

# Analysis of the influencing factors of left-behind children's mental health based on python program--Anhui Province as an example

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## ABSTRACT

With the rapid development of social economy, the number of farmers going to the cities to work has increased, leading to the problem of left-behind children in rural areas. Left-behind children face physical and mental health challenges due to the lack of parental accompaniment. The state has introduced policies to improve their environment, but uneven educational resources, psychological problems and lagging rural development remain to be solved. Based on the data of left-behind children in Anhui Province during the seven-year period of 2016-2022, this paper collates relevant literature and then empirically analyses the factors affecting the number of left-behind children and their mental health by means of multiple linear regression models. The study shows that the number of left-behind children has a strong negative correlation with economic growth and education problems, which means that improving the economic and educational conditions may help reduce the number of left-behind children, while the family environment and campus environment have a significant positive effect on the mental health of left-behind children. Finally, on the basis of the empirical findings, policy initiatives such as promoting economic growth and employment opportunities, improving the distribution of educational resources, strengthening family care and companionship, optimising the campus environment and teacher-student relationship, and establishing a peer support mechanism and are proposed in the hope of creating a better environment for left-behind children to grow up, and then promoting their psychological health development.

## KEYWORDS

left-behind children; Mental health; Anhui Province; Multiple linear regression

## 1. INTRODUCTION

### 1.1. Background

Since the reform and opening up, along with the rapid growth of China's society and economy, a large number of young and middle-aged farmers have flocked to the cities in search of better development opportunities, and have no choice but to leave their families and children in the countryside. As a result, the problem of left-behind children in rural areas has become more and more prominent, and their physical and mental health has attracted the attention of the society and the government's deep concern. We need to work together to create a healthier and happier environment for left-behind children. According to the China Child Welfare and Protection Policy Report 2021, the '14th Five-Year Plan' period is an important opportunity to promote child welfare and protection, with the goal of building a modernised child welfare and protection system that is professional, precise, intelligent and of high quality, and with the aim of innovating child welfare and protection policies and systems, strengthening child welfare and protection facilities, and establishing a professional child welfare and

protection system for children. The focus is on innovating child welfare and protection policies and systems, enhancing the supply capacity of child welfare and protection facilities, establishing a specialised child social worker system for children, and building an intelligent platform for child welfare and protection, with a view to narrowing the gap between urban and rural areas as well as regions. According to the latest data from the Ministry of Civil Affairs, in 2021, there will be about 6.43 million left-behind children in rural areas across the country, and these left-behind children have prominent physical and mental health problems. In recent years, the prosperous development of rural economy has strongly promoted the enhancement of rural culture and education, which makes left-behind children show a positive and optimistic side in character building. They not only have good social-emotional ability and can handle interpersonal relationships well, but also show strong independent ability and can deal with various challenges in life on their own. At the same time, the environment has also brought about certain impacts, their learning ability is insufficient, their self-confidence is insufficient, and their interaction and cognitive abilities are relatively lacking. China attaches great importance to left-behind children, both physically and mentally, as the top priority of youth work.

The problem of left-behind children is a social problem that has continued to stand out in recent years, and children in this period are in a critical period when they need to be correctly guided in their thinking and set up good values. However, most of the information shows that many left-behind children are unable to get guidance and help from their parents in their ideological understanding as well as their values, and they grow up without their parents' emotional attention and care, which produces deviations in values and abnormalities in their personality and psychological development. Development abnormality. A large part of them show inner closure, emotional indifference, low self-esteem and cowardice, withdrawn behaviour, introversion, lack of love and communication initiative. Secondly, a small number of left-behind children may have some resentment or even radical ideas towards their parents, and some of them may be alienated from their parents after they return home, leading to emotional separation. In short, the mental health of left-behind children is generally problematic.

## **1.2. Significance Of The Study**

### **(1) Theoretical significance**

This paper analyses the number and basic conditions of left-behind children in Anhui Province through python program, and researches the influencing factors of the number of left-behind children and the mental health of left-behind children in Anhui Province, which supplements the theoretical research on the influencing factors of the number of left-behind children and the mental health of left-behind children in China. On the basis of python program algorithm, data visualisation and quantitative analysis are carried out in combination with the data obtained from the research, which provides data support for the theoretical research on the number of left-behind children and the influencing factors of left-behind children's mental health.

### **(2) Practical significance**

This paper deeply analyses the number of left-behind children in Anhui Province and explores the key factors affecting their number. On this basis, it further studies the basic conditions of left-behind children in Anhui Province, including the local education situation, mental health conditions and family relationships, with a view to identifying the core elements influencing left-behind children's mental health problems. Through the comparative analysis of the number of left-behind children and their basic conditions, this paper provides practical countermeasures and suggestions for improving the mental health problems of left-behind children in Anhui Province, aiming to help left-behind children grow up in a comprehensive and healthy way.

### 1.3. Research Content

In the process of in-depth research on the influencing factors of left-behind children's mental health, this paper firstly, on the basis of theoretical analysis, used Python data mining technology to carry out word cloud map analysis on a large number of related texts, identifying the key reasons affecting left-behind children's mental health, which provides an important basis for the subsequent quantitative analysis. Subsequently, this paper selected the data of Anhui Province from 2016 to 2022 as the research object, and carried out quantitative analysis for left-behind children by using Python technology to deeply excavate the laws and trends behind the data, and visually demonstrated the various factors affecting the number of left-behind children by using data visualisation technology. At the same time, in order to understand the mental health of left-behind children more comprehensively, this paper also collects data with the help of questionnaire research. Through in-depth analysis of the questionnaire results, we further explore the specific reasons affecting the mental health of left-behind children, and based on the results of the above analyses, this paper puts forward a series of targeted countermeasures and suggestions to improve the mental health of left-behind children.

## 2. LITERATURE REVIEW

China's concern for left-behind children has always been high, in the early days of reform and opening up, due to the substantial economic development, the number of left-behind children has risen dramatically, the national leaders have made a lot of emergency decisions in this regard, and the problem of left-behind children in China has been greatly improved.

Tianqing He [2020] suggests that left-behind children are a social phenomenon under the economic development of China's rural areas, mainly due to the fact that young people go out to work, resulting in left-behind children being taken care of by the elderly at home. Due to the lack of parental care and education for a long time, left-behind children are prone to sensitivity and low self-esteem in their psychological growth [1]. Yang Shiming [2020] proposed to improve the psychological quality of left-behind children, cultivate their good psychological qualities, fully develop their psychological potential, and lay the foundation for their healthy growth and happy life [2]. Hu Xiaomei, Zhang Tianshan [2020] proposed that while improving the education method, we should also improve the psychological quality of left-behind children, cultivate their good psychological quality, fully develop their psychological potential, and lay the foundation for their healthy growth and happy life [3]. Li Menglong, Ren Yujia, and Yang Jiao [2020] suggested that the psychological problems of left-behind children cannot be completely solved only through pure education. And some scholars proposed the method of physical exercise to help left-behind children to solve the psychological aspects of the problem, and produced good results [4]. Zhang Tingpimei and Shi Zhilei [2021] used the counterfactual method to analyse the impact of parents' work outside the home on the psychological health of left-behind children in rural areas from the perspective of the theory of parental absence, and explored in depth the mechanism of the role of parents' work outside the home on the social psychological dimension of left-behind children. It was found that compared with fathers, mothers working outside the home were more likely to cause left-behind children to develop a sense of self-aloneness [5]. Dai, Binrong, Lu, Fang, and Fu, Shuying [2022] suggested that the CPC Central Committee and the State Council issued the 'Healthy China 2030' M Planning Outline, which takes children and adolescents' mental health as an important part of the construction of a healthy China. Due to factors such as long-time parent-child separation, lack of care and supervision by temporary guardians, and limited resources and protection provided by schools and communities, rural left-behind children are more prone to various psychological problems in their growth process [6]. Fu Guijing [2022] proposed that left-behind children have more character defects, affected values, inner imbalance, deviation of self-perception, and obstacles in interpersonal communication, and proposed

the solution strategies of strengthening school mental health education, conducting regular mental health education classes, and creating a good family education environment [7].

To sum up, there has been some research on the psychological problems of left-behind children in China. In the face of the psychological situation of left-behind children, our scholars and the government have put forward corresponding measures to improve the problem. But it still hasn't been completely solved. Therefore, this paper collates and analyses the information from the relevant research results to obtain the theoretical analysis and detailed explanation of the causes related to the psychological problems of left-behind children in Anhui Province. Finally, some feasible solutions are provided through the analysis of the data findings.

### **3. DATA SOURCES AND INNOVATIONS**

#### **3.1. Data Sources**

In the research of this paper, various data sources such as EPS database, statistical yearbook, questionnaire and public documents of Anhui Provincial Bureau of Statistics are used. Among them, the EPS database and statistical yearbook provide detailed data on the gross national product, education expenditure and mobile population; the questionnaire directly collects the real thoughts and needs of left-behind children and their families; and the public documents of the Anhui Provincial Bureau of Statistics provide information on the number of left-behind children from 2016 to 2022. These data sources complement each other and provide comprehensive and accurate data support for our study.

#### **3.2. Points Of Innovation**

##### **(1) In terms of research perspective**

At present, China has conducted a lot of research and analysis on the problem of left-behind children and put forward many feasible suggestions and countermeasures, but these suggestions and countermeasures can only improve the life and education of left-behind children, and there is not a lot of research on the psychological aspect. Therefore, this paper is aimed at this situation, taking left-behind children in Anhui Province as an example, to investigate, collate and analyse the psychological situation of left-behind children.

##### **(2) Research Methods**

There are many theoretical researches of current scholars on the problem of left-behind children, but there are fewer researches on the problem of left-behind children through python algorithm. Compared with the existing theoretical studies, this paper iteratively innovates on data analysis and comprehensively analyses the situation of left-behind children by using python data mining technology. This method can quickly and accurately get the data we need and process it. It allows us to find the deeper reasons more precisely and propose feasible solutions.

##### **(3) Quantitative analysis of data**

At present, most of the analyses of left-behind children's mental health remain at the level of qualitative analysis, which can reveal some common problems and phenomena, but it is often difficult to accurately reflect the significance of the influencing factors and their interaction. In order to gain a deeper understanding of the complexity and multiplicity of left-behind children's mental health, this paper tries to adopt the research method of data visualisation to reveal the key factors affecting left-behind children's mental health in a more intuitive and quantitative way.

## 4. ANALYSIS OF RELEVANT INFLUENCING FACTORS OF LEFT-BEHIND CHILDREN IN ANHUI PROVINCE

### 4.1. Model Construction

In order to effectively help us understand and quantify the influence of multiple potential factors on left-behind children, and to avoid focusing on a single factor while ignoring other possible important factors, we consider these influencing factors comprehensively and deeply by means of multivariate linear regression analyses, and get the degree of influence of each independent variable on the influence of the dependent variable, so that we can identify which factors have a more significant influence on the mental health of left-behind children, and provide a scientific basis for the development of targeted measures Provide scientific basis for the formulation of targeted measures. The established multiple linear regression model is shown in Equation 1.

$$Y = \alpha_0 + \alpha_1x_1 + \alpha_2x_2 + \alpha_3x_3 + \varepsilon \quad (1)$$

Where Y represents the dependent variable, X represents the independent variable, represents the correlation coefficient, and represents the residual value.

### 4.2. Factors Affecting The Number Of Left-Behind Children

Through reviewing the academic results of related scholars, it is learnt that the factors affecting the number of left-behind children mainly include the local economic development, the level of education and the situation of the local floating population. In this paper, the values of local national economic value, education expenditure and mobile population are used to represent the specific influence of three factors: local economic development level, education level and mobile population. Descriptive statistics, correlation analysis and residual test are used to analyse the factors affecting the number of left-behind children.

#### 4.2.1. Descriptive Statistics

In order to understand the influence of local economic development, the level of education and the situation of the local floating population on the number of left-behind children, descriptive statistics were analysed. Table 1 gives the results of the descriptive statistical analysis of the analysis related to left-behind children in Anhui Province during the nine years from 2016 to 2022.

**Table 1.** Descriptive statistics results of variables

	count	mean	std	min	25%	50%	max
lbc	7	71.6286	29.4739	33	49.3	73.6	112
gdp	7	35033.0357	7990.6391	24407.62	28512.41	37113.98	45045
ef	7	1635.5304	289.1279	1235.7931	1438.1672	1637.5812	2053.2087
fp	7	8.5001	2.7452	4.5	7.005	8.0949	12.8582

According to Table 1, the mean of the number of children left behind is 71.6286, the standard deviation is 29.4739, the minimum value is 33, and the maximum value is 112. The large difference between the standard deviation as well as the maximum value indicates a wide range of fluctuations in the number of children left behind over time with significant differences. The mean of economic growth is 35033.0357, the standard deviation is 7990.6391, the minimum value is 24407.62, and the maximum value is 45045. This indicates that areas with slower economic growth may face more migrant labour phenomenon, which may lead to an increase in the number of left-behind children. The mean of education problems is 1635.5304, the standard deviation is 289.1279, the minimum value is 1235.7931, and the maximum value is 2053.2087. The mean of education problems is at a medium level, and the standard deviation is relatively small, which indicates that the range of

fluctuation of the education problems is relatively small, but there are still some differences. The balanced distribution of educational resources and the improvement of quality may have a positive effect on reducing the number of left-behind children. Population mobility has a mean of 8.5001, a standard deviation of 2.7452, a minimum value of 4.5, and a maximum value of 12.8582. The low mean and moderate standard deviation of population mobility indicate that population mobility varies over time, but the overall range of fluctuation is relatively limited. Population mobility may be affected by a variety of factors, such as economic growth, employment opportunities and educational resources, which in turn have an impact on the number of children left behind.

#### 4.2.2. Correlation Analysis

In order to gain a deeper understanding of the intrinsic patterns of the data and the relationships between the variables, explore the degree of association between the number of children left behind and the influencing factors, and quantify the strength of this relationship. This paper carries out correlation analysis analysis, which is committed to understanding the role of these four variables, so as to lay a solid foundation for the later research. The results obtained in this paper through python software are shown in Table 2.

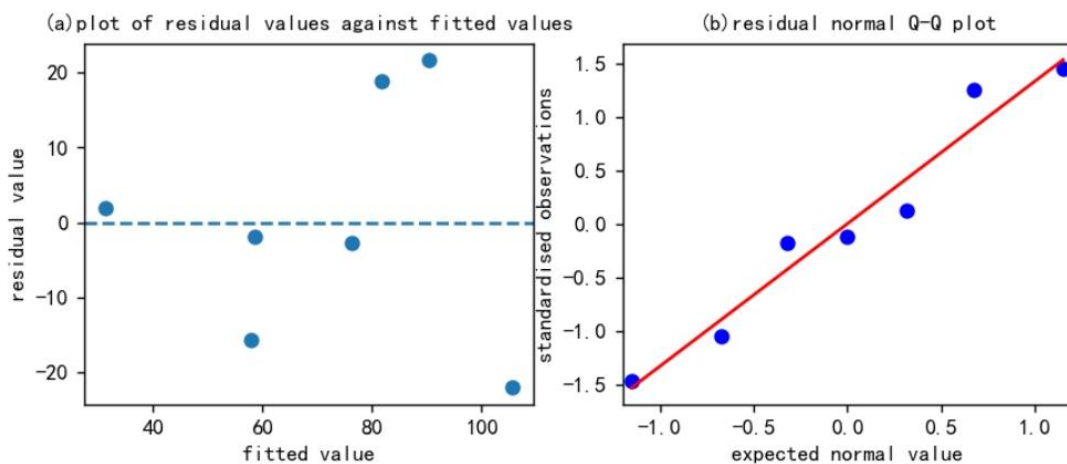
**Table 2.** Results of correlation coefficients of variables

	lbc	GDP	ef	fp
lbc	1	-0.762	-0.8038	-0.3261
GDP	-0.762	1	0.9873	0.5441
ef	-0.8038	0.9873	1	0.5396
fp	-0.3261	0.5441	0.5396	1

According to Table 2, it can be seen that the correlation coefficients between lbc and the other three variables are negative, showing a strong negative correlation. This means that the number of left-behind children may decrease when there is economic growth, improvement in educational problems and population mobility; this may be because economic growth, better educational resources and educational environment may provide more employment opportunities, attracting parents to return to their hometowns or travelling to the cities to work, thus reducing the number of left-behind children.

#### 4.2.3. Residual Test

In order to analyse the differences between the observed values and the predicted values of the model, assess the fitting effect of the model, and make corresponding adjustments and improvements to the model to improve its predictive accuracy and interpretability. We carry out the residual test, and the results are shown in Figure 1.



**Figure 1.** Residual test results

As shown in Figure 1, the residuals are uniformly distributed near the 0-axis, and the model does not have problems such as heteroskedasticity and can describe the data well.

### 4.3. Influencing Factors Of Left-Behind Children's Mental Health

Combined with the academic results of related scholars, this paper takes the four factors of gender, family environment, campus environment and friendship environment as the direction of researching the factors affecting the mental health of left-behind children, and adopts the method of questionnaire statistics, with a total of 150 questionnaires, of which 102 are valid questionnaires. By analysing the specific data generated from the questionnaires, the relevant factors affecting left-behind children's mental health were specifically analysed.

#### 4.3.1. Descriptive Statistics

In order to understand the influence of gender, family environment, campus environment and friendship environment on left-behind children's mental health, descriptive statistics were analysed. Table 3 gives the results of descriptive statistical analysis of the 102 questionnaires on the factors of gender, family environment, campus environment and dating environment.

**Table 3.** Descriptive statistics of variables

	count	mean	std	min	25%	50%	75%	max
mh	102	4.0196	1.3422	1	3	4	5	6
sex	102	1.5686	0.4977	1	1	2	2	2
family	102	7.6078	1.3799	4	7	8	9	11
classmate	102	6.8627	1.7005	2	6	7	8	10
school	102	7.2353	1.6541	4	6	7	8.75	10

According to Table 3, the mean of left-behind children's mental health is 4.0196, the standard deviation is 1.3422, the minimum value is 1, and the maximum value is 6. The mean of mental health is close to 4 (the higher the score means the better the mental health, and the range of the score is from 1 to 6), and the average of left-behind children's mental health is close to the middle level, and the fluctuation of the mental health has the moderate range, which indicates that there are differences in mental health status among different left-behind children. The average mental health status of left-behind children is close to medium, and the range of fluctuation of mental health is moderate, indicating that there are differences in mental health status between different left-behind children. The mean of gender is 1.5686, the standard deviation is 0.4977, the minimum value is 1, and the maximum value is 2. This means that there may be more females than males in the sample, but the overall distribution is more balanced. The mean of home environment is 7.6078, the standard deviation is 1.3799, the minimum value is 4, and the maximum value is 11. The mean of home environment is relatively high, and the standard deviation is moderate, which means that the home environment in the sample is generally better, but there are some differences. Campus environment had a mean of 7.2353, a standard deviation of 1.6541, a minimum value of 4, and a maximum value of 10. Campus environment also had a relatively high mean and was similar to the home environment, but had a slightly larger standard deviation, suggesting that campus environments were slightly more varied than home environments. The mean for peer relationships was 6.8627, standard deviation was 1.7005, minimum value was 2, and maximum value was 10. The mean for peer relationships was also relatively high, with a standard deviation similar to that of the campus environment, suggesting that peer relationships are generally better, but again, there is some variation.

#### 4.3.2. Correlation Analysis

In order to gain a deeper understanding of the intrinsic patterns of the data and the relationships between the variables, the degree of association between the mental health of the left-behind children and the influencing factors is explored, and the strength of this relationship is quantified. This paper

carries out correlation analysis, which is dedicated to understanding the role between these four variables, thus laying a solid foundation for the later research. The results obtained in this paper through python software are shown in Table 4.

**Table 4.** Results of correlation coefficients of variables

	mh	sex	family	classmate	school
mh	1	-0.0169	0.1966	0.0359	0.2922
sex	-0.0169	1	-0.0181	-0.1408	0.0283
family	0.1966	-0.0181	1	-0.1455	0.0105
classmate	0.0359	-0.1408	-0.1455	1	0.1559
school	0.2922	0.0283	0.0105	0.1559	1

According to Table 4, the correlation coefficient between left-behind children's mental health and gender is -0.0169, which indicates that the correlation between gender and left-behind children's mental health is very weak and almost negligible. The correlation coefficient between left-behind children's mental health and family environment is 0.1966, showing a positive correlation. This indicates that family environment has a positive impact on the mental health of left-behind children. A more positive and supportive family environment may help left-behind children maintain good mental health. The correlation coefficient between left-behind children's mental health and peer relationships is 0.0359, which is a positive correlation, but the correlation coefficient is small, indicating that peer relationships have a more limited effect on left-behind children's mental health. This may be due to the fact that peer relationship is only one of the many factors affecting left-behind children's psychological health, and it may be constrained by other factors. The correlation coefficient between left-behind children's psychological health and school environment is 0.2922, showing a relatively strong positive correlation. This indicates that the advantages and disadvantages of the campus environment have a relatively significant impact on the psychological health of left-behind children. A positive, safe and harmonious campus environment can help improve the psychological health of left-behind children.

Therefore, in the practice of improving the mental health of left-behind children, emphasis should be placed on the optimisation of the family and campus environments. For example, family education guidance can be strengthened to enhance parents' educational awareness and ability; at the same time, campus facilities can be improved, teacher-student relationships strengthened, and a positive and healthy campus atmosphere created. These measures can help create a more favourable growth environment for left-behind children, and thus promote their psychological health development.

#### 4.3.3. Benchmark regression analysis

In order to understand the results of influencing factor selection more deeply and explore the significance between left-behind children's mental health and influencing factors, this paper carries out benchmark regression analysis, and the results obtained through python software are shown in Table 5.

**Table 5.** Results of benchmark regression analysis of variables

	coef	std	t	P
Intercept	0.8698	1.16	0.75	0.455
sex	-0.0515	0.259	-0.199	0.843
family	0.1904	0.094	2.034	0.045
classmate	0.0132	0.078	0.17	0.865
school	0.2338	0.078	2.988	0.004
F-statistic		3.42		
Prob		0.0116		

According to Table 5, the coefficient of gender is -0.0515, the t-value is -0.199, and the p-value is 0.843, which means that the effect of gender on the mental health of the left-behind children is not significant in the current model. The coefficient of family environment is 0.1904, t-value is 2.034, P-value is 0.045. It shows that the family environment has a significant positive effect on left-behind children's mental health. This means that the better the family environment, the better the mental health of left-behind children may be.

The coefficient of classmates' relationship is 0.0132, t-value is 0.17, P-value is 0.865. Therefore, we can't think that classmates' relationship has a significant effect on left-behind children's mental health. The coefficient of campus environment is 0.2338, the t-value is 2.988, and the P-value is 0.004. It means that campus environment has a significant positive effect on left-behind children's psychological health. This means that a good campus environment helps to improve the psychological health of left-behind children. The F-value is 3.42, and the corresponding P-value is 0.0116, which is less than 0.05. This indicates that the model as a whole is significant, i.e., at least one of the independent variables has a significant effect on the psychological health of left-behind children. Afterwards, more relevant data will be further collected and consideration will be given to the inclusion of more possible independent variables to enhance the stability and reliability of the model.

## **5. CONCLUSIONS AND SUGGESTIONS**

### **5.1. Promote Economic Growth And Employment Opportunities**

The government should increase economic support for Anhui Province, promote industrial upgrading and balanced regional development, provide more employment opportunities for local residents, and reduce the demand for migrant labour, thus reducing the number of left-behind children.

### **5.2. Improve The Distribution Of Educational Resources**

The government should increase investment in rural education, improve school facilities, raise the quality of teaching, and narrow the gap between urban and rural education. At the same time, social forces are encouraged to participate in rural education to provide more quality educational resources for left-behind children.

### **5.3. Strengthen Family Care And Companionship**

Parents should go home as much as possible to accompany their children and pay attention to their children's growth and mental health. For parents who can't go home, they can keep in touch with their children through telephone, video and other means, so that the children can feel the love and warmth of the family.

### **5.4. Optimise Campus Environment And Teacher-Student Relationship And Establish Peer Support Mechanism**

Schools should create a good campus atmosphere, strengthen teacher-student communication and exchange, and pay attention to the mental health of left-behind children. Encourage the establishment of mutual assistance mechanisms among classmates to care for and support left-behind children.

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## REFERENCES

- [1] Tianqing He. Research on the Countermeasures for the Mental Health Development of Left-Behind Children [P]. 2020 3rd International Conference on Interdisciplinary Social Sciences & Humanities Volume, 2020, 156.
- [2] Yang Shiming. Mental Health Education of Left-behind Children in Remote Mountainous Areas [J]. Research on Curriculum and Textbook Teaching (Educational Research), 2020(Z6).
- [3] HU Xiaomei, ZHANG Tianshan. Exploring the causes and solutions of left-behind children's mental health problems [J]. Basic Education Forum, 2020(25).
- [4] Li Menglong, Ren Yujia, Yang Jiao, Lei Xianyang. Effects of physical activities on social anxiety of rural left-behind children [J]. The mediating role of psychological capital, 2020(06).
- [5] Zhang Tingpimei, Shi Zhilei. A study on the impact of parents' labour outside the home on the psychological health of rural left-behind children [J]. Northwest Population, 2021(04).
- [6] Dai Binrong, Lu Fang, Fu Shuying. A study on the psychological development characteristics of rural left-behind children based on healthy China [J]. China Special Education, 2022(03).
- [7] Fu Guijing. Research on Psychological Problems and Countermeasures of Rural Left-behind Children [J]. Modern Rural Science and Technology, 2022(02).