Systematic Evaluation of the Results in Mental Health Diathesis Among Chinese College Students

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Abstract : Objective To explore the development of mental health diathesis of college students in China, provide a basis for future research. **Methods** Three dimensions of college students' mental health diathesis, namely personality, psychological resilience and coping style, were selected. A meta-analysis was conducted on 82 articles published in Chinese core psychology journals from 1993 to 2023. **Results** The research results of the three dimensions of college students' mental health diathesis—personality, psychological resilience, and coping styles—showed high consistency and not affected by factors such as measurement tools, samples, and measurement time. Personality was characterized as agreeable, conscientious, open, extraverted, and relatively emotionally stable; the overall level of psychological resilience was moderately high; coping styles tended to be positive and mature. **Conclusion** Chinese college students have relatively sound personalities, positive coping styles, and a higher level of psychological resilience, reflecting good mental health diathesis. The overall level of personality and positive coping styles show a slow increasing trend over time, but the level of psychological resilience is significantly affected by the left-behind experiences, showing a slight decline with the passage of time.

Keywords: Chinese college students; Mental health diathesis; Systematic evaluation; Meta-analysis

1   Introduction

The concept of mental health diathesis is an academic concept proposed by Chinese psychologists under the influence of the positive psychology movement in the West. It refers to certain inherent and relatively stable psychological qualities formed by the combined effects of genetics and environment. These psychological qualities influence or determine an individual's psychological, physiological, and social functions, thereby affecting the individual's mental health status[1]. The concept of mental health diathesis follows a logical sequence of "quality - psychological quality - mental health diathesis," and it is the main

internal stability factor within psychological quality that affects a person's mental health, playing an intrinsic and decisive role in an individual's level of mental health.

Mental health diathesis, as a composite concept, is multidimensional in structure and complex in measurement. Deli Shen et al (2008) summarized mental health diathesis into seven aspects: self, interpersonal quality, personality quality, cognitive style, attribution style, coping style, and motivation system, with individual adaptation as its external manifestation. Based on this, they developed a survey scale for adolescent mental health diathesis. Baoyong Liang et al (2012), building on the research achievements of Shen Deli's project team, analyzed the personality development laws of Chinese adults, proposing that the structure of adult mental health diathesis is composed of eight main traits: self-concept, interpersonal quality, resilience, psychological flexibility, emotionality, social desirability, health beliefs, and life beliefs, as well as two sub-traits of cognitive style and coping methods. They correspondingly developed a set of scales for each characteristic, forming a comprehensive assessment system for Chinese adult mental health diathesis. Both sets of scales underpinned by a robust theoretical framework and are assured in terms of sample size, item discrimination, reliability, and validity. However, in subsequent empirical studies, the conclusions drawn by various researchers are not consistent.Meanwhile, most of the traits in the structure of mental health diathesis are independent concepts, and each subscale does not have an advantage in measuring reliability and validity compared to some scales recognized by each independent concept itself. Additionally, the large number of items in both scales increases the difficulty of administration and research, limiting their application and promotion. If only some subscales are selected for administration, they may not fully reflect all aspects of mental health diathesis. Furthermore, the Brief College Students' Psychological Quality Scale (Health Edition) revised by Wang Xinqiang et al (2017), as a measurement tool for core mental health diathesis, has made some new breakthroughs, but currently lacks normative data.

Drawing on a synthesis of existing literature, research into mental health diathesis predominantly centers on personality traits as fundamental indicators. With the promotion of positive psychology theories, coping styles and psychological resilience, which are closely related to an individual's social existence and adaptive state, have also emerged as significant subjects of study. Based on this, the present research selects three dimensions of mental health literacy: personality, psychological resilience, and coping styles. By employing systematic evaluation methods to analyze and integrate domestic empirical studies, this research aims to explore the state of research and development of mental health literacy among college students in China. This will provide references for future mental health education and related research.

2   Subjects and Methods

2.1   Literature Inclusion

The criteria for literature selection were based on the inclusion in the Chinese Science Citation Database (CSCD), Chinese Social Sciences Citation Index (CSSCI), and the Overview of Chinese Core Journals. We searched for nine core psychological journals,

including Acta Psychologica Sinica, Progress in Psychology, Chinese Journal of Psychology, Psychological Development and Education, Psychology and Behavior, New Explorations in Psychology, Chinese Clinical Psychology, and Chinese Journal of Mental Health. The search period spanned from June 1, 1993, to July 1, 2023. The search platforms included CNKI (China National Knowledge Infrastructure), Wanfang Database, and VIP Database. The search terms used were "college students + university students + higher education students AND personality," "college students + university students + higher education students AND psychological resilience + psychological elasticity + stress resistance + pressure resistance + recovery power," and "college students + university students + higher education students AND coping styles + coping strategies + coping mechanisms." A total of 507 non-duplicate research documents were retrieved.

The collected literature was screened according to the established criteria. Inclusion criteria were: ① The study subjects were college students currently enrolled in China; ② The study type included empirical research with questionnaire surveys; ③ The research content included surveys on the status of personality/psychological resilience/coping styles; ④ The measurement tools used were commonly used scales in the field; ⑤ The article could provide information on the survey sample size (n), scores and standard deviations on the scale overall or each factor, and convert medians, quartiles, or range values. Exclusion criteria were: ① Index entries and duplicate literature; ② Non-empirical research types, such as experimental studies, qualitative research, theoretical research, meta-analysis studies, etc.; ③ Failure to report relevant statistical quantities or incomplete statistical information or statistical quantities that do not represent the overall sample; ④ The total number of articles using the same scale is less than 3;⑤Use of self-developed scales or incomplete information on measurement tools or usage items. Ultimately, 82 articles met the statistical criteria for this meta-analysis. The details are shown in Figure 1.
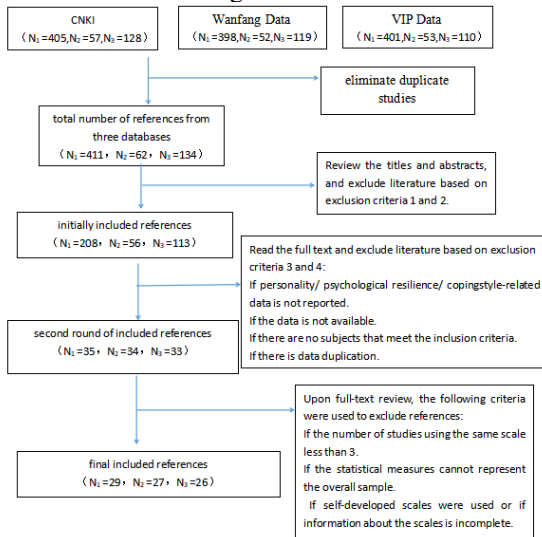
Fig. 1. Flow diagram of studies included in analysis

2.2   Overview of the Literature

The basic information of the 82 articles is as follows: In terms of publication dates, there were 2 articles published between 1993-2003, 26 articles between 2004-2013, and 54 articles between 2014-2023; in terms of sample size, the total number of participants was 73,413, with the largest sample being 6,154 individuals and the smallest sample being 56 individuals; in terms of research content, there were 29 articles on personality, 27 articles on psychological resilience, and 26 articles on coping styles; in terms of the selection of measurement tools, a total of 9 commonly used scales across three dimensions—personality, psychological resilience, and coping styles—were included.

2.3   Variable Coding

In conjunction with the conclusions of existing studies and the focus of the present research, and based on the specific data extracted from the included literature, four variables were selected as subgroup division criteria: (1) Gender was divided into male and female; (2) Publication time was categorized into 1993-2012 and 2013-2023, as well as 1993-2019 and 2020-2023; (3) Sample type was divided into groups with and without experiences of left-behind children; (4) Student category was divided into vocational college and undergraduate, and undergraduate and unspecified.

Each included study was coded based on the three dimensions of personality, psychological resilience, and coping styles, as well as the different research measurement tools, with each independent sample as a unit. If the same study contained multiple independent sample data or only reported the mean and standard deviation of personality/psychological resilience/coping styles in subgroups such as gender or presence of left-behind experiences, the subgroup data were combined using the method recommended by the Cochrane systematic review manual[2] to obtain the overall sample mean and standard deviation. For those that only reported medians and range, standard deviations were converted through formulas. Additionally, in cases where individual study information was missing during the coding process, the authors were contacted via email to obtain the information.

Initially, two researchers independently extracted and organized the data for coding. They then compared the two sets of data records and negotiated to reach a consensus on any divergent coding. If there were inconsistencies in the mean and standard deviation of the same dimension and items of the same scale, they were unified using the method of arithmetic mean.

2.4   Statistical Methods

Meta-analysis methods for continuous data from single-arm studies were used, with the extracted means from each study serving as the effect size. Using Stata software, first calculate the standard error of the effect size, and then select a random effects model for meta-analysis based on the heterogeneity test results. This study comprehensively examined Q, P, and I^2 indicators as the basis for judging the heterogeneity of the effect size. For parts with significant heterogeneity test results, subgroup analyses were

conducted in combination with data conditions and research purposes to explore the causes of heterogeneity. Publication bias was tested using the funnel plot Egger test to assess the accuracy and stability of the study. In addition, the personality research dimension scale EPQ-RSC was compared with the norm[3] of the same scale. The standard deviations of the norm factors were converted into 95% confidence intervals, and then the standard deviations and confidence intervals of the norms were compared with the effect sizes of each factor.

3   Results

As shown in Table 1, the Z-test results for the effect sizes of the three dimensions personality, psychological resilience, and coping styles—showed P-values all less than 0.001, indicating that each effect size is statistically significant. In the heterogeneity test results, except for the introversion-extraversion factor (CBF-PI-B) on the personality dimension (Q=17.24, P<0.01), the P-values for all other Q-tests were less than 0.001. Except for the defensiveness factor (EPQ-RSC) on the personality dimension (I^2=0.0%), the remaining I^2 values ranged from 76.8% to 100%, all greater than 75%, indicating significant heterogeneity between the studies for all variables.

The results of the publication bias tests indicated that for the personality dimension, the Egger test for the neuroticism factor (EPQ-RSC) (p=0.048) and the agreeableness factor (NEO-FFI) (p=0.044), as well as the avoidance factor (Coping Style Scale) in the coping styles dimension (p=0.023), had P-values less than 0.05. The funnel plots for the meta-analysis were asymmetrical, suggesting the presence of publication bias in the corresponding literature. For the rest of the total effects and factor effects, the P-values of the Egger tests were all greater than 0.05, and the funnel plots for the meta-analysis were symmetrical, indicating no publication bias in the corresponding literature.

Table 1. Effect size and heterogeneous test results of mental health diathesis (personality, psychological resilience and coping style)

Research dimensions	Research tools	K	N	Outcome factor	Effect size test			Heterogeneity test		Egger(p)
					ES	95%CI	z	Q	I²(%)	
Personality	EPQ-RSC	5	2248	introversion-extraversion	7.45	7.19,7.69	58.92***	17.24**	76.8	0.10
				neuroticism	5.52	4.93,6.11	18.25***	78.01***	94.9	0.05
				psychoticism	3.58	1.70,5.46	3.72***	2659.36***	99.8	0.92
		3	1512	defensiveness	4.76	4.63,4.89	72.79***	1.51***	0.0	0.17
	CBF-PI-B	6	6380	neuroticism	24.93	22.95,26.91	24.69***	502.19**	99	0.60
		4	4063	extraversion	29.86	29.37,30.34	120.59**	13.65***	78	0.77
		5	4597	openness	32.83	31.48,34.18	47.75***	163.49**	97.6	0.65
		4	4063	agreeableness	34.85	32.82,36.89	33.60***	207.62**	98.6	0.99

		k	N							
	NEO-FFI	4	4063	conscientiousness	33.28	31.69,34.87	41.02***	176.88***	98.3	0.688
		15	2524	neuroticism	32.67	30.90,34.43	36.24***	4970.29***	99.7	0.676
		14	2487	extraversion	33.18	31.25,35.20	33.61***	5473.08***	99.8	0.47
		13	2453	openness	38.30	36.60,39.99	44.26***	8407.16***	99.9	0.69
		14	2503	agreeableness	40.19	34.35,46.03	13.49***	8.534***	100	0.04
		15	2453	conscientiousness	40.87	39.06,42.67	44.45***	6598.91***	99.8	0.51
Psycho-logical resilience	CD-RISC-25	16	11358		77.29	70.27,84.31	21.59***	10478.53***	99.9	0.23
	Psychological Resiliences Scale	8	4247	the total effects	94.54	93.41,95.67	164.51***	61.76***	88.7	0.94
	CD-RISC-10	3	3351		34.25	25.32,43.18	7.52***	2827.93***	99.9	0.41
Coping styles	SCSQ	15	13643	positive coping styles	1.99	1.88,2.09	37.27***	2192.72***	99.4	0.66
				negative coping styles	1.29	1.10,1.48	13.26***	7124.76***	99.8	0.86
	The Coping Styles Scale	7	2139	problem-solving	0.74	0.71,0.76	63.94***	93.39***	93.6	0.21
				rationalization	0.43	0.40,0.45	31.34***	104.07***	94.2	0.08
				seeking help	0.54	0.51,0.57	35.67***	107.72***	94.4	0.63
				self-blame	0.38	0.34,0.42	20.20***	113.68***	94.7	0.91
				fantasy	0.47	0.45,0.49	40.33***	60.64***	90.1	0.06
				avoidance	0.43	0.38,0.46	22.32***	182.71***	96.7	0.02
	TCSQ	4	1261	positive coping styles	34.63	32.99,36.27	41.46***	48.15***	93.8	0.12
				negative coping styles	30.36	28.44,32.27	31.10***	71.93***	95.8	0.13

Note: Random effects models were used for all analyses; *p < 0.05, **p < 0.01, ***p < 0.001. Here, 'k' represents the number of studies included in the analysis, 'N' indicates the total sample size included in the analysis, and 'ES' (Effect size) denotes the magnitude of the effect.

3.1 Results of Personality Effect Size Test and Subgroup Analysis

The results of the effect size test for personality research (Table 1) show that in the CBF-PI-B, the scores from high to low for the five factors are agreeableness, conscientiousness, openness, extraversion, and neuroticism; in the NEO-FFI, the scores from high to low for the five factors are conscientiousness, agreeableness, openness, extraversion, and neuroticism. This indicates that the two scales have a high consistency in measuring the current state of personality among Chinese college students. Additionally, the EPQ-RSC scores for the four factors of introversion-extraversion, neuroticism, psychoticism, and defensiveness (Table 2) show that the 95% confidence intervals of the effect sizes for each factor overlap with the norms, indicating no statistically significant difference between the effect sizes and the norms. It can be seen that the measurement results of the three commonly used scales in the personality dimension (EPQ-RSC, CBF-PI-B, NEO-FFI) are basically consistent. Moreover, the indicators of

the personality dimension in the mental health diathesis of Chinese college students are relatively good, showing characteristics of being agreeable, rigorous, open, extraverted, and emotionally stable.

Table 2. Comparison of effect size with the Personality Study Scale (EPQ-RSC)

Factors	Meta-analysis effect size		The norms		
	mean	95% confidence interval	mean	standard deviation	95% confidence interval（M±1.96SD）
introversion-extraversion	7.445	7.19,7.69	7.5	2.84	1.93,13.07
neuroticism	5.518	4.93,6.11	4.42	2.95	1.36,10.23
neuroticism	3.576	1.69,5.46	2.73	2.05	1.29,6.75
defensiveness	4.758	4.63,4.89	6.19	2.96	0.39,11.99

In the personality research (NEO-FF), subgroup analyses were conducted based on publication time (2003-2012/2013-2023). The results (Table 3) show that the I^2 values for the effect sizes of each factor range from 99.5% to 100.0%, which is significantly greater than 75%, indicating substantial heterogeneity within each factor's studies. At the same time, the P-values for the comparison of effect sizes between subgroups range from 0.29 to 0.94, all greater than 0.1, indicating no heterogeneity between subgroups. Therefore, the differences in factor scores in the personality dimension across different publication periods are not statistically significant. However, it is worth noting that in the data of this study, except for agreeableness, the effect sizes for the other four factors after 2013 are all greater than those before 2013.

Table 3. Subgroup analysis results of mental health diathesis (personality, psychological resilience and coping style)

Research dimensions	Research tools	Outcome factor	Subgroup		K	ES	95%CI	I^2 (%)	P
Personality	NEO-FF	neuroticism		2013-2023	10	32.77	31.14,34.39	99.6	0.94
				1993-2012	5	32.49	25.97,39.01	99.8	
		extraversion		2013-2023	8	40.54	39.19,41.88	99.6	0.29
				1993-2012	5	36.85	30.11,43.60	99.9	
		openness		2013-2023	8	38.96	37.97,39.94	99.5	0.64
				1993-2012	5	37.28	30.28,44.27	99.9	
		agreeableness	publica-tion time	2013-2023	8	39.13	31.07,47.20	100.0	0.64
				1993-2012	5	41.68	34.78,48.57	99.9	
		conscientiousness		2013-2023	8	41.67	40.44,42.90	99.6	0.55
				1993-2012	5	39.59	32.87,46.31	99.9	
Psychological	CD-RISC-25	the total effects	student category	vocational college students	5	73.34	62.36,84.32	99.8	0.69

					k	ES	CI	I²	P
resilience				undergraduates	3	78.41	55.84,100.98	99.9	
		publication time	2020-2023		9	74.40	64.86,83.95	99.9	0.32
			1993-2019		7	81.00	72.37,89.64	99.7	
	Psychological Resiliences Scale		left-behind			89.83	82.06,97.61	99	0.02
					3				
			non-left-behind			99.85	96.30,103.41	97	
		positive coping styles	gender	male		27.31	22.49,32.12	99.2	0.99
				female		27.37	21.56,33.18	99.4	
		negative coping styles		male	3	12.52	6.71,18.32	99.7	0.99
				female		12.54	9.29,15.80	99.6	
		positive coping styles	publication time	2013-2023	8	2.03	1.82,2.23	99.6	0.47
				1993-2012	7	1.94	1.88,2.01	96.8	
Coping styles	SCSQ	negative coping styles		2013-2023	8	1.38	1.05,1.72	99.9	0.24
				1993-2012	7	1.17	1.06,1.29	98.8	
		positive coping styles	student category	undergraduate	5	1.91	1.89,1.94	61.7	0.15
				unspecified	10	2.03	1.88,2.18	99.6	
		negative coping styles		undergraduate	5	1.28	0.98,1.58	99.7	0.98
				unspecified	10	1.29	1.03,1.54	99.8	

Note: ES (Effect size) represents the magnitude of the effect; 'k' indicates the number of studies included in the analysis; 'P' denotes the P-value for the comparison of effect sizes between subgroups.

3.2 Results of Psychological Resilience Effect Size Test and Subgroup Analysis

The results of the effect size test for psychological resilience research (Table 1) show that although the effect size ratios of the three scales—CD-RISC-25, Psychological Resilience Scale, and CD-RISC-10—differ, they all exceed the theoretical mean, indicating that the psychological resilience dimension of mental health diathesis among Chinese college students is at a medium to high level.

Subgroup analyses for psychological resilience research (CD-RISC-25) were conducted based on student category (vocational college /undergraduate) and publication time (1993-2019/2020-2023). The results (Table 3) show that the effect size for undergraduates is higher than that for vocational college students; the effect size after 2020 is less than that before 2020. The overall level of the psychological resilience dimension in the mental health literacy of Chinese college students shows a slow declining trend over time, and the psychological resilience level of undergraduates is higher than that of vocational college students. However, the I^2 values for the total effect sizes in this study range from 99.7% to 99.9%, which is significantly greater than 75%, indicating significant internal heterogeneity; the P-values for the comparison of effect sizes between subgroups are 0.69 and 0.32, both greater than 0.1, indicating no heterogeneity between subgroups, and the differences in psychological resilience levels across different student categories and publication times are not statistically significant.

Furthermore, subgroup analysis for the psychological resilience dimension (Psychological Resilience Scale) based on whether the students have experienced being left-behind shows that the I^2 values for the two groups are 99% and 97%, respectively, indicating significant heterogeneity among studies within subgroups; the P-value for the comparison of effect sizes between subgroups (P=0.02) is less than 0.05, indicating significant heterogeneity between subgroups, and college students with experiences of being left behind have significantly lower levels of psychological resilience than those without such experiences.

3.3   Results of Coping Styles Effect Size Test and Subgroup Analysis

The results of the effect size test for coping styles research (Table 1) show that the SCSQ and TCSQ each consist of two factors: positive coping styles and negative coping styles. The SCSQ uses a 0-3 four-point scoring system, with the effect size for individual items on positive coping styles being higher than the national norm score by 1.78 [4]; the effect size for individual items on negative coping styles is lower than the national norm score by 1.59 [4]. This indicates that Chinese college students tend to choose positive coping styles, and their overall coping styles are good. The TCSQ uses a 1-5 five-point scoring system, and the total scores for positive and negative coping styles factors range from 0 to 50, with both effect size scores also indicating that Chinese college students are relatively inclined to choose positive coping styles.The Coping Styles Scale categorizes coping styles into three types: mature coping, immature coping, and mixed coping, based on scores on six factors: problem-solving, rationalization, seeking help, self-blame, fantasy, and avoidance. In the meta-analysis results, the scores from high to low on the six factors are problem-solving, seeking help, fantasy, rationalization, avoidance, and self-blame. This suggests that college students often use mature "problem-solving - seeking help" coping styles, actively dealing with problems and knowing how to seek assistance. Combining the meta-analysis results from the three scales (SCSQ, Coping Styles Scale, TCSQ), it can be seen that the coping styles in the mental health literacy of Chinese college students are relatively mature, and they are able to actively utilize resources and solve problems.

In the research on the coping styles dimension (SCSQ), subgroup analyses were conducted based on gender (male/female), publication time (1993-2012/2013-2023), and student category (undergraduate/unspecified). The results (Table 3) show that the effect size for positive coping styles before 2013 is lower than that for positive coping styles after 2013. At the same time, except for the I^2 value of the effect size for positive coping styles among undergraduate students (I^2=61.7), which is less than 75%, the I^2 values for the effect sizes of positive and negative coping styles in all other groups range from 96.8% to 99.9%, significantly greater than 75%, indicating significant internal heterogeneity among the studies in each group. The P-values for the comparison of effect sizes between subgroups range from 0.15 to 0.99, all greater than 0.1, indicating no heterogeneity between subgroups. This suggests that there is no statistically significant difference in the choice of positive/negative coping styles among college students of different genders, categories, and time periods.

4   Conclusions

The research findings on the personality dimension of college students indicate that the indicators of the personality dimension of mental health diathesis among college students in existing studies are relatively good, and there is a high consistency among the three commonly used scales. Except for agreeableness, the effect sizes for the other four factors after 2013 are all greater than those before 2013, with no statistically significant difference. This conclusion is partially consistent with the research by Yuan Tian et al (2017)[5], which found that from 2004 to 2013, the five-factor personality scores of Chinese college students showed an upward trend, and there was a significant positive correlation between different time periods. This suggests that with the development of the times, Chinese college students have shown more extroverted, open, and conscientious personality traits. However, there is a trend of decreased emotional stability in the process of coping with rapid changes in the internal and external environment. Additionally, the research by Yuan Tian et al (2017) also showed significant gender differences in personality changes, with males showing a larger increase and females a smaller decrease in agreeableness scores. It can be inferred that the inconsistency between the two genders in terms of agreeableness factors and statistical differences may be due to differences in the gender ratio of the sample and data processing methods.

The research results on the psychological resilience dimension of college students show that the psychological resilience dimension of mental health diathesis among Chinese college students is at a medium to high level. The inconsistency in the ratio among the three commonly used scales may be related to the different psychological resilience conceptual theories and structural models each scale is based on, as well as the non-complete overlap in measurement content. This study further found that although the differences in psychological resilience level based on student category and publication time are not statistically significant, the overall level of psychological resilience shows a slow declining trend over time, and the psychological resilience level of undergraduates is higher than that of vocational college students. This is consistent with the conclusion by Lu Shi et al (2023)[6] that the overall level of psychological resilience among Chinese college students is showing a downward trend. This may be related to the increase in stressful life events in the social environment, the overall decline in achievement motivation among modern college students, and the pressure of employment[7][8]. Additionally, the decline in psychological resilience among college students after 2020 may also be affected by the complex influence of the COVID-19 pandemic. This study also reveals that there is a significant difference in psychological resilience levels among Chinese college students based on whether they have experienced being left behind, consistent with previous research[9] .

The research results on the coping styles dimension of college students indicate that the conclusions from the three commonly used scales are relatively consistent. Chinese college students tend to choose positive coping styles, often using mature "problem-solving - seeking help" coping styles, actively dealing with problems, and knowing how to seek assistance. This conclusion is consistent with previous research. Further subgroup analysis in this study found that although there are differences in the choice of

positive/negative coping styles among Chinese college students in the three subgroups of gender, student category, and different periods, these differences are not statistically significant. This is in line with the meta-analysis conclusions of Sufei Xin et al (2018)[10].

In summary, the overall mental health diathesis of Chinese college students is good, with relatively sound personality, positive coping styles, and high levels of psychological resilience. The personality and positive coping styles show a slow upward trend over time, while the level of psychological resilience is significantly affected by experiences of being left behind and shows a slight decline over time. The common perception in society that mental health issues among Chinese college students are becoming increasingly severe may be related to factors such as the complex and changing social environment, the increasing public attention, the rapid and fissiparous nature of public opinion dissemination in the era of social media, and the relatively low overall mental health literacy of the population [11][12].

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