


The Relationship Between College Students' Interpersonal Relationship and Mental Health: Multiple Mediating Effect of Safety Awareness and College Planning

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Purpose: The research intends to find the internal influence mechanism of interpersonal relationship on college students' mental health. College students have many mental health problems, which can easily lead to extreme events. It is of great research value to explore the relationship among interpersonal relationship, safety awareness, college planning, and mental health.

Participants and Methods: GHQ, WHOQOL-BREF, SWBS-CC, LSIB, and TSCS scales were used, revised questionnaire for cluster sampling of college students, 1661 valid samples. SPSS 26.0 and PROCESS V4.1 were used for analysis, and nonparametric Bootstrap method was used to test the significance level of the mediating effect.

Results: There are significant differences in interpersonal relationship, safety awareness, and college planning between high mental health group and low mental health group. There are differences in safety awareness between genders. There is a positive correlation among interpersonal relationship, safety awareness, college planning, and mental health. Interpersonal relationship has a positive predictive effect on mental health. There are three mediating pathways of interpersonal relationship on mental health: independent mediating effect pathway of safety awareness, independent mediating effect pathway of college planning, and chain mediating effect pathway through safety awareness and college planning.

Conclusion: This study reveals the Influence mechanism of interpersonal relationships on college students' mental health. The relationship between interpersonal relationship and mental health is affected by the multiple mediating effects of safety awareness and college planning. It provides a new perspective for preventing and intervening mental health problems. College students' personality has plasticity, which can be interfered by mediating mechanism. The present findings could help college students actively participate in interpersonal communication, improve safety awareness, and make a good college planning, so as to enhance the mental health level of college students.

Keywords: interpersonal relationship, safety awareness, college planning, mental health, chain mediating effect

Introduction

In an environment full of multiple uncertain risks,¹ social competition is becoming more and more fierce, and there is an increasing emphasis on mental health.^{2,3} Mental health is a state of working, studying, and living effectively in the face of pressure.^{4,5} College students have frequent mental health problems,^{6,7} such as insomnia, depression, and academic obstacles.^{8,9} Suicide deaths of college students account for 47.2% of the abnormal deaths.¹⁰ WHO data show that mental health problems easily lead to extreme events, which is one of the main causes of suicide.¹¹ Many empirical studies in the United States, the United Kingdom, Greece, Japan, and other countries have been confirmed.^{12–15}

According to ecosystem theory, individual development is influenced by different environmental systems,^{16,17} from inside to outside, they are microsystem, mesosystem, exosystem, and macrosystem.^{17,18} Based on ecological theory,¹⁹ mental health can be studied from four aspects: individual, family, school, and social factors.²⁰ The factors that affect

college students' mental health are stress, emotion, and self-esteem at the individual dimension.^{21,22} The family dimension is income, parenting style, and so on.^{23,24} At the school dimension, there are factors such as physical exercise, interpersonal relationship, academic support, learning environment.^{25–28} At the social dimension, there are covid-19, technology, and other factors.^{14,15,29,30} School is the microsystem that has the most influence on college students.^{31–33} It is of high research value to explore what factors will affect college students' mental health and study the influencing mechanism of mental health, which is also the focus of scholars' attention.³⁴

This study focuses on the impact of interpersonal relationships on the mental health of college students. Interpersonal relationship has an impact on college students' mental health,³⁵ and establishing friendly interpersonal relationship is one of the criteria of mental health.^{36,37} Interpersonal skills are an individual's ability to successfully interact with others,³⁸ interpersonal relationship can get social support,³⁹ and interpersonal relationship dilemma will affect mental health.⁴⁰ Interpersonal relationship mainly includes parent–child relationship, peer relationship, and teacher–student relationships. School is the principal place that affects individual development, and the peer relationship formed in the school context is the primary social relationship of college students.⁴¹ Peer relationships are crucial to mental health,⁴² and the interpersonal relationship in this study mainly refers to peer relationship. It is of great practical significance to explore the process of interpersonal relationship affecting college students' mental health, find out which mediating variables have effects on the process between them, and build a multiple mediating effect model to study the mechanism between interpersonal relationship and college students' mental health. Only by finding out the mechanism path can the conclusion have pertinence value for improving the mental health level of college students.

Friendly interpersonal relationship is a way for college students to gain safety awareness,⁴³ which can increase their sense of security.⁴⁴ According to the Hierarchy of Needs theory of psychological humanistic psychologist Maslow, people will pursue spiritual security after obtaining physical security, that is, mental health security.⁴⁵ Security can meet the needs of college students' love and interpersonal relationship,⁴⁶ and people's sense of security is threatened, leading to loneliness and double division, resulting in psychological problems.⁴⁷ It is necessary to cultivate safety awareness of college students and guide them to integrate into the collective to enhance their sense of security,⁴⁸ which is conducive to their mental health.²³

The main pressure of college students during the school is study and future problems.^{49,50} Learning will bring psychological pressure,^{51,52} dissatisfaction with their majors will easily lead to suicidal ideation.⁵³ COVID-19 will cause uncertainty and confusion about the future.^{54,55} Planning can clarify goals, reduce the occurrence of problem behaviors, and predict mental health.⁵⁶ Planning can deal with uncertainty, relieve psychological pressure, and improve mental health.⁵⁷

To sum up, there are many studies on influencing factors of college students' mental health, but with interpersonal relationships as the predictive variable, and there are few researches on the influencing mechanism of college students' mental health. Previous studies have studied the relationship among the four variables of college students' interpersonal relationship, safety awareness, study planning, and mental health, but the relationship between only two of the four variables has been studied, less discussion of its internal mechanism, and more or less ignores the complexity of the problem. This study investigates the influence mechanism of interpersonal relationship on college students' mental health to increase the profound understanding of this issue. To explore the multiple mediating roles of safety awareness and college planning in the influence of interpersonal relationship on mental health, analyzes the influencing mechanism of interpersonal relationship on mental health from independent mediating role and chain mediating role, and provides suggestions from interpersonal relationship, safety awareness, and academic planning to improve the mental health level of college students.

Participants and Methods

Participants

A questionnaire survey was carried out at L University, which is a full-time general undergraduate school in the Yangtze River Delta region of China, which can be used as a typical representative of local universities. The scientific nature of questionnaires comes from representative sampling.^{58,59} Cluster sampling method was adopted in this study, 2000 questionnaires were distributed to freshmen in L University, and 1675 questionnaires were recovered, with a recovery rate of 83.75%,⁶⁰ and the survey quality is ensured.⁶¹ After data cleaning, 1661 valid samples were retained, among which 675 were male (40.6%), 986 were female (59.4%), 503 were liberal arts students (30.3%), 436 were science students (26.2%), 473 were engineering students (28.5%), 183 were art students (11%) and 66 were sports students (4%).

Tools

General Health Questionnaire (GHQ)

GHQ questionnaire was used for mental health level. GHQ was originally compiled by Goldberg and widely used,⁶² which is a good psychological measurement tool.⁶³ It was later revised into GHQ-12, GHQ-20, GHQ-28 and other versions,⁶⁴ among which GHQ-12 is widely used all over the world.⁶⁵

World Health Organization Quality of Life Questionnaire-BREF (WHOQOL-BREF)

WHOQOL-BREF is compiled by WHO. WHOQOL-BREF covers four areas, including mental health and social relationships. It has good reliability and is equivalent among different countries,⁶⁶ mainly adopting its interpersonal relationship, life satisfaction, and security.

Subjective Well-Being Scale for Chinese Citizens (SWBS-CC)

SWBS-CC, compiled by Xing Z, includes multiple subscales for mental health, relationships, safety, and the future. It is widely used to measure satisfaction and happiness.⁶⁷

Life Satisfaction Index B (LSIB)

LSIB is a part of life satisfaction scales, life satisfaction scales were established in 1961 by Neugarten BL, Havighurst RJ, Tobin SS, including Life satisfaction rating scales, LSIA and LSIB, LSIB can be used to measure subjective life satisfaction.^{68,69}

Tennessee Self-Concept Scale (TSCS)

TSCS was first compiled by Fitts in 1965 and revised by Lin B in 1978, including self-satisfaction and self-awareness.⁷⁰

Through literature research, the main influencing factors of college students' mental health are interpersonal relationship, safety awareness, college planning, and so on, which are also the components of college students' mental health standards.⁷¹ Revised based on the above classical scale, selected interpersonal relationship, psychological status, satisfaction, safety awareness, and college planning as the questionnaire validity criteria, consulted experts for subjective test, and tried to investigate 30 samples for objective test. Combined with subjective test opinions and objective test results, we completed the revision.⁷² The core variables adopt Likert scoring method, and the assignment rules are as follows: very bad-1, bad-2, average-3, good-4, and very good-5. The Cronbach's alpha was 0.811, good internal consistency, high credibility, the KMO was 0.927, Bartlett's sphericity test has a significance of 0, the structure validity is good. The sample quality and representativeness are high.

Data Processing

SPSS26.0 was used for descriptive analysis and correlation analysis. The PROCESS V4.1 made by Hayes was used to analyze the chain mediation effect with Model6 in the program.⁷³ The significance level of mediating effect was tested by nonparametric Bootstrap method.⁷⁴ A total of 5000 Bootstrap samples are selected to estimate the 95% confidence interval of multiple mediating effects, and whether the mediating effect is significant or not is determined according to the interval estimation results.

Common Method Bias

Harman's single-factor test was used to investigate the existence of common method bias.⁷⁵ Factor analysis showed that the first unrotated factor explained 29.760% of the variance of variables, not more than 40%, and there was no serious common method bias.⁷⁶

Results

Difference of Variables

Independent sample *t*-test showed differences in safety awareness between different genders. The samples were divided into high mental health group and low mental health group. From Table 1, it can be seen that there are significant differences in interpersonal relationship, safety awareness, and college planning.

Table 1 Difference Comparison Results of Each Variable

	Male (M ± SD)	Female (M ± SD)	t	Cohen's d
Safety awareness	4.11 ± 0.764	3.99 ± 0.724	3.348**	0.161
	Low mental health (M ± SD)	High mental health (M ± SD)		
Interpersonal relationship	3.06 ± 0.677	3.79 ± 0.822	17.040**	-0.969
Safety awareness	3.61 ± 0.751	4.15 ± 0.698	12.198**	-0.745
College planning	2.37 ± 0.566	2.64 ± 0.524	8.079**	-0.495

Note: **P < 0.01.

The effect size Cohen's d is calculated, and Cohen's d can reflect the difference effect when the difference is significant.⁷⁷ The results showed that there was significant difference between the high mental health group and the low mental health group, and the difference in safety awareness between male and female existed but was small.

Correlation Analysis Among Variables

Table 2 shows the correlation among variables, interpersonal relationship, safety awareness, college planning, and mental health are all correlated, and mental health is significantly positively correlated with interpersonal relationship, safety awareness, and college planning, which provides a basis for the test of chain mediation effect.⁷⁸

Mediation Effect Test

Mental health as variable Y, interpersonal relationship as variable X, safety awareness and college planning as multiple mediating variables, safety awareness as M1 and college planning as M2, gender as control variable S, and mediation analysis was performed.

According to the results of regression analysis among variables in Table 3, three models can be constructed. The first is that the prediction variable is interpersonal relationship ($\beta=0.308$, $p<0$), safety awareness is the outcome variable, and the fitting degree R^2 is 0.130, which can be extended to all. In the second, interpersonal relationship ($\beta=0.147$, $p<0$) and safety awareness ($\beta=0.105$, $p<0$) were used as predictive variables, and college planning was used as outcome variable, and the fitting degree R^2 was 0.097, which had positive predictive effect. When interpersonal relationship, safety awareness and college planning simultaneously predict mental health ($\beta=0.328$, $p<0$), safety awareness ($\beta=0.281$, $p<0$) and college planning ($\beta=0.133$, $p<0$) have significant positive predictive effects on mental health ($\beta=0.147$), and the third model with R^2 of 0.302 is constructed.

The nonparametric Bootstrap method was used to test the mediating effect. Table 4 of the test results shows that safety awareness and college planning have partial mediating effects between interpersonal relationship and mental health, and the mediating effect is 0.110. The mediating effect is produced by three mediating chains. Bootstrap test results show no 0 between BootLLCI and BootULCI, and the mediating effect is significant. One is indirect effect:

Table 2 Correlation Analysis Results of Interpersonal Relationship, Safety Awareness, College Planning and Mental Health

	M	SD	1	2	3	4
1. Interpersonal relationship	3.63	0.847	1			
1. Safety awareness	3.64	0.743	0.350**	1		
1. College planning	4.04	0.544	0.279**	0.216**	1	
1. Mental health	2.59	0.784	0.473**	0.414**	0.249**	1

Note: **P < 0.01.

Table 3 Regression Analysis Among Variables

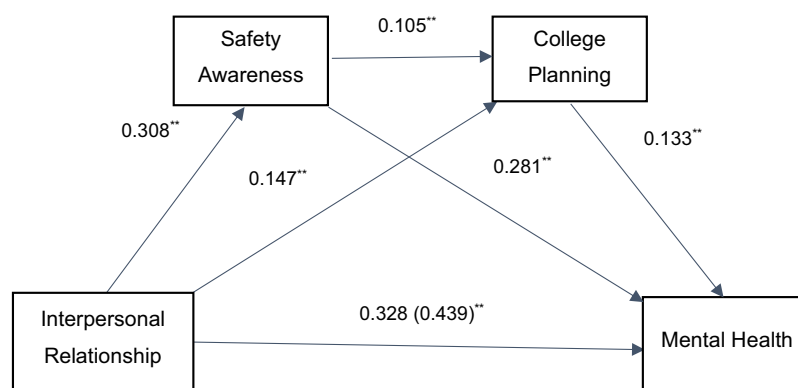
Model	Predictor variable	Overall Fit Index			Significant	
		R	R ²	F	β	t
Safety awareness	Interpersonal relationship	0.360	0.130	122.999	0.308	15.274**
	Gender				-0.131	-3.766**
College planning	Interpersonal relationship	0.312	0.097	59.303	0.147	9.123**
	Safety awareness				0.105	5.693**
	Gender				0.062	2.396*
Mental health	Interpersonal relationship	0.549	0.302	177.974	0.328	15.724**
	Safety awareness				0.281	11.956**
	College planning				0.133	4.261**
	Gender				-0.043	-1.303

Note: *P < 0.05, **P < 0.01.

Table 4 Mediating Effects of Safety Awareness and College Planning on Interpersonal Relationship and Mental Health

	Effect	BootSE	BootLLCI	BootULCI	Relative Mediating Effect
Mediating effect	0.110	0.012	0.088	0.136	25.06%
Path 1	0.087	0.011	0.067	0.109	19.82%
Path 2	0.020	0.006	0.010	0.031	4.56%
Path 3	0.004	0.001	0.002	0.007	0.91%

interpersonal relationship → safety awareness → mental health, and safety awareness plays a significant mediating role; Second, indirect effect: interpersonal relationship → college planning → mental health, college planning plays a significant mediating role; The third is indirect effect: interpersonal relationship → safety awareness → college planning → mental health, which shows that safety awareness and college planning play a significant role in chain multiple mediation between interpersonal relationship and mental health. The effect values of the three pathways were 0.087, 0.020 and 0.004, and the relative mediating effects were 19.82%, 4.56%, and 0.91%. The specific path of the chain mediation effect of college students' interpersonal relationship on mental health is shown in Figure 1.

**Figure 1** Chain-mediated effect path.

Note: **P < 0.01.

Discussion

The results show differences in safety awareness between genders, which is consistent with previous research results.⁴³ There are significant differences in interpersonal relationship, safety awareness, and college planning between high mental health group and low mental health group. The research results can be explained by Schema theory. High and low mental health groups will form their self-schemas; act according to context schemas in interpersonal relationship, safety awareness, college planning; and have their strategic schemas and emotion schemas, which form related schema towers.^{43,79}

The results show that interpersonal relationship, safety awareness, college planning, and mental health of college students are positively correlated, which shows that interpersonal relationship, safety awareness and college planning can actively promote mental health and influence each other. On the correlation between interpersonal relationships and mental health, result is consistent with the interpersonal theory. Sullivan argues that interpersonal relationship is the main manifestation of people's sociality,⁸⁰ and bad interpersonal relationship will affect mental health.⁸¹ Han believes that mental health education should include interpersonal relationship education.⁸² Zhang and Jiang argue that college students' mental health is related to interpersonal relationship^{26,83}; this is consistent with our research. On the correlation between interpersonal relationship and safety awareness, Hu thinks that interpersonal conflict is related to safe behavior,⁸⁴ Huang Y believes that good interpersonal relationship is the way to obtain safety awareness,⁴³ our study confirms these results. On the correlation between interpersonal relationship and college planning, Chen thinks that interpersonal relationship and college planning are related dimensions.⁸⁵ In terms of the correlation between other variables, Wang discussed the relationship between safety awareness and college planning.⁸⁶ Gustafsson and Ren found that safety awareness is closely related to mental health.^{47,48} Jin H and others analyzed global doctoral survey data and concluded that planning is closely related to mental health,^{27,47} which is consistent with this study.

The results of regression analysis showed that interpersonal relationship, safety awareness, and college planning significantly positively predicted mental health. Interpersonal relationship, safety awareness, and college planning can form positive psychological capital, which is an important index to measure mental health,⁸⁷ and this is consistent with our findings. Interpersonal relationships can help college students gain recognition and attention, and it is a positive attitude that can get emotion. Reasonable handling of interpersonal relationship can reduce social anxiety.⁸⁸ Safety awareness is personal cognition, and college planning is a planning behavior for the future, improving safety awareness and college planning will bring a sense of certainty,⁵⁷ and then there is the pursuit of spiritual safety, which is mental health safety, which also verifies the hierarchy of needs theory.⁴⁵

Further research shows that interpersonal relationship has three mediating effects on mental health: independent mediating effect path of safety awareness, independent mediating effect path of college planning and chain mediating effect path through safety awareness and college planning. Safety awareness and college planning play a mediating role in the influence of interpersonal relationship on mental health, and both can improve the level of mental health. Allport argues that healthy personality should include self-expansion ability, good interpersonal relationship, security emotion.⁸⁹ The results of this study are consistent with it. The decrease in interpersonal trust level will lead to lack of security, affect mental health,⁹⁰ and interpersonal conflict will affect safe behavior.⁸⁴ In crisis events, interpersonal relationship changes obviously,⁹¹ which is consistent with the research results of safety awareness independent intermediary effect path. It is the responsibility and obligation of colleges and universities to pay attention to the safety and health of college students.⁹² Individual self-realization needs the mediating effect of studies, which is closely related to mental health and needs to be respond actively.^{84,93} Students' career planning can promote students to form positive interpersonal relationships, thus promoting students' mental health development.⁹⁴ The independent mediating effect path of college planning verifies the research results. The chain mediating effect of safety awareness and college planning between interpersonal relationship and mental health shows how interpersonal relationship affects college students' mental health through multiple mediating variables, and explains the inner mechanism of interpersonal relationship's influence on mental health. College students actively carry out interpersonal communication, improve their safety awareness level, and do college planning well, which is helpful to improve the level of individual mental health.

Exploring the influence mechanism of college students' mental health is helpful to evaluate college students' psychological problems and risks. College students' personality has plasticity,⁹⁵ which can be interfered by mediating mechanism. Colleges and families should actively encourage college students to participate in interpersonal communication, improve interpersonal communication skills, build good interpersonal relationships, do a good job in safety education, create campus safety culture, improve college students' safety awareness in a way that students like, and guide college students to make effective academic planning and life planning, which is not only conducive to improving college students' comprehensive quality and mental health level but also conducive to improving college students' happiness.⁹⁶

Limitations and Implications

This study reveals the Influence mechanism of interpersonal relationships on college students' mental health. It provides a new perspective for preventing and intervening mental health problems of college students and improving their mental health level. Only one university is selected for cluster sampling. In the future, students from different regions and universities will be selected for investigation to improve the validity.⁹⁷ This study uses cross-sectional data, which have limitations in causal inference, and can collect longitudinal data for verification in the future.⁹⁸ Besides safety awareness and college planning, whether there are other mediators in the influence mechanism of interpersonal relationship on mental health of college students needs further research in the future.⁹⁹

Conclusion

There are significant differences in interpersonal relationship, safety awareness, and college planning between high mental health group and low mental health group, and the difference effect is obvious. There are differences in safety awareness between genders; interpersonal relationships, safety awareness, college planning, and mental health are all positively correlated; interpersonal relationship has a positive predictive effect on mental health. There are three mediating pathways of interpersonal relationship on mental health: independent mediating effect pathway of safety awareness, independent mediating effect pathway of college planning, and chain mediating effect pathway through safety awareness and college planning.

Ethical Statement and Informed Consent

This study was conducted in accordance with the Declaration of Helsinki. The Ethics Committee of Suzhou University approved the study. Participants were informed that their responses to the task would be anonymous and confidential.

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Disclosure

The author reports no conflicts of interest in this work.

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