

Effects of Psychological Capital, Coping Style and Emotional Intelligence on Self-Rated Health Status of College Students in China During COVID-19 Pandemic

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Abstract

Objective To explore the relationship between the self-reported health status, emotional coping style, emotional intelligence and positive psychological state of college students during the COVID-19 pandemic.

Methods The questionnaires of Self-rated Health Measurement Scale (SRHMS), Emotional Intelligence Scale (EIS), Psychological Capital Questionnaire (PCQ), Simplified Coping Style Questionnaire (SCSQ) were used for online survey. The study included 367 undergraduates.

Results Male undergraduates had significantly higher psychological capital scores than female ($P < 0.05$), and those without siblings had significantly higher emotional intelligence and psychological capital scores than those with ($P < 0.05$). The students from urban had significantly higher emotional intelligence scores than those from rural ($P < 0.05$). Students who spent less than 3 hours online per day had significantly higher self-rated health scores than those spending 6 hours online per day ($P < 0.05$), and those who spent 3–6 hours online per day was significantly higher psychological capital scores than those who spent more than 6 hours online per day ($P < 0.05$). The interaction between emotional intelligence, psychological capital and coping styles was statistically significant ($\beta = -0.045, P < 0.05$) in health status with coping style ranking the top ($\beta = 21.277$).

Conclusion: Sex, having siblings or not, birth place and online time per day affected health status, emotional intelligence, and psychological capital in undergraduate students. Coping style is a main positive factor that affects health, which was modified by emotional intelligence and psychological capital. In this pandemic emergency, positive coping style with optimistic emotional perception and understanding is an important measure against the pandemic-induced health problem.

Introduction

Outbreak of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), which causes coronavirus disease 2019 (COVID-19), occurred in early January 2020 in Wuhan, China, resulting in complete lockdown of Wuhan cities right before the eve of Chinese (or Lunar) New Year. To help slow the spread of highly contagious COVID-19, most of cities in China later on took measures such as to restrict traveling, party gathering and business operation, social distancing, isolation and contact tracing. To meet the measurement for containing COVID-19, the Ministry of Education of China made a decision, closing all schools for the Spring semester until reopen, and all students were not allowed to return to campuses for in-person instruction, instead staying at home and opting for virtual online courses. Physical isolation makes individuals fewer opportunities to engage with peers. In addition, communications with others via internet increases the probability of excessive online surfing, exposing individuals to a large number of complex information streams. Therefore, the long-term isolation and lockdown or closures and stressful information on COVID-19 could result in anxiety, fear, grief and other emotional problems, consequently affecting physical, social and mental health issues[1]. Mental health issues, such as difficulty sleeping or

eating, abuse alcohol consumption or substance, worsening chronic conditions, rise due to worry and stress over the pandemic[2–5]. Mental health experts provide a series of shareable resources on how to cope with COVID-19 and to manage stress during this difficult time, educating individuals how to stabilize emotions with a positive attitude to fight against COVID-19-related stress. Although college students are young with relatively less susceptible to severe COVID-19 in comparison to the elderly (greater than 65 years old), campus closure, physical isolation (or home-confinement) and online instruction may still bring negative impact on their mental health [6]. A recent study consisting a small sample size conducted in Poland reported that COVID-19 outbreak led to high stress and low general self-rated health in University students [7]. As a special population, college students' health always can affect their parents' and the community's health and emotional distress. Thus, it is essential to evaluate college students' health and assess factors influencing mental health in the context of COVID-19, so that strategies could be made to improve their health and achievements.

Emotional intelligence refers to the ability of an individual to properly perceive and understand emotions, regulate emotions through certain strategies, and use emotional knowledge to deal with difficulties [8]. In stressful situations, individuals with high emotional intelligence generally can interact with others in a receptive and appropriate way, thereby obtaining an optimal adaptation to surrounding environments with motivation, perseverance, empathy and mental agility[9]. In contrast, those with low emotional intelligence is vulnerable to stress and burnout[10]. During the pandemic, nurses with high emotional intelligence have been shown to have better job performance in a study conducted in Saudi Arabia[11].

Psychological capital refers to a positive mental state shown by an individual in the process of growth and development. It consists of four aspects: self-efficacy (confidence), optimism, hope and resilience. It has been shown that psychological capital could ameliorate the negative consequences of stress on mental health, and enhance positive psychological outcome in undergraduate students [12]. High psychological capital score empowers individuals with resilience strength to cope up with adverse situations. The results from another study also suggest that increasing psychological capital had a protective effect on the risk of burnout and traumatic stress in social workers, augmenting the sustainability of their working conditions[13]. Similar results were reported in a previous study on Chinese nurses, in which psychological capital reduced job burnout with the help from organizational commitment[14]. Psychological resilience, an ability to “bounce back” from a negative emotional experience and to confront stressful situations, is a major protective factor of burnout in nurses[15, 16].

When individuals confront stress or difficulties, different persons may take different coping strategies of either task-, emotion- and avoidance-oriented coping. Previous studies have shown that lower burnout is accompanied with task-oriented coping, whereas increased burnout results from emotion-oriented coping, and the long-term avoidance-oriented coping can lead to severe mental problem[17–20]. Over the period COVID-19 pandemic, individuals with poor coping styles had adverse mental health such as anxiety and depression[21, 22].

Taken together, we hypothesize that emotional intelligence, psychological capital and coping style are associated with self-rated health of college students during the COVID-19 pandemic in China. To test this hypothesis, we conducted a cross-sectional survey by sampling undergraduate students in China in May 2020, so that we can provide theoretic basis to make strategies to keep students healthy in the context of COVID-19.

Participants And Methods

Study subjects

In May 2020, we conducted a survey on the impact of COVID-19 pandemic on health status in college students in China using online questionnaires via the platform of "Questionnaire Star". A college in Henan Province was chosen, and a total number of 367 undergraduate students voluntarily participated and provided valid questionnaires. Among the participants, 88 (24.0%) were men, and 279 (76%) women. The age ranged from 18–24 years old, with an average of 20 years old. The basic demographics and questions include such as sex, age, birthplace, and time length spent on internet surf per day. Informed consent was obtained from all participants included in the study.

Health status: Using the self-rated health measurement scale[23] (self-rated health measurement scale, SRHMS), the health status of each participant of college students was evaluated. The measurement scale includes 48 items in three dimensions: physical, mental, and social health. Using 1 to 5 scoring method for each item, the scores of each dimension are the sum of all items in the dimension. The higher the score is, the better the health status. The Cronbach's α coefficient of the scale in this study was 0.939.

Emotional Intelligence: The Emotional Intelligence Scale (WLEIS)[24] has 16 items in 4 measure dimensions of emotional awareness and management of one's own and others: self-emotional evaluation, emotional evaluation of others, emotional use and management. Using the 5-point rating method for each item, 1 represents "strongly disagree" and 5 "strongly agree". The higher the score of the subject is, the higher the level of emotional intelligence, and the higher ability to regulate one's own emotions when necessary and help others to do the same. In this study, the Cronbach's α coefficient of the scale was 0.890.

Psychological capital: The psychological capital questionnaire (PCQ) developed by Luthans et al. was used to comprehensively evaluate psychological capital. The Chinese version of PCQ was translated by Li and colleagues[25]. The questionnaire contains 24 items in four measure dimensions: self-efficacy, hope, resilience and optimism. Each item uses Likert 6-level scoring method, 1 means "strongly disagree" and 6 "strongly agree". The higher the score is, the higher the level of positive psychology for individuals, and the more resources they can use to improve their performance on the job and their success. The Cronbach's α coefficient of the scale in this study was 0.958.

Coping style

The Simplified Coping Style Questionnaire (SCSQ) was used to measure the coping style of college students[26]. There are 20 items in two dimensions of positive and negative coping. The score each item is graded 0 to 3. A high score of the positive coping indicates that the individuals are more inclined to adopt positive coping styles with efforts to solve a stressful situation/problem, and a high score of the negative coping refers that the individuals are more inclined to adopt negative coping styles with distancing or avoiding a stressful situation. The Cronbach's α coefficient of the scale was 0.798 in this study.

Statistical analysis

All data analyses were performed using SPSS 18.0 software. The measurement data showed an approximate normal distribution after normality test with both Skew and kurtosis methods. Pearson correlation analysis was performed to examine the correlation between self-rated health, emotional intelligence, psychological capital, and coping style. Multivariate regression analysis was used to explore the effect of emotional intelligence, psychological capital, and coping style on and their interaction in self-rated health[27]. A P value less than 0.05 was considered statistically significant.

Results

Characteristics of self-rated health, emotional intelligence, psychological capital and coping style in college students during COVID-19 pandemic

Table 1 illustrates the associations of self-rated health, emotional intelligence, psychological capital and coping style scores with demographic variables in college students of a university in China during COVID-19 pandemic period. Male students had a significantly higher score of psychological capital than female ($P < 0.05$). The students who have no siblings had a significantly higher score of both emotional intelligence and psychological capital than those having siblings ($P < 0.05$). There were significant differences in emotional intelligence scores between the students from different areas ($P < 0.05$). Pairwise comparisons showed that the students from urban areas had a significantly higher emotional intelligence score than those from rural areas ($P < 0.05$). Significant differences were also observed in self-rated health status, and psychological capital scores between students who spent different hours per day in internet surfing ($P < 0.05$). With online surfing hours per day increasing, the scores of self-rated health and psychological capital significantly decreased. Those who spent less than 3 h online surfing per day had significantly better health status or higher psychological capital scores than those who spent more than 6 h ($P < 0.05$).

Table 1

Associations of self-rated health, emotional intelligence, psychological capital and coping style with demographic variables in college students ($\bar{x} \pm s$)

Variable	n	Self-rated health	Emotional intelligence	Psychological capital	Coping style
Sex					
Male	88	335.31 ± 50.54	46.05 ± 6.09	107.24 ± 16.86	0.77 ± 0.64
Female	279	335.76 ± 42.65	44.91 ± 4.77	102.72 ± 15.99	0.83 ± 0.61
<i>t</i>		-0.076	1.816	2.283 [*]	-0.824
Having Siblings					
No	61	342.56 ± 44.09	46.70 ± 5.18	109.21 ± 16.13	0.90 ± 0.69
Yes	306	334.27 ± 44.64	44.88 ± 5.08	102.72 ± 16.14	0.80 ± 0.60
<i>t</i>		1.326	2.558 [*]	2.869 ^{**}	1.226
Birthplace					
Urban	104	338.42 ± 45.90	46.39 ± 4.69	106.38 ± 16.08	0.81 ± 0.63
Suburban	41	342.34 ± 43.23	45.02 ± 5.94	104.44 ± 16.59	1.00 ± 0.65
Rural	222	333.12 ± 44.60	44.64 ± 5.09	102.47 ± 16.25	0.78 ± 0.61
<i>F</i>		1.021	4.216 [*]	2.089	2.19
Online surfing time					
< 3 h	88	342.00 ± 43.59	45.72 ± 5.28	107.90 ± 16.44	0.89 ± 0.65
3 ~ 6 h	178	338.27 ± 42.50	45.35 ± 5.15	104.53 ± 14.83	0.82 ± 0.59
> 6 h	101	325.50 ± 47.72	44.43 ± 4.92	98.95 ± 17.53	0.74 ± 0.65
<i>F</i>		3.872 [*]	1.67	7.708 ^{**}	1.237
[*] <i>P</i> < 0.05, ^{**} <i>P</i> < 0.01;					

Correlations between health status, emotional intelligence, psychological capital and coping style scores in college students

The results of Pearson correlation analyses are shown in Table 2. There were significantly positive correlations between self-rated health, emotional intelligence, psychological capital and coping style scores in college students during the COVID-19 pandemic ($P < 0.01$). A moderate correlation strength was observed between either emotional intelligence, or psychological capital or coping style, or self-rated health, as well as between emotional intelligence and psychological capital (correlation coefficients ranged from 0.50 to 0.65). A relatively weak positive correlation existed between coping style score and either emotional intelligence or psychological capital (correlation coefficients 0.35 and 0.42).

Table 2

Pearson correlations between health status, emotional intelligence, psychological capital and coping style in college students ($n = 367$)

Variable	<i>M</i>	<i>SD</i>	Self-rated health	Emotional intelligence	Psychological capital	Coping style
Self-rated health	335.65	44.60	1			
Emotional intelligence	45.18	5.13	0.50 ^{xx}	1		
Psychological capital	103.80	16.29	0.63 ^{xx}	0.65 ^{xx}	1	
Coping style	0.82	0.62	0.50 ^{xx}	0.35 ^{xx}	0.42 ^{xx}	1
xx $p < 0.01$.						

Association of self-rated health with emotional intelligence, psychological capital and coping style

To investigate the effect of emotional intelligence, psychological capital and coping style on and their interactions in self-rated health in college students during the period of COVID-19 pandemic, we performed multivariate regression analyses in three different models. The results are illustrated in Table 3. In the model 1, we included the main effects of three variables only. We found that all three variables had significantly positive effects, explaining 47.4% variation of self-rated health. The coefficient of coping style was the largest, suggesting that coping style was the largest contributor to self-rated health in the model. In the model 2, then we added pairwise interaction terms besides the main effects. No pairwise interaction was found statistically significant ($P > 0.05$). We then added a three-way interaction term beyond the model 2 in the model 3, and we found the three-way interaction term was statistically significant ($P = 0.045$). The three-way interaction independently explained 0.6% variation of self-rated health.

Table 3
Effect of emotional intelligence, psychological capital and coping style on self-rated health in college students

Variable	Model 1		Model 2		Model 3	
	β	<i>P</i> value	β	<i>P</i> value	β	<i>P</i> value
Emotional Intelligence	1.436	0.001	1.455	0.001	1.863	< 0.001
Psychological capital	1.118	< 0.001	1.111	< 0.001	1.144	< 0.001
Coping style	18.541	< 0.001	18.674	< 0.001	21.277	< 0.001
Emotional intelligence × psychological capital			0.020	> 0.05	0.026	> 0.05
Emotional intelligence × coping style			-0.882	> 0.05	-0.762	> 0.05
Psychological capital × coping style			-0.049	> 0.05	-0.065	> 0.05
Emotional intelligence × Psychological capital × coping style					-0.045	0.045
Adjusted R ²	0.474		0.473		0.477	
ΔR^2	0.478	< 0.001	0.004	> 0.05	0.006	0.045

To visualize the effect of emotional intelligence, psychological capital and coping style and its interaction in self-rated health in college students during the period of COVID-19, we further constructed a figure showing the relationship between three variables and self-rated health based on the method for three-way interaction as described by Dawson and Richter[27] (Fig. 1). With the increased emotional intelligence, the self-rated health score increased regardless of psychological capital and coping style. At the same level of emotional intelligence, the self-rated health status was better in college students with high vs. low psychological capital. At the same levels of emotional intelligence and psychological capital, the self-rated health score was better in college students who actively take positive vs. negative coping styles.

Discussion

In this study, we demonstrated the associations between emotional intelligence, psychological capital, coping style and self-rated health in college students in China during the period of COVID-19 pandemic. We found all three variables were significantly positively associated with self-rated health, and there was

a statistically significant three-way interaction. The results suggest that college students who had high emotional intelligence, psychological capital and coping style scores had better health conditions than their peers with low ones. To our knowledge, this is the first study to investigate the effect of emotional intelligence, psychological capital and coping style on college student health during the pandemic.

Emotional intelligence is an important determinant in an individual's life success, and affects a person's mental health and social status. The stronger the individual's ability to regulate emotion is, the more helpful it is for the person to relieve stress and stabilize his/her emotional state [28]. A recent study demonstrated that the emotional intelligence workshops and seminars could improve academic engagement and performance, and reduce academic burnout in pharmacy students during the lockdown and quarantine[29]. Individuals with positive psychological capital score would show a more determined attitude in the face of difficulties[30], and believe that they have abilities and more resources to use to overcome difficulties and achieve success when facing challenges. Lebares and colleagues reported that high psychological resilience was significantly positively associated with a low risk of emotional exhaustion-related burnout and low job performance[31]. In consistence with this principal, our study shows that at the same level of emotional intelligence, college students with a high psychological capital score had better self-rated health state than those with low ones.

Coping style refers to the cognitive and behavioral styles that individuals take to deal with the frustrations and difficulties when they face in daily life. The choice of coping styles, task-oriented, emotion-oriented and avoidance-oriented, determines the consequent effect of stress events on individuals' health [32]. Individuals taking task-oriented coping will actively find a solution to solve the stress problems by such as learning new skills or obtaining more information to manage it, consequently eliminating the stress. Emotion-oriented coping involves emotional response to the perception of stress, alleviating the stressor-associated unpleasant stressful feeling. Avoidance-oriented coping instead involves activities and cognition to avoid the stressful situations, always accompanying with distraction and social diversion. Repeated or long-term avoidance or distancing from a stressful situation can result in a detrimental consequence to the individual. A previous study demonstrated that the positive coping styles could promote individual's mental health with a positive attitude, and reduce psychological harm[33]. When an individual has more psychological capitals during the grow-up, it is easier for him/her to take positive coping styles to find solutions with more positive optimism when facing challenges[34], promoting the individual's health. In this study, we found that the coping style was a major effect on self-rated health with a statistically significant three-way interaction. Taking a positive coping style is important in maintaining good health when they face a stressful situation, and it is a more active strategy even at the same levels of emotional intelligence and psychological capital.

In this study, we also found that sex, having sibling or not, birthplace and online surfing time were associated with emotional intelligence, psychological capital and coping style. Previous studies have shown that women had a higher emotional intelligence than men in the nursing profession[35, 36]. However, we did not find a significant difference in emotional intelligence in college students. This discrepancy is most likely duo to the difference in social experience. Undergraduate Students, particularly

in China, have much less experience in society in comparison to nurses or other professionals. Male college students have a relatively more social relation, and more resources to use. Thus, when they face challenges and difficulties, they will be more active with courage and optimism to solve the problems in comparison to their female peers. The college students from only-one child family (no siblings) usually have a higher emotional intelligence and psychological capital score, since they probably start earlier to play together with peers from other families, learning mutual and social relationship through the interaction. Similarly, the students from urban area usually have more skills to identify and manage their own's emotions and may affect others as necessary, since their family incomes are relatively higher with more opportunity to expose themselves to different cultures in urban than in rural area. In addition, although the internet emergency facilitates the access to obtain knowledge and information, internet also provides a virtual village for users, allowing online interactions behind screen but with isolating themselves from others. Internet addiction makes college students insufficient personal communication with peers, thereby leading to mental health problem.

There was a significantly positive correlation among the variables of college students' emotional intelligence, psychological capital, and coping styles as expected. The findings suggest that college students with a high emotional intelligence have more resources and adopt a positive coping style, since they have a strong ability to perceive, evaluate, understand, express their own emotions and influence others' [37]. When they have more psychological capitals to use, they will take more positive coping styles with optimism to face difficulties[38]. Thus, better health status is maintained.

Some limitations exist in this study. This survey is a cross-sectional study, and it is difficult to make causal inference from the association between the factors we investigated and self-rated health. Secondly, the sample size is relatively small, and the survey was conducted in one college only, bias may exist and the participants may not well represent the whole population of college students. However, the findings warrant further studies with a relatively large sample size. Longitudinal or intervention studies can be carried out

In summary, this study demonstrated the effects of emotional intelligence, psychological capital and coping style on health in college students in China during the period of COVID-19 pandemic. We found that coping style was a major factor positively associating with health. The findings provide knowledge for our educational administrators how to improve and maintain college students' health, keeping them mentally healthy during the period of COVID-19 pandemic.

Abbreviations

SARS-CoV-2, Severe acute respiratory syndrome coronavirus 2; COVID, contagious coronavirus disease; SRHMS, Self-rated Health Measurement Scale; EIS, Emotional Intelligence Scale; PCQ, Psychological Capital Questionnaire; SCSQ, Simplified Coping Style Questionnaire.

Declarations

Ethical approval

The procedures followed were in accordance with the ethical standards of the Committee on Zhengzhou Normal University. The questionnaire had an introductory paragraph explaining the purpose of the survey and the name of the research centre undertaking the research, and that responses were anonymous. All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Availability of data and materials

The dataset supporting the conclusions of this article can be shared with the corresponding author by email.

Conflict of interest

No conflicts of interest are declared.

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Authors' contributions

YY and XJ designed the research, carried out data analysis, wrote the paper, and YY is the corresponding author. HM provided guidance in study design, organized the investigation. LL, YL and XJ provided help with the data analysis, interpretation, and write-up. YL provided help with the data collection and interpretation. All authors read and approved the final manuscript.

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Figures

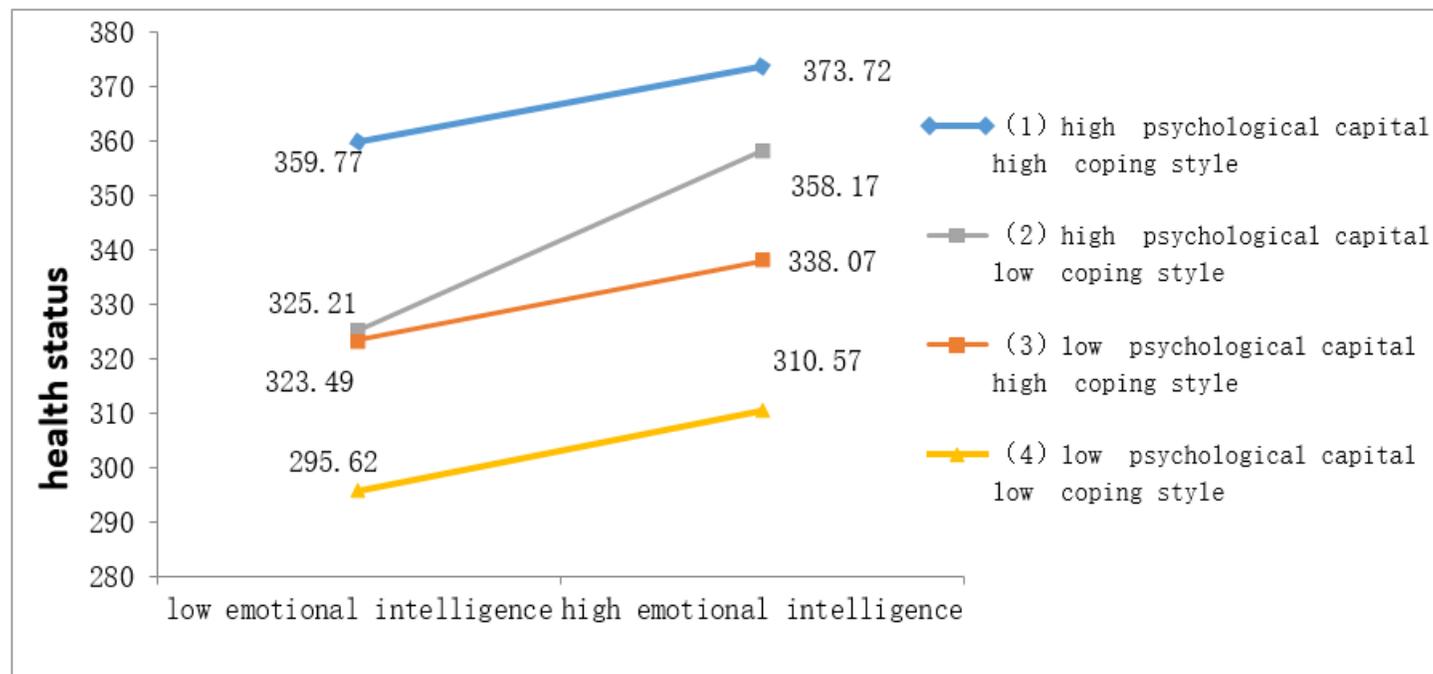


Figure 1

Interaction of emotional intelligence, psychological capital and coping style in self-rated health. Blue line represents the individuals with high psychological capital and coping style; grey line represents those with high psychological capital but low coping style; tangerine line represents low psychological capital but high coping style, and orange line represents low psychological capital and coping style. Individuals with high psychological capital and coping style show the best health status regardless of emotional intelligence. High emotional intelligence improves health status in comparison to low one at the same level of psychological capital and coping style.