

Research on the Influence of Family Environment on Mental Health of Junior High School Students

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Abstract. Under the catalyst of fierce competition in society, more and more teenagers have serious psychological problems. In the case that the pressure brought by school is difficult to avoid, exploring what causes the psychological problems of teenagers in the family, and trying to find a solution from it has become a topic that needs further exploration. Based on the data of the 2013-2014 school year of China Education Panel Survey, this paper uses regression models to select seventh and ninth grade students as representative research objects to judge the impact of family environment on students' mental health. The results show that for the objective conditions of the family, the students with better family economic conditions and parents' education level are less likely to have psychological problems. The only child is more likely to have depression, anxiety and other emotions than the non-only child. Furthermore, the subjective conditions of the family have a more severe psychological impact on junior middle school students, which is mainly manifested in that the harmony among family members can greatly promote the development of junior middle school students' mental health. According to the results, this study suggests that parents should try to improve the objective conditions at home, and more importantly, maintain the parent-child relationship and family atmosphere will greatly benefit the mental health growth of junior high school students.

Keywords: Family environment; mental health; junior high school students; regression models.

1. Introduction

Junior high school stage is one of the important development periods in people's life. At this stage, the child will have stronger feedback to the external environment due to the enhancement of self-awareness. In addition, this is a period of relatively heavy academic tasks, which leads to children at this stage will be more sensitive to receive negative information, and then produce depression, anxiety and other bad psychological states. According to the "China National Mental Health Development Report (2019-2020)" by the Institute of Psychology of the Chinese Academy of Sciences, about 30% of junior high school students will show depressive symptoms, and there is an upward trend [1]. This means that the psychological problems of junior high school students are urgent problems to be solved. And one of the most influential factors is the influence of family environment on junior high school students' psychological state.

Based on the above background, the mental health of junior high school students has always been an issue that scholars domestic and abroad pay attention to, so there are a lot of relevant studies. Judging from the results of multiple studies, the degree of family intimacy, parent-child relationship, family economic conditions, educational background, educational methods and so on will have a profound impact on students' psychology. In terms of family intimacy, Victoria believed that good family intimacy can improve students' ability to solve problems [2]. The research of Fu showed that a sound and harmonious family can provide a sense of security and benefit students' mental health development [3]. Fergusson found that families full of tension and conflict will directly cause children's psychological trauma, and families with poor entertainment will lead to children's high sensitivity and introversion [4]. In the parent-child relationship, Canetti found that when the degree of parental control over the child increased, the child's negative emotions increased significantly [5]. Kandel found that the increase of harmonious parent-child interaction can effectively prevent adolescents from developing depression [6]. In addition, the study of Resnick et al. showed that families whose parents had higher educational expectations for their children had a lower rate of

depression among adolescents compared with families with lower educational expectations [7]. The situation at home is different. According to domestic surveys, the imbalance of parent-child expectations, that is, the gap between teenagers' educational expectations and parents' educational expectations for children is too large, especially parents' educational expectations are higher than their own educational expectations, will lead to the negative effect of increasing psychological pressure on teenagers [8]. In terms of family economy and parents' educational background, Qian showed that the higher the educational level of parents, the lower the probability of children's anxiety [9]. At the same time, Feng concluded that students with better family conditions would have less anxiety, depression and other bad states [10]. On the contrary, Yu believed that parents' excessive strict interference or excessive protection of students' study life would cause teenagers to have psychological problems [11].

To sum up, it can be found that objective conditions in the family, such as family economy, parents' educational background, and subjective conditions such as parental relationship, parent-child relationship and educational attitude jointly affect children's mental health. Therefore, this study will use regression models to comprehensively study the family factors that affect the psychological state of junior high school students, so as to help parents establish a good family environment and improve the mental health level of junior high school students.

2. Methods

2.1. Data Source

Data from the China Education Panel Survey were used in this study. Based on the 2013-2014 school year, 28 county-level units were randomly selected nationwide with the average education level of the population and the proportion of floating population as stratified variables. Based on the school, 112 schools and 438 classes were randomly selected from the selected county-level units for investigation. After data cleaning and screening, about 16,000 valid data were finally used in this study.

2.2. Variable Selection

2.2.1 Explained variable

In the student questionnaire section of CEPS, the mental health scale was designed to ask if "in the past 7 days, you have experienced the following feelings: "depressed," "depressed," "unhappy," "life is not fun," and "sad." Then assign the options "never," "rarely," "sometimes," "often," and "always" in the order of 1 to 5. In this study, these five scores were added together to produce a mental health variable as the dependent variable of this paper. The score ranges from 5 to 25, with the lower the score, the better the mental health. After testing, the reliability coefficient of this mental health scale is 0.86, and it has been used in the research of adolescent mental health [12].

2.2.2 Explanatory variables

Parental education level: This study converts parental education level into years of schooling, which is a continuous variable. Family economic conditions: CEPS questionnaire divides family conditions into five categories and assigns values from 1 to 5 respectively. Only child: "Yes" and "no" are assigned in two categories. Parent-child interaction: The CEPS questionnaire includes the parent-child interaction question, "How often do you and your parents do the following things together?" This study will be divided into six gears according to different frequencies, and assigned values of 1 ~ 6. Parent-child relationship: Measured by the subjective judgment in the questionnaire, adding the number of parents' proximity. Parental relationship: The CEPS questionnaire sets the subjective feelings of middle school students about "whether their parents have a good relationship" and "whether their parents quarrel", which are divided into two categories according to "not so" and "yes". As table 1 shows.

Table 1. List of Variables

Variable	Logogram	Coding scheme
Emotion	Y	Continuous variable
Parental education level	x_1	Categorical variable; Education =0, primary school graduation =6, junior high school graduation =9, technical school, vocational high school =11, high school =12, junior college =15, undergraduate =16, graduate or above =19
Family economic conditions	x_2	Categorical variable; 1= very difficult, 2= relatively difficult, 3= medium, 4= relatively rich, 5= very rich
Only child	x_3	Categorical variable; 0= no, 1= yes
Parent-child interaction	x_4	Categorical variable; 0= no interaction, 1= hardly no interaction, 2= occasional interaction, 3= frequent interaction
Parent-child relationship	x_5	Categorical variable; 0= bad, 1= general, 2= good
Parental relationship	x_6	Categorical variable; 0= divorce, 1= bad, 2= general, 3= good
Education method	x_7	Categorical variable; 0= no care, 1= occasional discipline, 2= strict, 3= very strict

2.3. Method Introduction

A regression model is a mathematical model used to describe the relationship between one or more independent variables and dependent variables. In order to further explore the influence mechanism of family environment on junior high school students' mental health, this study attempts to establish different types of multiple regression models to find a model that can summarize the relationship between the above family environment factors and junior high school students' mental state to the greatest extent.

3. Results and Discussion

3.1. Correlation Analysis

It can be seen from the correlation analysis table that all independent variables pass the significance test (table 2). Among them, parents' education level, family economic situation, parent-child interaction, parent-child relationship and parental relationship were negatively correlated with students' negative emotions ($r=-0.037$, $r=-0.072$, $r=-0.191$, $r=-0.228$, $r=-0.044$, $p<0.001$). However, the severity of family education and whether the students were the only child were positively correlated with the negative emotions of the students ($r=0.049$, $r=0.031$, $p<0.001$).

Table 2. Correlation Analysis

	Y	x_1	x_2	x_3	x_4	x_5	x_6	x_7
Y	1							
x_1	-0.037**	1						
x_2	-0.072**	0.273**	1					
x_3	0.031**	0.399**	-0.185**	1				
x_4	-0.191**	0.286**	-0.222**	0.973**	1			
x_5	-0.228**	0.059**	0.040**	0.196**	0.186**	1		
x_6	-0.044**	0.010	-0.011**	0.294**	0.285**	0.337**	1	
x_7	0.049**	-0.029**	0.028**	-0.003	-0.008	0.121**	0.192**	1

Note: **At the 0.01 level (two-tailed), the correlation is statistically significant.

This indicates that the higher the education level of parents, the better the family economic status, and the more harmonious the family members can help prevent the negative emotions of middle school students. The increasingly strict parental restrictions and the environment of only child may make junior high school students more prone to depression, anxiety and other adverse psychological states.

According to the correlation analysis table, family environment has a significant impact on junior high school students' mental health. In order to further explore the influence mechanism of family environment on junior high school students' mental health, this paper tried to establish a multiple regression model for regression analysis.

3.2. Multiple Linear Regression

Multiple linear regression models are linear regression models with multiple explanatory variables. It is used to explain the linear relationship between the explained variable and multiple other explanatory variables. This study hypothesized the relationship between students' mental health (Y) and influencing factors ($x_1, x_2, \dots, x_7$) there is a linear correlation, then a regression model can be established, as shown in formula (1).

$$E(Y) = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \dots + \beta_7 x_7 + \varepsilon \quad (1)$$

Where β_0 is a constant term, ε is the random error term.

Table 3. Regression coefficient table

	B	S.E.	Beta	T	significance	VIF
Y	15.134	0.260		58,184c	0.000	
x_1	-0.034	0.011	0.027	3.012	0.003	1.297
x_2	-0.316	0.058	-0.045	-5.430	<0.001	1.108
x_3	0.119	0.070	0.015	1.698	0.009	1.217
x_4	-0.794	0.049	-1.41	-16.063	<0.001	1.230
x_5	-1.819	0.076	-1.98	-23.879	<0.001	1.086
x_6	-0.427	0.071	0.048	6.045	<0.001	1.001
x_7	0.017	0.050	0.003	0.334	0.738	1.053

Table 3 reports the regression test results of family environment on junior middle school students' mental health. First of all, the VIF of all variables is less than 5, so it can be determined that there is no multicollinearity between the independent variables. The education method did not pass the significance test, so regrettably, this study could not consider its influence at this stage. In addition, all other variables achieved $P < 0.01$, which was significant at 1% level.

As can be seen from the chart, parental education level (-0.034), family economic status (-0.316), parent-child relationship (-0.794), parent-child interaction (-1.819) and parental relationship (-0.427) were all negatively correlated with the increase of mental health problems in middle school students. It can be seen that the effect of objective family conditions on students' psychology is lower than that of competent family environment. In the subjective family conditions, parent-child relationship has the most obvious effect on the promotion of students' mental health. Only children showed a slight positive correlation, and only children were 1.119 times more likely to have depression than non-only children. Based on the above data, the author can get a multi-layer linear regression equation:

$$E(Y) = 15.134 - 0.034x_1 - 0.316x_2 + 0.119x_3 - 0.794x_4 - 1.819x_5 - 0.427x_6 + \varepsilon \quad (2)$$

It can be seen from the normal P-P plot of the regression standardized residuals that the scatter data of the residuals are close to the diagonal (Figure 1). It shows that the residuals in this paper conform to normal distribution.

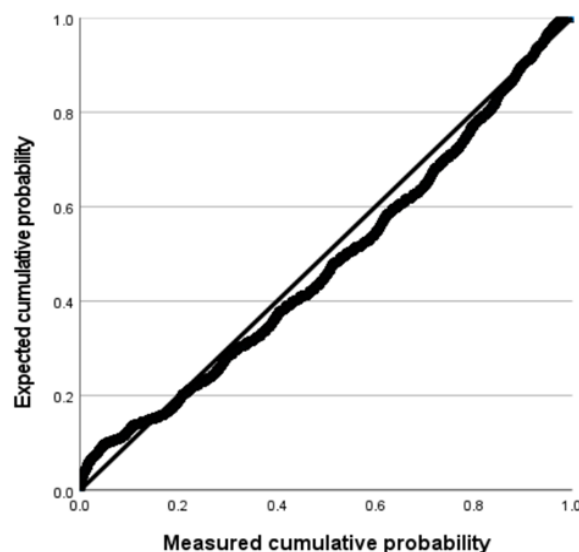


Fig. 1 Normal P-P plot of the regression normalized residuals

The multivariate correlation coefficient R of this study is 0.381, and the adjusted R^2 is 0.144. The prediction value of this model is low, and there is still room for further optimization (table 4).

Table 4. Model Summary

R	R^2	Adjusted R^2	Error in standard estimates
0.381	0.145	0.144	3.842

3.3. Logistic Regression

The explanatory variable, that is, the mental health degree of junior high school students, is divided into two categorical variables (0= healthy, 1= unhealthy). A score of less than 15 is considered healthy, and a score of 15 or higher is considered mentally unhealthy.

This part tries to analyze the influence of family environment on mental health by using logistic regression model. With "mental health =0" as the reference group, the following model is established.

$$P(Y = 1|X) = \frac{\exp(\beta_0 + \sum_{k=1}^k (\beta_k x_k))}{1 + \exp(\beta_0 + \sum_{k=1}^k (\beta_k x_k))} \quad (3)$$

The following model is obtained by taking the logarithm of the above model:

$$\text{Logit}\left(\frac{P}{1-P}\right) = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \cdots + \beta_7 x_7 + \varepsilon \quad (4)$$

Where $P(Y = 1|X)$ is the conditional probability of junior high school students being mentally unhealthy when other factors are considered. β_0 is a constant term, ε is the random error term.

Table 5. Regression coefficient table

	B	S.E.	Wald	significance	Exp(B)
Y	0.154	0.187	0.679	0.041	1.167
x_1	0.030	0.009	12.227	<0.001	1.031
x_2	0.093	0.044	4.547	0.033	1.091
x_3	-0.145	0.054	7.218	0.007	0.865
x_4	-0.365	0.038	92.440	<0.001	0.695
x_5	0.934	0.050	352.137	<0.001	1.893
x_6	0.172	0.050	11.698	<0.001	1.187
x_7	-0.080	0.038	4.442	0.035	0.984

First, all variables passed the significance test. Among them, the OR of parental education level, family economic situation, parent-child relationship and parental relationship are all greater than 1,

which means that the increase of these items can increase the probability of junior high school students' mental health development (Table 5). The influence of family subjective environment is again higher than that of family objective conditions. Among them, parent-child relationship has the greatest effect on the promotion of junior high school students' mental health, and the likelihood of junior high school students' mental health increases by 89.3% for every level of parent-child interaction. For each level of parental relationship, the likelihood increased by about 18.7%. For each level of parents' education level and family economic status, the likelihood of junior middle school students' mental health increases by 3.1% and 9.1%, respectively.

As in the multiple linear analysis, only children were more likely to be depressed than non-only children. The difference, however, was that logistic regression showed that an increase in parent-child interaction would increase the likelihood of students being psychologically unhealthy. A previously unconsidered approach to parenting suggests that increasing parental stringency also leads to an increase in psychological problems. According to the above data, the following formula is obtained:

$$\text{Logit}\left(\frac{P}{1-P}\right) = 0.154 + 0.03x_1 + 0.093x_2 + \cdots + 0.172x_6 - 0.08x_7 + \varepsilon \quad (5)$$

4. Conclusion

Based on the data of CEPSS 2013-2014, this study explores the influence of family environment on the mental health of junior middle school students. The mental health status of junior high school students is taken as independent variable, and the subjective and objective factors of family are taken as dependent variable. Through regression analysis, the following conclusions are drawn.

The subjective factors of family have more influence on junior middle school students' psychology than the objective factors. Among the subjective family factors, parent-child relationship has the most significant influence, and the harmony of parent-child relationship can prevent the psychological problems of junior high school students to a great extent. The improvement of parental intimacy also has a more obvious optimization effect on students' psychological state. However, the effect of parent-child interaction in the two models is not the same, and it is still controversial to promote or inhibit the development of students' mental health. Parenting style, that is, whether parental rigor has an effect on students, also differs between the two models. The logistic model shows that the more strict the parents, the more likely the children to have psychological problems.

Among objective family factors, families with higher family economic conditions and parents' education level are less likely to suffer from depression, anxiety and other psychological problems. Children from one-child families are more likely to have adverse psychological states than children from non-one-child families, but the effect is not significant.

According to the above results, the closeness of family members has the greatest impact on junior high school students, which means that establishing close and friendly family relationships is the most effective way to avoid junior high school students from having negative psychological problems. Secondly, in terms of objective family conditions, different families have different backgrounds, which is not easy to change. But positive and effective improvement will certainly have a favorable effect on the psychological state of junior high school students.

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