulty and cognition of subjects, which will affect the authenticity of measurement results. Therefore, the future research can adopt the strategy of combining questionnaire survey with other assessment techniques. Such as: interview method, non-verbal behavior recording method, significant others evaluation method, etc.

## 3.2 Research prospect

Although people's understanding of happiness has made great progress at the individual, social and international levels, the research on happiness is still insufficient in both depth and breadth, and more in-depth research in this field is still needed in the future (Miao Yuanjiang, 2015), especially the research on happiness intervention, which is still a relatively new field. Deepening and perfecting the research of happiness intervention is of guiding significance to the relevant happiness theory, positive psychology theory and practice in China.

The study of subjective well-being will remain a research hotspot with long-term prospects in the future (Ge Xiaoyu, 2021). First, in the future, with the rapid development of China's sports industry and the popularization of national fitness activities, the sports participation population will continue to increase, exercise projects will continue to diversify, and exercise types will be further differentiated. The current research conclusion only analyzes the frequency, intensity, duration and participation form of exercise, and does not involve the explanatory power of subdivided exercise items, which can only be used as a reference for the study of mass exercise items in the field of participation in mass sports. Second, in terms of variable measurement, this study follows the traditional self-report scale method. With the deepening of research on subjective well-being, quantitative tools have begun to show a diversified development trend. The questionnaires and scales used in this study may be invalidated in the face of future refined research questions. Thirdly, the research of happiness is a complicated problem from the beginning. Although the research of subjective wellbeing has become a classic model, the concept of well-being has always been a complex scientific system. There are many factors affecting happiness. In the future, this study will adhere to the interdisciplinary research perspective, expand the current research framework, and incorporate more influential factors such as cultural factors, psychological factors and regional factors into the overall analysis framework, so as to further explore the impact and mechanism of sports participation on subjective happiness, so as to enrich the theoretical and practical research content of subjective happiness.




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## APPENDIX

**APPENDIX 1 Sports Participation, Social Capital and Subjective Well-being Questionnaire (over 18 years old)** 

Dear Sir/Madam,

Hello! Thank you very much for taking the time to complete this questionnaire! The purpose of this questionnaire is to better understand the impact of sports participation and social capital on residents' subjective well-being and the differences among groups. All survey results are not for use except for academic research. Please feel free to answer. There is no standard answer or correct answer to all questions, please fill in according to your usual physical exercise situation and thoughts and feelings, your valuable information feedback will be of great help to our research. Thank you for your strong support!

Part 1: General information and basic information about sports participation and social interaction, please add  $\checkmark$  symbol in the ( ) text page that best suits you.

1. sex

() A. Male () B. Female

2. age

( ) A.<18 years old ( ) B.18-25 years old ( ) C.26-45 years old

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( ) D.46-60 years old ( )E .>60 years old

3. education

) A. Junior high School or below

- () B. Senior high School or technical secondary school
- ( ) C. Junior college ( )D. Undergraduate ( ) E. Graduate

4. occupation

()A.Civil servants or personnel of public institutions

- ()B. personnel of enterprises ()C. Pupil () D. self-employed persons
- () E. retired persons () F. farmers () G. other
- 5. Monthly income
- ( ) A.2500 Yuan and below ( ) B.2501 yuan to 5000 yuan
- ( ) C.5001 yuan to 8000 yuan ( ) D.8001 to 10000 yuan
- () E.10000 yuan and above
- 6. Marital status:
- () A. unmarried () B. Married () C. Divorce or separation
- ( ) D. The loss of a spouse ( ) E. The loss of a child
- 7. Physical health:
- () A. Health () B. General () C. Sub-health () D. Sick, not healthy

8. How often you engage in social entertainment with friends:

() A. never () B. Several times A year or less () C. Several times a month

- () D. Several times a week () E. Almost every day
- 9. Do you play sports? (Sports participation)
- () A. Never () B. Occasionally

() C. More frequent participation () D. Regular participation

10.What is your preference for sports activities:

()A. Speed and strength type: such as sprinting, weightlifting, throwing, strength equipment exercises, etc

()B.Endurance type: such as long-distance running, long-distance swimming, race walking, fitness walking, cycling, etc

( )C .The performance of difficult beauty type: such as yoga, martial arts (Tai Chi), aerobics dance, gymnastics, etc

() D. Accurate skills: such as shooting, archery, etc

- () E. Anti-net type: such as table tennis, badminton, tennis, volleyball, etc
- () F. Match type: such as basketball, football, rugby, ice hockey, hockey, etc
- ( ) G. Combat type: such as fencing, judo, wrestling, boxing, etc
- ()H Other: such as sports activities with regional characteristics

11. Your form of physical activity:

- () A. Exercise alone () B. Exercise in a group (with family or friends)
- 12. Exercise intensity when participating in physical exercise:
- () A. Light exercise () B. Light and not too intense exercise
- () C. Moderately intense and sustained exercise

() D. Intense but not sustained exercise with rapid breathing and heavy sweating Intense, sustained exercise that involves heavy breathing and sweating.

13. How long does each physical exercise last?

- () A.10 minutes or less () B.11-30 minutes
- ()C.31-59 minutes ()D.60 minutes or more
- 13. Frequency of participation in physical exercise:
- () A. Once a month or less () B. 2-3 times a month
- () C. 1-2 times a week () D. 3-5 times a week

( ) E. Almost every day

14. How long have you maintained the above exercise behavior?

- () A. Less than six months () B. Less than six months to one year
- () C. Less than one to two years ()D. Within 2-3 years
- ()E.more than 3 years

## Section 2: Scale survey of exercise motivation

Please type " $\checkmark$ " in the space below your choice (no, a little, strong, strong, very strong) according to your own situation.

I=No, 2=a little, 3=More intense.	, 4=strong, 5=very strong

No.	Topic content	1	2	3	4	5
1	I want to have a strong body					
2	I want to control my weight					
3	I want to do something entertaining					
4	I want to acquire new motor skills					
5	I want to maintain good social relationships					
6	I want to keep my mind and body healthy					
7	I want to keep or improve my body shape					
8	I want to be happy					
9	I want to improve my current motor skills					
10	I want to enhance my feelings and friendship with my friends					
11	I want to live a healthy life					
12	I want to make my appearance more attractive					
13	I want to enjoy a happy life					
14	I want to keep my current motor skills					
15	I want to maintain good social relationships					

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## Section 3: Social Capital Inventory survey

**Explanation:** Please rate each item from 1 to 5. please tick  $\sqrt{}$  in the mark according to your opinions. Using the scale range from 1=Strongly disagree,2=Disagree,

3=Neutral, 4=Agree, 5=Strongly agree.

No.	Topic content	1	2	3	4	5
1	You have your own circle that you hang out with					
2	You have some influence in the social circle					
3	You are an active member of a local organization or club,					
	such as a football association, yoga association, dance					
	association, calligraphy association, etc.					
4	You enjoy living with people who have different lifestyles					
5	When you go to an event, you say hello to others					
6	You can meet new peopl <mark>e thro</mark> ugh physical fitness					
	activities and leisure activities					
7	When participating in various activities, you can					
	consciously comply with management requirements and					
	activity rules					
8	You think it's important to follow social norms of behavior					
9	When people around you (people you know) do not follow					
	the code of conduct, you will alert and stop.					
10	When you see strangers not obeying the code of conduct,					
	you will alert and stop.					
11	You have a lot of trust in the circles and groups that you					
	regularly participate in	-	3			
12	Generally speaking, do you agree that the vast majority of					
	people in this society can be trusted?					
13	"Generally speaking, do you agree that in this society, if					
	you are not careful, others will try to take advantage of					
	you?"					
14	You think it's safe to walk the streets after dark					
15	In social interactions, you often ask for your partner's					
----	---	--	--	--		
	opinion or the opinion of others					
16	In life, I can easily get the information I need					
17	When I have trouble, I can easily find someone to talk to					
18	In life, when I encounter difficulties, I can get support and					
	help from others					
19	In life, I am very willing to help others					



### Section 4: Subjective well-being scale survey

**Explanation:** Please rate each item from 1 to 5. please tick  $\sqrt{}$  in the mark according to your opinions. Using the scale range from 1=Strongly disagree,2=Disagree, 3=Disagree a little, 4=Agree a little, 5=Agree, 6=Strongly agree.

No.	Topic content	1	2	3	4	5	6
1	Society offers people more and more ways out						
2	As I grow older, I have learned many lessons from life,						
	which have made me more determined and capable						
3	Most of the goals I set in my life inspire me rather than						
	discourage me						
4	I often feel like I'm just trying to get through the day						
5	I don't know what the meaning of what I've done in my life						
	is						
6	I often feel uncomfortable in certain parts of my body						
7	Compared to the person next to me, I was content						
8	I am satisfied with my family's financial situation						
9	I often worry about trifles						
10	I am very distressed about my health						
11	I often find it difficult to form friendships with others						
12	I am more satisfied with my character						
13	I feel like most people have more friends than I do						
14	I feel very happy when I am with my family						
15	I had worse luck than others						
16	I believe that society will continue to develop						
17	Compared with others, I feel I am at a disadvantage						
18	When I meet unpleasant things, I can't cheer up for a long		3		7		
	time	0					
19	I am glad that my ideas have matured over the years						
20	I sometimes find it difficult to communicate with my						<u> </u>
	family (including parents, children, lovers, etc.)						

APPENDIX 2 IOC results from the first round of the	questio	
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			د •		Ę	e -		•				10	6
N0.	APPENDIX 2. Question and option design	Exp1	sults Ir Exp2	om the Exp3	Exp4	Exp5	the que Exp6	stionnai Exp7	re Exp8	Exp9	Total	Average	Results
1	Sex: A. Male B. Female		-		-	1	1	1	1	1	6	1	Pass
7	Age: A.<18 years old B.18-25 years old C.26-45 years old D.46-60 years old E. >60 years old	-	_	-	-	_	1	0	-	1	∞	0.89	Pass
r	Education: A.Junior high School or below B.Senior high School or technical secondary school C.Junior college D.Undergraduate E. Graduate			-	-1		1	-	1	1	6	1	Pass
4	Monthly income A.2500 Yuan and below below below C.5001 yuan to 8000 yuan E.10000 yuan and above		-		-1		1	-	-	1	~	0.89	Pass
Ś	Marital status: A. unmarried B. Married C. Divorce or separation D. The loss of a spouse E. The loss of a child	-	_	-	-	1	1	-	-	-	6	1	Pass
9	Physical health status: A. Health B. General D. Sick, not healthy	1	-	-	-		1	1	1	1	6	1	Pass
٢	How often you engage in social entertainment with friends: A. never B. Several times A year or less C. Several times a month	1	-	0			1	1	1	1	×	0.89	Pass

0		Pass	Suggest modific -ation	Pass	Pass	Pass
1		0.78	0.56	1	Ι	0.89
		Ĺ	S	6	6	8
		I		1	Ι	1
		T	0	1	1	1
		1	1	1	I	1
		1	0	1	I	1
		1		-1	-	1
		1	-		-	1
		1	_	-	-	1
		1	_	-	-	0
		1			_	1
	D. Several times a week E. Almost every day	Do you play sports? A. Never B. Occasionally C. More frequent participation D. Regular participation	Your options for physical exercise are: A. Running B. Martial Arts C. Aerobics D. Swimming E. Table tennis F. Basketball G. Football H. Badminton I. Tennis J. Volleyball K. Fitness Walking L. Cycling M. Archery N. Strength exercises O. Rock climbing P. Mountaineering Q. Yoga R. Sports with regional characteristics S. other	Your form of physical exercise: A. Exercise alone B. Exercise in a group (with family or friends)	Exercise intensity when participating in physical exercise: A. Light exercise and sustained exercise and sustained exercise Intense but not sustained exercise with rapid breathing and heavy sweating Intense, sustained exercise that involves heavy breathing and sweating.	How long does each physical exercise last: A.10 minutes or less B.11-30 minutes C.31- 60 minutes D. 60 minutes or more
		8	6	10	11	12

Ļ				-	-	_							
Freque exercis A. Ono times C. 1-2 E. Alm E. Alm	ercy of participation in physical ec: be: a month or less a month times a week D. 3-5 times a week times a week b. 3-5 times a week	-		-	-	-	-	-	-	1	6	1	Pass
How J exerci A. Le than s than o D.Wit	ong have you maintained the above se behavior? B. Less ss than six months ix months to one year the to two years hin 2-3 years E. more than 3 years	_	-	-	-	-	-	-	1	-	6	1	Pass
Your J exerci A. I w B. I w B. I w shape C.I wi health health D.I w D.I w	motivation to participate in physical se is: ant to have a strong body ant to maintain or improve my body to make myself more attractive ant to keep a happy mood and live a y life through physical exercise ant to maintain and improve my current skills and learn new ones		-	-1	-	<b>—</b>	<b>_</b> •	-	7	-	4	0.44	Suggest modific -ation
You h with.	ave your own circle that you hang out	1	1	1	1	1	1	-	I	1	6	1	Pass
You h	ave some influence in the social circle.	1	1		0			1		1	8	0.89	Pass
You a organ assoc assoc	re an active member of a local ization or club, such as a football iation, yoga association, dance iation, calligraphy association, etc.	1	-		0	-	-		- 1	1	×	0.89	Pass

Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Delete	Pass
0.89	0.89	-	-	1	0.89	0.78		0.33	0.89
8	~	6	6	6	×	7	6	m	8
1	1	-	-	1		1	1	0	1
1	_	_	-	1		1	1	-	1
0			1	1	_	1	-	-	1
1	0		1	-		0	1	-	1
1	-	_	1	-	I I	1	1	Ţ	0
1	-		1	1	1	1	1	-	1
1	-		1	_	0	0	1	-	1
1	1	1		I	1	1	1	0	1
1	1	1	1	1	1	I	1	-	1
You enjoy living with people who have different lifestyles.	When you go to an event, you say hello to others.	You can meet new people through physical fitness activities and leisure activities	When participating in various activities, you can consciously comply with management requirements and activity rules.	You think it's important to follow social norms of behavior.	When people around you (people you know) do not follow the code of conduct, you will alert and stop.	When you see strangers not obeying the code of conduct, you will alert and stop.	You have a lot of trust in the circles and groups that you regularly participate in.	Do you agree or disagree that in general social interactions/contacts that do not directly involve pecuniary interests, there are more people who can be trusted among relatives, neighbors, colleagues, classmates and good friends	Generally speaking, do you agree that the vast majority of people in this society can be trusted?
19	20	21	22	23	24	25	26	27	28

Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	05 Pass	
0.89		0.89						0.5	
~	6	~	6	6	6	6	6		
		-	1	1	-	1	-		
1	-		-		-	-			
-1			1				-1		
			1			1			
0		-	1		-	-			
1		1	1		1	-	-		
1		0	1		1		1		
-1		-		1	1	1	-		
1	_	-	-	-		1	_	1	
Generally speaking, do you agree that in this society, if you are not careful, others will try to take advantage of you?	You think it's safe to walk the streets after dark.	In social interactions, you often ask for your partner's opinion or the opinion of others.	In life, I can easily get the information I need.	When I have trouble, I can easily find someone to talk to.	In life, when I encounter difficulties, I can get support and help from others.	In life, I am very willing to help others.	The subjective well-being surve <mark>y was</mark> conducted by using the Chinese Residents Subjective Well-being Scale (SWBS-CC20)	Tota	2163
29	30	31	32	33	34	35	36		

AF	<b>TENDIA 3 IOC IIIIAI results of the questionnaire</b>				
ž	. Question and option design	Round 1	Round2	Final	Results
-	Sex: A. Male B. Female	1	1	1	Pass
7	Age:A.<18 years oldB.18-25 years oldC.26-45years oldD. 46-60 years oldE. >60 years old	0.89	-	1	Pass
ε	Education: A.Junior high School or below B.Senior high School or technical secondary school C.Junior college D.Undergraduate E. Graduate		I	1	Pass
4	Monthly income A.2500 Yuan and below B.2501 yuan to 5000 yuan C.5001 yuan to 8000 yuan D.8001 to 10000 yuan E.10000 yuan and above	0.89	0.89	0. 89	Pass
Ś	Marital status: A. unmarried B. Married C.Divorce or separation D. The loss of a spouse E. The loss of a child	Π	T	1	Pass
9	Physical health status: A. Health B. General C. Sub-health D. Sick, not healthy	1	-	1	Pass
7	How often you engage in social entertainment with friends: A. never B. Several times A year or less C. Several times a month D. Several times a week E. Almost every day	0. 89	0. 89	0. 89	Pass

17.0 APPENDIX 3 IOC final r

×	Do you play sports? A. Never B. Occasionally C. More frequent participation D. Regular participation	0.78	0.78	0. 78	Pass
6	Your options for physical exercise are:				Suggest
	A. Running B. Martial Arts C. Aerobics D.		Modify to "What are		modific-
	Swimming E. Table tennis F. Basketball G. Football		MUUILY to Wilat arc		ation
	H. Badminton I. Tennis J. Volleyball K. Fitness	0.56	your preterences when		
	Walking L. Cycling M. Archery N. Strength		you exercise (Q10)		
	exercises O. Rock climbing P.Mountaineering Q. Yoga R.				
	Sports with regional characteristics S. other				
10	What are your preferences when you exercise:				Pass
	A. Speed and strength type: such as sprinting, weightlifting,				
	throwing, strength equipment exercises, etc				
	B.Endurance type: such as long-distance running, long-				
	distance swimming, race walking, fitness walking, cycling,				
	etc				
	C.The performance of difficult beauty type: such as yoga,				
	martial arts (Tai Chi), aerobics dance, gymnastics, etc		-	-	
	D. Accurate skills: such as shooting, archery, etc		1	4	
	E. Anti-net type: such as table tennis, badminton, tennis,				
	volleyball, etc				
	F. Match type: such as basketball, football, rugby, ice				
	hockey, hockey, etc G. Combat type: such as fencing, judo,				
	wrestling, boxing, etc				
	H. Other: such as sports activities with regional				
	characteristics				

		-			
11	Your form of physical exercise:				Pass
	A. Exercise alone B. Exercise in a group (with family or	1	1	1	
	friends)				
12	Exercise intensity when participating in physical exercise:				Pass
	A. Light exercise B. Light and not too intense exercise				
	C. Moderately intense and sustained exercise	-		-	
	D. Intense but not sustained exercise with rapid breathing	Т	7	Т	
	and heavy sweating Intense, sustained exercise that involves				
	heavy breathing and sweating.				
13	How long does each physical exercise last:				Pass
	A.10 minutes or less B.11-30 minutes C.31-60	0.89	0.89	0.89	
	minutes D. 60 minutes or more				
14	Frequency of participation in physical exercise:				Pass
	A. Once a month or less <b>B. 2-3</b> times a month	-	-	Ŧ	
	C. 1-2 times a week D. 3-5 times a week E.	I	1	I	
	Almost every day				
15	How long have you maintained the above exercise				Pass
	behavior?				
	A. Less than six months B. Less than six months to one year	1	1	1	
	C. Less than one to two years				
	D.Within 2-3 years E. more than 3 years				
16	Your motivation to participate in physical exercise is:		Modify to "Exercise		Suggest
	A. I want to have a strong body	0.44	motivation was		modific-
	B. I want to maintain or improve my body shape to make		investigated using		ation

26	When people around you (people you know) do not follow the code of conduct, you will alert and stop.	0.89	0.89	0.89	Pass
27	When you see strangers not obeying the code of conduct,	0.78	0.78	0.78	Pass
	you will alert and stop.				
28	You have a lot of trust in the circles and groups that you	1	l	1	Pass
	regularly participate in.	1	7	Т	
29	Do you agree or disagree that in general social				Delete
	interactions/contacts that do not directly involve pecuniary		(repeat; Little		
	interests, there are more people who can be trusted among	0.33	relevance)		
	relatives, neighbors, colleagues, classmates and good				
	triends				
30	Generally speaking, do you agree that the vast majority of	0 80	0 80	0 89	Pass
	people in this society can be trusted?			0.00	
31	Generally speaking, do you agree that in this society, if you	0.89	0.89	0, 89	Pass
	are not careful, others will try to take advantage of you?				
32	You think it's safe to walk the streets after dark.	1	1	1	Pass
33	In social interactions, you often ask for your partner's	00.0	00 0	0 00	Pass
	opinion or the opinion of others.	0.03	0.03	0.03	
34	In life, I can easily get the information I need.	1	1	1	Pass
35	When I have trouble, I can easily find someone to talk to.	1	1	1	Pass

Pass	Pass	Pass	Pass	
1	1	1	0.926	
1	1	-	0.926	
1	1	-	0. 905	
<b>36</b> In life, when I encounter difficulties, I can get support and help from others.	<b>37</b> In life, I am very willing to help others.	<b>38</b> The subjective well-being survey was conducted by using the Chinese Residents Subjective Well-being Scale (SWBS- CC20) compiled by Xing Zhanjun	Total	

RESULTS	Modify	Pass		Pass				Pass		
Average	0.6	-			-				0.8	
Exp5		-			1				1	
Exp4	1	-			-				1	
Exp3	0	-		F	1				0	
Exp2	-				1				1	
Exp1	0		ł		T				1	
Items	<b>Time</b> : 5:00-5:30 pm on Monday, Thursday, lasts 30 minutes.	Instrument	such as computers, projectors, microphones, etc. 2. School playground, and all kinds of exercise equipment for easy operation. Such as basketball,	badminton, table tennis venues and equipment. Activity form	1. The experimental researcher and assistant explain sports knowledge, activity arrangement and precautions to the subjects.	2. The experimental researchers and assistants organize the subjects to exercise.	3.Experimental researchers and assistants organized group discussions for subjects and shared their exercise	feelings. Intervention process(Week 1 -1)	1. With the help of multimedia, explain the connotation of modern health and measure the standard of health to	the envoys. The importance of health to the individual.
No.	-	0			$\mathfrak{c}$				4	

APPENDIX 4 IOC results of the first round of exercise intervention program

2. Organize the subjects to analyze their own health problems or behaviors that have an impact on healthy development according to the health standards (5	
inters) which accounting to the incartur standards. (3	
3. Explain the health promotion of sports and other	
benefits of physical exercise through videos and	
pictures. (15 minutes)	
4. Explain how to participate in physical exercise	
scientifically and effectively and the problems that need	
attention. (10 minutes)	
5. Organize the subjects to discuss and communicate	
and express their views. (5 minutes)	
Intervention process(Week 1 -2)	ass
1. Stimulate participation interest by playing short 1 1 0 1 0 1 1 0.8	
videos and pictures of physical exercise. (5 minutes)	
2. Explain the main content of this exercise and the	
problems that need attention during exercise. (2	
minutes) 3. Organize the subjects to warm up	
activities to avoid injury problems during physical	
exercise. (8 minutes) 4. Instruct the subjects to	
do physical exercise (b <mark>adm</mark> inton). (20 minutes)	
5. Organize subjects to organize and relax activities. (5	
minutes)	
Intervention process(Week 2)	Pass
1. Explain the main content of this exercise and the 1 1 1 0 1 1 0.8	
problems that need attention during exercise. (2	
minutes)	

Ś











4		auon reaus				
N0.	Items	Round 1		Round2	Final	RESULTS
-	Time: 5:00-5:30 pm on Monday, Thursday,lasts 30 minutes.	9.0	Modify to "T Monday, minutes."	<b>ime:</b> 5:00-5:40 pm on Thursday,lasts 40		Modify
	Time: 5:00-5:40 pm on Monday, Thursday, lasts 40 minutes.			1	1	Pass
3	Instrument 1. The school has a quiet classroom that can accommodate 50 people, with multimedia equipment such as computers,	Π		1	-	Pass
	projectors, microphones, etc. 2. School playground, and all kinds of exercise equipment for easy operation. Such as basketball, badminton, table tennis venues and equipment.		Å			
$\mathfrak{c}$	Activity form 1. The experimental researcher and assistant explain sports knowledge, activity arrangement and precautions to the subjects.	1		1	-	Pass
	2. The experimental researchers and assistants organize the subjects to exercise.					
	3.Experimental researchers and assistants organized group discussions for subjects and shared their exercise feelings. <b>Intervention process(Week 1 -1)</b>	0.8		0.8	0.8	Pass
4	1. With the help of multimedia, explain the connotation of modern health and measure the standard of health to the envoys. The importance of health to the individual. (5 minutes)					

**APPENDIX 5 Sports intervention scheme and final IOC evaluation results** 

188		S	
	Pass	Pas	
	0 8 0	0.8	
		~	
	8.	0	
	×.	8.	
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	roblems lopment nefits of ntifically ion. (10 ion. (10 sate and deos and roblems roblems ton). (20	roblems <b>ninutes</b> ) minton).	,
	health p hy deve other be ( <b>15 min</b> ise sciet ise sciet d attent attent short vic short vic (badmin vities.	nd the p s) ount (8 n orts (bad	,
	eir own bin healt inutes) orts and orts and all exerc hat need and cc and cc and cc ercise a minutes minutes wercise (	cercise a minutes (utes) Il and cc earn spo	(
	alyze th mpact of trds. ( <b>5 n</b> of spo cos and <u>F</u> <b>n</b> physic blems t discuss <b>s</b> ) <b>s</b> ) <b>.</b> <b>2</b> ) <b>.</b> <b>2</b> ) <b>.</b> <b>2</b> ) <b>.</b> <b>1</b> <b>.</b> <b>.</b> <b>.</b> <b>.</b> <b>.</b> <b>.</b> <b>.</b> <b>.</b> <b>.</b> <b>.</b>	f this ex f this ex reise. (2 s (5 min s (5 min game/Ca ise and 1	
	tts to an ve an i promotio ugh vide icipate i icipate i the pro jects to <b>5 minut</b> (Week 1 (Week 1 tion inte vercise. to ontent c cring exel cts to w ical exel s to do pl	(Week 2 ontent c ing exer activitie rracelet g	
	ne subje- that ha he health be health isise thro v to part ly and the sub- views. (t process varticipa sarticipa sarticipa ng phys subjects t	process : main c ntion du "arm-up nes: Unb ubjects	,
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	<ol> <li>2. Orgacor be or be accor accor</li> <li>3. Explosive the second of t</li></ol>	<b>Inter</b> 1. Exj 1. Exj 1. Exj 1. Exj 1. Exj 3. Sp 4. Gu	
	Ś	9	

	Pass	Pass	
	0.8	0.8	
		0.8	
	0.8		
	0.8	0.8	
activities. (2 gs about this	the problems	activities. (2 ss about this the problems oot board(10 Table tennis). tivities. (2-5 ss about this	
and relax e their feeling	exercise and (2 minutes) ninutes) ay(8 minutes)	and relax and relax at their feeling exercise and exercise and <b>(2 minutes)</b> ninutes) and relax big for and relax ac at their feeling e their feeling	
to organize ojects to share	(Week 3) content of this ring exercise. activities (5 n p/Head-on rel	to organize jects to share (Week 4) content of this rring exercise. activities (5 n incible Hot v incible Hot v o exercise and to organize to organize	
nutes) nize subjects s) anize the sub c. (3 minutes)	in the main can ain the main can attention du nize warm-up is games: Sit u	<ul> <li>utes)</li> <li>uize subjects</li> <li>s)</li> <li>nize the subjects</li> <li>intion process</li> <li>ain the main of attention du nize warm-up nize warm-up rts games:Inv</li> <li>s)</li> <li>the subjects the subjects</li> <li>s)</li> <li>inize subjects</li> <li>s)</li> </ul>	
(20 mir 5. Orga minute 6. Org exercise	Interve 1. Expli- that nee 7 2. Orga 3. Sport 4. Guidd	<ul> <li>20 minute</li> <li>5.Orgar</li> <li>5.Orgar</li> <li>6. Orga</li> <li>exercist</li> <li>Interve</li> <li>1. Explained</li> <li>that nee</li> <li>8 2. Orga</li> <li>3. Sponte</li> <li>4. Guide</li> <li>4. Guide</li> <li>6. Organ</li> </ul>	
	<ul> <li>(20 minutes)</li> <li>5. Organize subjects to organize and relax activities. (2 minutes)</li> <li>6. Organize the subjects to share their feelings about this exercise. (3 minutes)</li> </ul>	(20 minutes)         5. Organize subjects to organize and relax activities. (2         6. Organize the subjects to share their feelings about this exercise. (3 minutes)         6. Organize the subjects to share their feelings about this exercise. (3 minutes)         1. Explain the main content of this exercise and the problems       0.8       0.8         7       2. Organize warm-up activities (5 minutes)       0.8       0.8         3. Sports games: Sit up/Head-on relay(8 minutes)       3. Sports games: Sit up/Head-on relay(8 minutes)       0.8	(20 minutes)       (20 minutes)         5. Organize subjects, to organize and relax activities. (2 minutes)       - Organize subjects to share their feelings about this exercise. (3 minutes)         7       - Organize manipulation of the problems of the problem of the properties (2 minutes)       0.8       Pass         7       1. Explain the properties (2 minutes)       0.8       0.8       0.8       0.8         7       2. Organize subjects to organize and lean sports (Table terms)       0.8



			1/1
	Intervention process(Week 6)	1 (Modified to "Starting from 1	
	1. Explain the main content of this exercise and the problems 0.6 that need attention during exercise. (2 minutes)	the 6th week, in the exercise Mc	lodify
11	2. Organize warm-up activities (5 minutes)	links of sports events, in	
	3. Sports games:Dry dragon boat/cooperation dribble(10	addition to badminton and table	
	minutes) 4.The subjects were grouped into sports (table	tennis group exercises,	
	tennis/badminton). (15-18 minutes)	independent exercise activities	
	5.Organize subjects to organize and relax activities. (2-5 minutes)	were added to fully consider the	
	6. Organize the subjects to share their feelings about this	diversity of participants' sports	
	exercise. (3 minutes)	participation interests")	
	Intervention process(Week 7)	1 (Modified to "Starting from 1 Mc	<b>1</b> odify
12	1. Explain the main content of this exercise and the problems 0.6	the 6th week, in the exercise	
	that need attention during exercise. (2 minutes) 2. Organize warm-up activities (5 minutes)	links of sports events, in	
	3. Sports games:Football pass game/train race(10 minutes)	addition to badminton and table	
	4. The subjects were grouped into sports (table tennis/badminton). (15-18 minutes)	tennis group exercises,	
	5. Organize subjects to organize and relax activities.	independent exercise activities	
	(2-5 minutes)	were added to fully consider the	
	exercise. (3 minutes)	diversity of participants' sports	
		participation interests")	

Modify	Pass	Pass
		0.9
1 (Modified to "Starting from the 6th week, in the exercise links of sports events, in addition to badminton and table tennis group exercises independent exercise activities were added to fully consider the diversity of participants' sport participation interests")		
0.6	0.8	0.771
<ul> <li>Intervention process(Week 8-1)</li> <li>1. Explain the main content of this exercise and the problems that need attention during exercise. (2 minutes)</li> <li>1.3 2. Organize warm-up activities (5 minutes)</li> <li>3. Sports games:Invincible Hot wheels (10 min)</li> <li>4. The subjects were grouped into sports (table tennis/badminton). (15-18 minutes)</li> <li>5. Organize subjects to organize and relax activities.</li> <li>6. Organize the subjects to share their feelings about this exercise. (3 minutes)</li> </ul>	<ul> <li>Intervention process(Week 8-2)</li> <li>1. With the help of multimedia teaching equipment, explain social sports resources to subjects, including public facilities resources (including community gyms, sports grounds, etc.) and media resources (video learning, etc.), and guide subjects to learn to use various social sports resources for physical exercise. (10 minutes)</li> <li>2. Explain to subjects that lack of physical exercise will lead to potential risks, such as obesity, chronic diseases and poor body shape. (5 minutes)</li> <li>3. Encourage participants to move toward their goals and keep exercising. (5 minutes)</li> <li>4. The subjects took exercise independently. (15 minutes)</li> </ul>	Organize subjects to organize and relax activities.( <b>5 min</b> ) Total

### **APPENDIX 6 Human ethics research certificate**



## MAHASARAKHAM UNIVERSITY ETHICS COMMITTEE FOR RESEARCH INVOLVING HUMAN SUBJECTS

#### Certificate of Approval

#### Approval number: 021-573/2024

Title : The influence of sports participation and social capital on subjective well-being.

Principal Investigator : Lyu xianli Responsible Department : Faculty of Education Research site : AnKang City, Shanxi Province, China

Review Method : Expedited Review

Date of Manufacture : 17 January 2024

expire : 16 January 2025

This research application has been reviewed and approved by the Ethics Committee for Research Involving Human Subjects, Mahasarakham University, Thailand. Approval is dependent on local ethical approval having been received. Any subsequent changes to the consent form must be re-submitted to the Committee.



(Asst. Prof. Ratree Sawangjit) Chairman

Approval is granted subject to the following conditions: (see back of this Certificate)

# **APPENDIX 7 Expert Invitation Letter Example**

MAHASARAKHAM UNIVERSITY	44000, THAILAND Tel/fax +66 43 713 174 Email: cia.edu@msu.ac.th
Center for International Affairs	
MHERSI No. 0605.5 (2) / CL643	Date: February 14, 2024
To: Prof. Zhou Jiaying	
Xi'an Physical Education University, China	
Subject: Thesis Reviewer Invitation	
Our student, Ms. Lyu Xianli, student ID 64010564008 majoring in t Science program is currently undertaking a research project titled Social Capital to the Subjective Well-being" under the guidance o	the Ph.D. Exercise and Sports "The Effect of Sports Participation, f Dr. Napatsawan Thanaphonganan
To ensure the successful execution and the highest quality of this r your valuable expertise and experience. Therefore, I am delighted you to serve as a reviewer for the research instrument designed fo	research project, we are seeking to extend a formal invitation to or this thesis project.
Your participation in this academic endeavor is highly valued and a any further information or have questions regarding this invitation	appreciated. Should you require n, please do not hesitate to contact
us de eman.	
Yours sincerely,	
Jan	
Assoc. Prof. Chowwalit Chookhampaeng Dean, Faculty of Education, Mahasarakham University	
trian and and and and a start	

Education is GROWTH



79/2 Muang, Maha Sarakham, 44000, THAILAND Tel/fax +66 43 713 174 Email: cia.edu@msu.ac.th

Center for International Affairs

MHERSI No. 0605.5 (2) / CL643

Date: February 14, 2024

To: Prof. Yu Kullong Baiji University of Arts and Sciences, China

Subject: Thesis Reviewer Invitation

Our student, Ms. Lyu Xianli, student ID 64010564008 majoring in the Ph.D. Exercise and Sports Science program is currently undertaking a research project titled "The Effect of Sports Participation, Social Capital to the Subjective Well-being" under the guidance of Dr. Napatsawan Thanaphonganan.

To ensure the successful execution and the highest quality of this research project, we are seeking your valuable expertise and experience. Therefore, I am delighted to extend a formal invitation to you to serve as a reviewer for the research instrument designed for this thesis project.

Your participation in this academic endeavor is highly valued and appreciated. Should you require any further information or have questions regarding this invitation, please do not hesitate to contact us be email.

Yours sincerely,

Assoc. Prof. Chowwallt Chookhampaeng Dean, Faculty of Education, Mahasarakham University

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79/2 Muang, Maha Sarakham, 44000, THAILAND Tel/fax +66 43 713 174 Email: cia.edu@msu.ac.th

Center for International Affairs

MHERSI No. 0605.5(2) / CL643

Date: February 14, 2024

To: Prof. Shao Xiaojun Shaanxi Xueqian Normal University, China

Subject: Thesis Reviewer Invitation

Our student, Ms. Lyu Xianli, student ID 64010564008 majoring in the Ph.D. Exercise and Sports Science program is currently undertaking a research project titled "The Effect of Sports Participation, Social Capital to the Subjective Well-being" under the guidance of Dr. Napatsa wan Thanaphonganan.

To ensure the successful execution and the highest quality of this research project, we are seeking your valuable expertise and experience. Therefore, I am delighted to extend a formal invitation to you to serve as a reviewer for the research instrument designed for this thesis project.

Your participation in this academic endeavor is highly valued and a ppreciated. Should you require any further information or have questions regarding this invitation, please do not hesitate to contact us be email.

Yours sincerely,

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Assoc. Prof. Chowwalit Chookhampaeng Dean, Faculty of Education, Mahasarakham University

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FACULTY OF EDUCATION MAHA SARAKHAM UNIVERSITY	79/2 Muang, Maha Sarakham, 44000, THAILAND Tel/fax +66 43 713 174 Email: cia.edu@msu.ac.th
Center for International Affairs	
MHERSI No. 0605.5 (2) / CL643	Date: February 14, 2024
To: Prof. Liu Changjiang	
Xi'an Jiaotong University, China.	
Subject: Thesis Reviewer Invitation	
Our student Ms. Lyu Xianli, student ID 64010564008 majoring in t	he Ph.D. Everrise and Sports
Science program is currently undertaking a research project titled ' Social Capital to the Subjective Well-being" under the guidance of	The Effect of Sports Participation, Dr. Napatsa wan Thana phonganan.
To ensure the successful execution and the highest quality of this n	esearch project, we are seeking
your valuable expertise and experience. Therefore, I am delighted you to serve as a reviewer for the research instrument designed for	to extend a formal invitation to r this thesis project.
Your participation in this academic endeavor is highly valued and a any further information or have questions regarding this invitation.	p <mark>prec</mark> iated. Should you require , p <mark>leas</mark> e do not hes <mark>itate</mark> to contact
us be email.	
Yours sincerely,	
fre	
Assoc. Prof. Chowwalit Chookhampaeng	
Mahasarakham University	
Education is GROWTH	
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	79/2 Muang, Maha Sarakham, 44000, THAILAND Tel/fax +66 43 713 174 Email: cia.edu@msu.ac.th
Center for International Affairs	
MHERSI No. 0605.5 (2) / CL643	Date: February 14, 2024
To: Prof. Chen Shanping	
Xi'an Jiaotong University, China.	
Subject: Thesis Reviewer Invitation	
Our student, Ms. Lyu Xianli, student ID 64010564008 majoring in Science program is currently undertaking a research project titled Social Capital to the Subjective Well-being" under the guidance o	the Ph.D. Exercise and Sports "The Effect of Sports Participation, f Dr. Napatsa wan Tha naphonganan.
To ensure the successful execution and the highest quality of this your valuable expertise and experience. Therefore, I am delighted you to serve as a reviewer for the research instrument designed for	research project, we are seeking to extend a formal invitation to or this thesis project.
Your participation in this academic endeavor is highly valued and a any further information or have questions regarding this invitation us be email.	appreciated. Should you require a, please do not hesitate to contact
Your sincerely	
Tours since ety,	
J se	
Assoc. Prof. Chowwalit Chookhampaeng Dean, Faculty of Education,	
Assoc. Prof. Chowwalit Chookhampaeng Dean, Faculty of Education, Mahasarakham University	
Assoc. Prof. Chowwalit Chookhampaeng Dean, Faculty of Education, Mahasarakham University	
Assoc. Prof. Chowwalit Chookhampaeng Dean, Faculty of Education, Mahasarakham University	
Assoc. Prof. Chowwalit Chookhampaeng Dean, Faculty of Education, Mahasarakham University	







79/2 Muang, Maha Sarakham, 44000, THAILAND Tel/ťax +6643 713 174 Emaik cia.edu@msu.ac.th

Center for International Affairs

MHERSI No. 0605.5 (2) / CL624

Date: February 14, 2024

To: Whom it May Concern Baota District, Yan'an City, Shanxi Province, China

Subject: Data Collection Permission Request

Our student, Ms. Lyu Xianli, student number 64010564008, majoring in the Ph.D. Exercise and Sport Science Program is currently undertaking a research project titled "The Effect of Sports Participation, Social Capital to the Subjective Well-being" under the guidance of Dr. Napatsawan Thanaphonganan.

To ensure the success and quality of this project, we are seeking your permission to allow our student to process data collection within your institution.

The details of the data collection are as follows:

Thesis title: The Effect of Sports Participation, Social Capital to the Subjective Well-being The period of data collection: February to March 2024

We believe that your institution provides a valuable environment and resources that are essential for the successful execution of this research. The data collection process will be carried out diligently and with the utmost respect for your institution's policies and procedures. We acknowledge that the student has made the necessary preparations, including obtaining the Thesis title approval from our institution.

Should you require any further information or clarification regarding this permission, please feel free to contact us be email.

Yours sincerely,

Assoc. Prof. Chowwalit Chookhampaeng Dean, Faculty of Education, Mahasarakham University

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FACULTY OF EDUCATION MAHASARAKHAM UNIVERSITY	79/2 Muang, Maha Sarakham, 44000, THAILAND Tel/fax +66 43 713 174
	Email: cia.edu@msu.ac.th
Center for International Affairs	
MHERSI No. 0605.5 (2) / CL624	Date: February 14, 2024
To: Whom it May Concern	
Ankang University, Hanbin District, Ankang City, Shanyi Province, China	
Annual Ext, sharin Fronnee, enna	
Subject:	
Data Collection Permission Request	
Our student, Ms. Lyu Xianli, student number 64010564008, major	ing in the Ph.D. Exercise and Sport
Science Program is currently undertaking a research project titled Participation. Social Capital to the Subjective Well-being" under t	"The Effect of Sports the guidance of Dr. Napatsawan
Thanaphonganan.	9
To ensure the success and quality of this project, we are seeking y	our permission to allow our
student to process data collection within your institution.	
The details of the data collection are as follows:	
There titles The Effect of Search Participation Social Capital to the	Subjective Well being
The period of data collection: February to March 2024	e Subjective Well-being
We believe that your institution envides a valuable environment	and some work that are exceptial
for the successful execution of this research. The data collection p	rocess will be carried out diligently
and with the utmost respect for your institution's policies and pro-	cedures. We acknowledge that the
institution.	the mesis the approval from our
Should you require any further information or clarification regardi to contact us be email.	ng this permission, please feel free
Yours sincerely,	
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Assoc. Pmf. Chowwalit Chookhampaeng	
Dean, Faculty of Education,	
Mahasarakham University	
Education is GRO WTH	
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## APPENDIX 8 Sample photos of questionnaire survey and sports intervention experiment



Figure 6 Train assistants to assist in issuing questionnaires









## Figure 7 Offline questionnaire survey pictures



Figure 8 Pay close attention to the development of online questionnaire survey



Figure 9 Before the experiment intervention, inform the assistant of the precautions and requirements of the intervention experiment



Figure 10 Pre-test and sports knowledge presentation



Figure 11 Table tennis in sports intervention







Figure 12 Badminton sports intervention





Figure 13 Sports intervention for basketball projects



## BIOGRAPHY

NAME	Xianli Lyu
DATE OF BIRTH	March 11,1978
PLACE OF BIRTH	Xi'an City, Shaanxi Province, China
ADDRESS	92 Yucai Road,Hanbin District,Ankang City, Shaanxi <mark>Pr</mark> ovince,China
POSITION	Professor
PLACE OF WORK	Ankang <mark>Un</mark> iversity, 92 Yucai Road, Hanbin District, Ankang City, Shaanxi Province, China
EDUCATION	1997-2001 Bachelor Programs in Physical Education, Hanzhong Normal University.
	2005-2008 Master Programs in Physical Education and Training, Tianjin University of Sport.
Research grants & awards	2021-2024 Doctor of Philosophy, Exercise and Sport Science, Mahasarakham University Shaanxi Provincial Philosophy and Social Science Research Foud: Research on the influence of physical exercise on adolescent happiness
	Shaanxi Provincial Philosophy and Social Science Research Foud: Study on the relationship between fitness status, life satisfaction and social attitude of adults in Shaanxi Province and its application countermeasures Shaanxi Provincial Education Department Research Fund: Comparative study on social adaptation and coping styles
	Shaanxi Provincial Sports Bureau research Fund: Research
Wini	on present situation and countermeasure of urban community sports service in southern Shaanxi Province Shaanxi Provincial Sports Bureau research Fund: Research on physical exercise consciousness and behavior of urban residents in southern Shaanxi Province
Research output	Research paper 1: The influence of physical exercise type on mental health of the elderly Research paper 2: What kind of happiness concept is
	needed in today's society Research paper 3: Investigation on social adaptability of college students in southern Shaanxi Research paper 4: Investigation on physical exercise and social adaptability of college students in southern Shaanxi Province

Research paper 5: Analysis of Individual consumption behavior in Sports economy -- Transformation of sports attention into sports consumption

Research paper 6: Discuss the reasons affecting people's sports consumption and solutions Research paper 7: Effects of garcinia cambogia extract on lipid metabolism and body morphology of obese female college students

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