

Relationship between Family Dynamics Characteristics and Depression among College Students in Southwest China

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Abstract: This study adopted the revised Self-assessment of Family Dynamics (SSFD), the Centre for Evaluation of Streaming Depression (CES-D), and the Chinese version of the Interpersonal Reactivity Indicator (IRI-C) by Zeng Weinan and others to investigate the family dynamics, depressive status, and empathy of college students in Sichuan, Chongqing, and Guizhou. The results showed that: (1) Male students' cognitive empathy scores were significantly lower than female students; (2) The overall depression score of college students in Chongqing municipality was significantly lower than that of college students in Sichuan and Guizhou provinces; (3) Higher vocational college students' depression scores were significantly lower than undergraduate college students; (4) The overall depression scores of college students from rural areas were significantly higher than those of college students from urban areas; (5) The only child had significantly lower depression scores than the non-only child, and significantly higher scores on all dimensions of systemic family dynamics than the non-only child; (6) Depression had a highly significant correlation with all dimensions of family dynamics traits, and depression was highly significantly associated with cognitive empathy; (7) Cognitive empathy partially mediated the relationship between illness conceptions, systemic logic, and depression, with the proportion of indirect effect accounting for the total effect of 9.18% and 2.64% respectively.

1. Preface

As the main force of youth for national development, the mental health of college students is increasingly receiving extensive attention from society and the state. Depressed mood of college students is an important factor affecting their study, life and work, and relevant survey results show that about 21.48% of college students are at risk of depression [1]. The family unit holds a crucial position in the physical and psychological well-being of college students, serving as the fundamental basis for their personal growth and development. The German Heidelberg group employs the concept of family dynamics to analyze various family types and examine the relationships and interactions among family members from a comprehensive and interconnected standpoint. Their research indicates that the characteristics of family dynamics have a significant impact on the alleviation of individual psychological symptoms during family therapy [2]. Research conducted on domestic environments has revealed that persons experiencing depression tend to have a subdued and less open home atmosphere. Furthermore, these individuals exhibit reduced levels of individualization and a "either/or" thinking when addressing challenges [3].

Empathy consists of two dimensions, emotional empathy and cognitive empathy. Emotional empathy refers to an individual's ability to empathize with the emotions of others and to have vicarious experiences, while cognitive empathy refers to an individual's ability to identify and understand the emotions or perspectives of others [4-5]. Some studies have shown that empathy positively predicts depression [6], while others have shown that empathy negatively predicts depression [7]. However, the impact of empathy on mood is mostly attributed to emotional empathy, whereas cognitive empathy serves as a protective element [8].

In summary, although there have been studies on the relationship between family dynamics traits and depression, there are fewer studies specifically on college students, and fewer studies on the mechanism of empathy in the process of family dynamics traits affecting depression. This study aims to gain insight into the variations in demographic variables both systemic family dynamics and depression among college students. Additionally, it seeks to explore the relationship between systemic family dynamics and depression and the mediating role of cognitive empathy. It also aims to enrich the theoretical foundation of family education and provide ideas for alleviating depression and improving the mental health of college students.

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2. Objects and Methods

2.1. Objects

A total of 3152 college students in Southwest China, including Sichuan Province, Guizhou Province, and Chongqing municipality, were surveyed by questionnaire using random sampling and anonymity after informed consent. A total of 2790 valid questionnaires were returned, with a valid questionnaire recovery rate of 88.52%.

2.2. Methods

2.2.1. Research Instrument

The Self rating Scale of Systemic Family Dynamics (SSFD) was revised by Zeng Weinan et al. in 2014 [9]. The questionnaire consists of 23 items on a 5-point scale (1-5), which evaluates family dynamics characteristics in four dimensions: family atmosphere, individualisation, systemic logic, and illness conception. Family atmosphere refers to the emotional characteristics of communication within the family system, with a high score representing "relaxed and happy" and a low score representing "hostile and dull"; using personalisation to evaluate the degree of differentiation of family members' emotions and behaviours, with a low score representing "low differentiation, unclear self-boundaries", while the high score is "high differentiation, autonomous and self-reliant"; the low score for system logic represents the family members' use of the phrase "that is... and..." , whereas a high score represents an "either/or" view of the problem; a high score in illness conception means that the family member associates the illness with his or her own responsibility and subjective efforts, whereas a low score represents an individual who views the member with the problem as a "total victim" and is unwilling to take responsibility. "and unwilling to take responsibility. The internal consistency reliability of the scale in this study was 0.877.

The Center for Epidemiological Studies Depression Scales (CES-D) was revised by Zhang Jie et al. (2010) [10] to screen individuals for depressive symptoms, which consists of 20 items on a 4-point scale (1-4) with the options of "none or almost none," "rarely," "often," and "almost always," respectively, which are recorded as, the higher the score, the more pronounced the depressive mood. The internal consistency reliability of this scale in this study was 0.915.

The Chinese version of the Interpersonal Reactivity Index-C (IRI-C), revised by Zhang Fengfeng et al [11], uses a 5-point scale (1-5), the higher the score, the higher the empathic ability, the scale consists of 22 items and four dimensions, which are: individual sadness, empathic concern, perspective taking and fantasies. The first two dimensions measure subjects' emotional empathy and the last two dimensions measure subjects' cognitive empathy [12], and this study focuses on the relationship between cognitive empathy and the other two variables. The

internal consistency reliability of the scale in this study was 0.789.

2.2.2. Statistical Methods

The collected data were analysed using SPSS 22.0 for descriptive statistics and correlation regression.

3. Results

3.1. Common Method Bias Test

Since this study all used self-reporting for data collection, in order to control for the effect of possible common method bias, this study used the Harman single factor test for common method bias test. The results showed that the unrotated first factor explained only 19.84 percent of the total variance and did not account for 40 percent of the total variance explained, indicating that there was no significant common method bias in the data of this study.

3.2. Demographic Differences in the Variables

The dimensions of systemic family dynamics, depression, and empathy differed significantly in terms of demographic characteristics such as gender, location of school in terms of province, place of origin, whether or not the child is an only child, and the type of school, as shown in Table 1. As can be seen in Table 1, male university students in Southwest China were significantly higher in systemic logic than their female counterparts, and their cognitive empathy was significantly lower than that of their female counterparts. This is consistent with the results of previous studies [13-14]. This pertains to the disparity in social role expectations based on gender, which makes women pay more attention to other people's thoughts in the process of interacting with others, and can produce more empathy for other people's viewpoints as well as the resulting emotions. Furthermore, it was observed that women exhibited larger activation levels and longer durations of brain regions associated with cognitive empathy processing compared to men. This finding suggests that physiological factors may contribute to the gender differences observed in cognitive empathy [15].

The scores of family atmosphere, personalisation, and illness conception were significantly higher for college students from urban areas than for those from rural areas. This may be due to the fact that families of college students from urban areas are able to receive more scientific family education concepts. These families prioritize creating a relaxed and harmonious family environment for their children, while also allowing for greater independence and mutual respect in the realm of family education. Furthermore, it was observed that the depression scores of college students from urban areas were significantly lower than those of college students from rural areas, which may be attributed to the fact that college students from rural areas have more left-behind

experiences, and these experiences can positively predict the depression levels of college students [16].

The scores for the dimensions of systemic family dynamics features among college students who are only children were found to be significantly higher compared to college students who have siblings. Additionally, the scores for depression were significantly lower among only-child college students compared to their non-only-child counterparts. These findings align with prior research [17], indicating that college students who are only-children typically receive greater parental care, do not engage in competitive dynamics with siblings, have lower levels of stress, and exhibit comparatively reduced levels of depression. The scores pertaining to system logic and illness conception among college students in higher vocational colleges exhibited a statistically significant increase compared to students in undergraduate institutions. Conversely, the depression

scores of the former group were significantly lower than those of the latter group. This may be due to the fact that the differential expectations held by undergraduate college students in comparison to their counterparts in higher vocational colleges, resulting in heightened levels of stress and concomitant exposure to depression.

University students in Chongqing municipality scored significantly higher than those in Sichuan and Guizhou Provinces on both system logic and illness conception. Additionally, the former group exhibited lower levels of depression, with a statistically significant difference. This may suggest that there is a difference in the importance of mental health education work in the location of the university. Specifically, it appears that university students in Chongqing, where greater emphasis is placed on mental health education, exhibit comparatively lower levels of depression.

Table 1 Demographic test of significance for each variable

Project	n	Family atmosphere	Personalisation	systemic logic	illness conception	Depression	Cognitive empathy
Gender	Male	533	25.41±4.530	21.36±4.172	14.29±3.274	13.02±2.785	25.81±5.807
	Female	2257	25.97±4.518	21.33±3.886	13.40±2.837	12.85±2.257	27.22±5.075
	t		1.137	0.161	4.919**	1.283	-0.531
Origin of student	Towns and cities	882	28.87±5.388	22.00±4.128	13.78±3.130	13.18±2.457	27.16±5.510
	Rural areas	1908	28.13±5.100	21.03±3.814	13.71±2.845	12.75±2.313	26.86±5.126
	t		3.492**	5.905**	0.584	4.340**	1.355
Only child or not	Yes	615	29.03±5.496	22.14±4.195	13.97±3.299	13.19±2.500	27.18±5.618
	No	2175	28.17±5.103	21.11±3.837	13.66±2.824	12.80±2.321	26.89±5.142
	t		3.461**	5.486**	2.085*	3.491**	1.208
Type of school	Higher vocational	2491	28.41±5.256	21.36±3.966	13.77±2.957	12.91±2.400	26.99±5.313
	Undergraduate	299	27.93±4.732	21.08±3.731	13.40±2.758	12.63±2.053	26.64±4.698
	t		1.640	1.177	2.017*	2.234*	-2.025*
Province/municipality where the school is located	Chongqing	1644	28.54±5.185	21.48±3.928	13.86±2.989	13.20±2.377	27.01±5.206
	Sichuan	857	28.20±5.367	21.18±4.028	13.60±2.905	13.27±2.353	26.93±5.472
	Guizhou	289	27.84±4.764	20.99±3.727	13.36±2.688	12.60±2.034	26.71±4.833
	F		2.885	2.839	4.795**	37.459**	18.674**

(Note: *p<0.05, **p<0.01, same below. The Test of Variance takes Chongqing as the reference group, and there is no significant difference between the other two groups.)

3.3. Correlations between the Dimensions of Systemic Family Dynamics and Empathy and Depression

Table 2 displays the results of the correlation study conducted to examine the relationship between the dimensions of systemic family dynamics features and cognitive empathy and depression. According to the data presented in Table 2, there is a noteworthy negative correlation between the family atmosphere, personalisation, and illness conceptions of college students in Southwest China and their levels of depression. This finding aligns with previous research, suggesting that a negative family atmosphere plays a significant role in the development of depressive moods

among college students [18]. Conversely, there is a significant positive correlation between systemic logic and depression, which contradicts previous studies [19]. This discrepancy may be attributed to the higher scores of system logic observed in the current study, indicating a tendency among family members to adopt a "either/or" mindset, which differs from the approach employed in prior research.

In addition, the results also showed that depression was significantly and negatively related to cognitive empathy, which was significantly and positively related to family atmosphere, personalisation, and illness conceptions, and significantly and negatively related to systemic logic.

Table 2 Correlation Analysis of Dimensions of Family Dynamics Characteristics with Depression and Empathy

Elements	Depression	Cognitive empathy	Family atmosphere	Personalisation	systemic logic	illness conception
Depression	1					
Cognitive empathy	-0.110**	1				

Family atmosphere	-0.494**	0.257**	1			
Personalisation	-0.393**	0.208**	0.716**	1		
systemic logic	0.236**	-0.065**	-0.100**	-0.023	1	
illness conception	-0.178**	0.218**	0.514**	0.499**	0.234**	1

3.4. Mediating Effects of Cognitive Empathy between Systemic Family Dynamics Traits and Depression

The study employed regression analyses to investigate the potential mediating role of cognitive empathy in the relationship between family dynamics traits and depression. The results showed that cognitive empathy had a significant mediating effect between illness conception and depression, and systemic logic and depression, respectively. The results are shown in Tables 3 and 4. The results of the regression analyses indicate that illness conception negatively predicts depression and systemic logic positively predicts depression; illness conception positively predicts cognitive empathy and systems logic negatively predicts cognitive empathy; and cognitive empathy negatively predicts depression. That is, when an individual adopts an either/or conception of a problem, more depression tends to develop; at the same time, if there is a greater tendency within the family to believe that the individual is responsible for the illness

and that the status quo of the illness can be changed through subjective endeavours, this increases the individual's sense of self-efficacy and control, which in turn reduces the level of depression [20].

The results of mediation effect analysis using Bootstrap method (5000 samples) showed that cognitive empathy mediated significantly between illness conception, system logic and depression respectively, with indirect effects accounting for 9.18% and 2.64% of the total effect. This finding suggests that in the mental health education work of colleges and universities, the level of depression can be reduced by improving students' cognitive empathy; Moreover, the physical and mental development of college students cannot be separated from each family, and the mental health education of colleges and universities should simultaneously focus on home-school communication, convey the correct concepts of family education, and foster the concepts of taking responsibility for one's own illnesses and looking at the problem from a multidimensional perspective.

Table 3 Regression Analysis of Cognitive Empathy in the Mediation Model between Dimensions of Systemic Family Dynamics Characteristics and Depression

Variables	Model 1		Model 2		Model 3	
	β	t	β	t	β	t
Illness conception	-0.648	-9.569	0.484	11.794	-0.589	-8.503
Cognitive empathy					-0.123	-3.944
R2	0.032		0.048		0.037	
F	91.561**		139.108**		53.796**	
System logic	0.692	12.840	-0.117	-3.465	0.674	12.532
Cognitive empathy					-0.156	-5.194
R2	0.056		0.004		0.065	
F	164.862**		12.002**		96.689**	

(Note: Model 1 independent variables predicted the dependent variable, Model 2 independent variables predicted the mediator variable, Model 3 independent and mediator variables predicted the dependent variable, and the dependent variable was all total depression score.)

Table 4 Analysis and Effect Sizes of the Mediating Effect of Cognitive Empathy between Dimensions of Family Dynamics Traits and Depression

Effect	Path	Standard error	Ratio to total effect	95% Confidence Interval	
				Maximum	Minimum
Total effect		0.068		-0.781	-0.515
Direct effect	illness conception - Depression	0.069		-0.724	-0.453
Indirect effect	illness conception - Cognitive Empathy - Depression	0.017	9.18%	-0.095	-0.027
Total effect		0.054		0.586	0.798
Direct effect	systemic Logic-Depression	0.054		0.568	0.779
Indirect effect	systemic Logic-Cognitive Empathy-Depression	0.008	2.64%	0.004	0.035

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