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The Relationships between Emotion, Sense of Coherence, Social Rhythm and Positive Mental Health in Chinese University Students during COVID-19

Wenjuan Zhang[1*], Lanyan Ding[1], Jin Yin[2], Wenwen Song[2]

[1]Mental Health Education Center, Xidian University, Xi'an, China
[2]Haitang No. 4 Academy, Xidian University, Xi'an, China
Email: *wjuanzhang@xidian.edu.cn

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Abstract

Aim: This study explored positive mental health during the COVID-19 epidemic control period and further examined emotion, sense of coherence, social rhythm may contribute to positive mental health among a sample of 521 university students in China. **Method:** The questionnaires contained items concerning demographic information, Positive Mental Health Scale, Positive Affect and Negative Affect Scale, Sense of Coherence Scale and Brief Social Rhythm Scale. **Results:** Analysis of the data showed that positive mental health was significantly positively correlated with positive affect and sense of coherence, but negatively correlated with negative affect and social rhythm. Regression analysis also showed that positive affect, negative affect, sense of coherence, and social rhythm could predict the level of positive mental health of individuals in the context of COVID-19 epidemic control management in Chinese university students. **Conclusions:** Results suggest it is of great significance to keep positive affect, sense of coherence and regular social rhythm for maintaining the mental health of individuals under the influence of the spread of COVID-19. It would be useful to carefully measure each of these variables and investigate other potential factors related to positive mental health with the possibility that emotion, sense of coherence and social rhythm are mediating variables.

Keywords

Positive Mental Health, Emotion, Sense of Coherence, Social Rhythm, University Students

1. Introduction

The outbreak of the coronavirus disease in December 2019 (COVID-19) and its rapid spread from 2020 to 2023 have significantly changed people's everyday life. The COVID-19 outbreak is taking an unprecedented toll on people not only physically, but also psychologically. To slow down the pandemic spread, governments and authorities all over the world introduced restrictive behavior measures, such as "social distancing", "stay at-home" requests and so on. Following available literatures, the spread of the epidemic and the control measures have had a significant impact on the mental health of individuals. More mental health problems have been exposed (Jung et al., 2020; Serafini et al., 2020) and emotional problems such as depression and anxiety were more frequent (Brooks et al., 2020; Dozois, 2020; Dyer & Kolic, 2020; Fullana et al., 2020; Rana & Singh, 2020; Johnson et al., 2022). Indeed, as many as two-thirds of people in the general population reported at least some anxiety or depression symptoms during the early phases of the pandemic (Fullana et al., 2020). In China, the implementation of unprecedented strict quarantine measures was used to keep a large number of people in isolation and affected many aspects of people's lives. The first nationwide large-scale survey of psychological distress in the general population of China during the tumultuous time of the COVID-19 epidemic found that almost 35% of the respondents experienced psychological distress (Qiu et al., 2020).

After the pandemic, more attention has been paid to the impact of psychopathology and negative emotions on individuals. And mental health is more than the absence of mental problems. So this study wanted to focus on the impact on positive mental health. In recent years, it has been increasingly recognized that the absence of mental disorder is not the same as the presence of positive mental health (PMH). Thus, elements of positive mental health (PMH) and mental health problems can be present at the same time. They are seen as independent but correlated concepts (Lukat et al., 2016). Specifically, positive mental health is a well-known protective factor that buffers the impact of negative experiences and reduces the risk of mental disorders (Brailovskaia et al., 2020).

Sense of coherence (SOC) is a concept put forth by the sociologist Antonovsky and is defined as "a global orientation that expresses the extent to which one has a pervasive, enduring though dynamic feeling of confidence" (Antonovsky, 1987). SOC reflects a coping capacity and individuals with a strong SOC tend to cope with stress flexibly and effectively (Super et al., 2015). Studies have demonstrated SOC to be an important variable in predicting mental health (Takeuchi, 2013; Krok & Kleszczewska-Albańska, 2019) and the positive relationship between SOC and PMH was also found in mental health professionals (Jiménez et al., 2015). The recent study demonstrates that SOC is an important predictor and modulator of psychopathological symptoms during the COVID-19 pandemic, particularly in those respondents that ruminate about the pandemic (Schäfer et al., 2022). Therefore, the positive relationship between sense of coherence and

positive mental health can be expected in this study.

A cross-cultural study found that social rhythm irregularity is related to increased reporting of health problems, depression, anxiety, and stress. In contrast, greater regularity is related to better overall health state, life satisfaction, and positive mental health. This relationship was present in samples from Russia, the U.S. and Germany (Margraf et al., 2016). A longitudinal study of Chinese college students also provides evidence of a longitudinal positive reciprocal relationship between regular social rhythm and positive mental health (Cai et al., 2017). Therefore, the relationship between the change of social rhythm caused by the outbreak of Covid-19 and the control measures and individual health needs further attention.

In December 2021, when an epidemic swept through Xi'an, China, the authorities adopted silent and closed control measures to prevent the rapid spread of the epidemic. Given that the containment measures during the outbreak of COVID-19 and life changes of college life may lead to greater risk of negative emotion and irregularity in social rhythm as well as to changes in positive mental health, a university student sample was selected for the current study. Sense of coherence and regular social rhythm may protect against mood disturbance and promote positive mental health. Therefore, it is important to identify these factors that can contribute to the enhancement of positive mental health and to understand their interaction especially during the pandemic. The present study aimed to gain insight into the relationships of positive mental health, sense of coherence, emotion and social rhythm during the outbreak of COVID-19 when university students are confined to a certain space, and implementing relevant mental health intervention policies to cope with this challenge efficiently and effectively.

2. Methods

2.1. Subjects

A total of 521 university students (65.70% male students), aged 17 - 28 years (mean age = 21.05 years and SD = 1.51), were included via a convenience sampling method in this survey from January 9 to January 11, 2022 in Xi'an. Xi'an were lockdown during this period and many measures including traveling limits, social distancing, closure or lockdown of schools and workplaces, requirement of mask wearing in public places, and regular nucleic acid test were places by the local governments. The participants were enrolled from a university of science and engineering in Xi'an. All participants were properly instructed and submit their answers through an online questionnaire. The inclusion criteria were as follows: 1) being the university students; 2) they are in Xi'an at that time; 3) restrictions on travel; 4) without a history of major physical and psychiatric disorders. All the respondents were informed beforehand regarding the purpose and process of the whole study. They were also told to participate in this study voluntarily and anonymously and have the opportunity to withdraw from this

participation at any time. This survey was approved by the local ethical committee. All procedures met the 1964 Helsinki Declaration and its later amendments. Participants gave their consents before participation and received a gift (about RMB 1.0) after completing the survey.

Two questionnaires had missing demographic data, making the valid sample for the combined analysis 519 students (99.62% of the collected questionnaires). 493 (94.99%) individuals reported their ethnicity as Han and 26 (5.01%) as an ethnic minority. The detailed demographic information of the study sample is shown in Table 1.

2.2. Measures

Demographics

There are six demographic questions asked about grade, gender, age, ethnicity and only child.

Positive Mental Health Scale

The unidimensional Positive Mental Health Scale (PMHS) (Lukat et al., 2016) was used to assess the level of positive mental health. The PMHS is an internationally well-established instrument for the assessment of psychological, emotional, and social well-being. Research indicates that this scale is appropriate for cross-cultural research, based on analyses indicating measurement invariance across cultures (Bieda et al., 2017). The PMHS includes nine items that are rated on a 4-point Likert-type scale (e.g., "I am often carefree and in good spirits"; 0 = do not agree, 3 = agree). The higher the sum score, the higher the level of positive mental health. The total sum score can range from 0 to 27.

Positive Affect and Negative Affect Scale

The Positive Affect and Negative Affect Scale (PANAS) including 20 items in total, with 10 rating positive affect and another 10 negative affect (Watson et al., 1988), was used to assess the participants' emotional experience in the past 14 days. The Chinese version of PANAS has been confirmed to be sufficiently reliable and valid (Xue et al., 2021). Each item was measured on a 5-point Likert scale, ranging from 1 ("Very Slightly or Not at all") to 5 ("Extremely"). Items were

Table 1. Demographic characteristics of the study sample (n = 519) (M ± SD).

Variable name		N	%	PMH	PANAS-PA	PANAS-NA	SOC	Social rhythm
Sex	Male	341	65.70	27.23 ± 6.14	29.79 ± 7.65	22.46 ± 8.52	37.83 ± 7.26	13.68 ± 4.92
	Female	178	34.30	27.39 ± 6.58	29.07 ± 7.88	21.57 ± 8.43	38.10 ± 8.19	13.28 ± 4.92
Ethnicity	Han	493	94.99	27.19 ± 6.33	29.52 ± 7.70	22.11 ± 8.46	37.88 ± 7.64	13.56 ± 4.91
	Ethnic minority	26	5.01	29.08 ± 5.20	29.92 ± 8.36	23.04 ± 9.15	38.77 ± 6.51	13.31 ± 5.14
Only child	Yes	269	51.83	27.46 ± 6.63	29.88 ± 7.79	22.44 ± 8.78	37.96 ± 7.84	13.30 ± 5.23
	No	250	48.17	27.09 ± 5.91	29.17 ± 7.67	21.85 ± 8.17	37.88 ± 7.31	13.80 ± 4.55

a. PMH, Positive Mental Health; PANAS, Positive Affect and Negative Affect Scale; PA, positive affect; NA, negative affect; SOC, Sense of Coherence; SD, standard deviation.

scored as indicated by the survey to calculate a positive affect score (possible range 10 - 50, higher scores represent higher levels of positive affect) and a negative affect score (possible range 10 - 50, lower scores represent lower levels of negative affect).

Sense of Coherence Scale

Students were asked about their sense of coherence by complete the "Leipzig Short Scale of Sense of Coherence" (SOC-L9) (Kase & Endo 2020, Lin et al., 2020). The reliability and validity of the Chinese version of the scale were confirmed (Gao et al., 2013). This section of the questionnaire consisted of 9 items. Participants were asked to rate the severity of each item on a 7-point Likert scale. Items were summed to reach a total score of sense of coherence where higher total summed scores indicated higher SOC. Some items (item 2, item 3, item 5, and item 8) were reverse-coded.

Brief Social Rhythm Scale

Social rhythm was assessed using the Brief Social Rhythm Scale (Margraf et al., 2016) which includes 10 items measuring an individual's perceived social rhythm regarding sleep, meals, wake-up time, and social contacts on a scale ranging from 1 (very regularly) to 6 (very irregularly). In the present study, in consideration of the control after the epidemic, we modified the scale by eliminating the difference between working days and rest days and the social contacts including face-to-face communication and online communication. It assesses the regularity of time spent with others at work/school and during free time. The final scale contained five items, and the high sum score indicates more irregular social rhythm.

2.3. Data Analysis

Statistical analyses were conducted using the Statistical Package for the Social Sciences (SPSS 26). Descriptive statistics were conducted to describe demographic characteristics, positive mental health, positive affect and negative affect, sense of coherence and social rhythm. Positive mental health, positive affect and negative affect, sense of coherence and social rhythm are all continuous variables. We performed the comparison of positive mental health among different demographic subgroups using independent t-test. In addition, we explored the correlation among study variables by using Pearson's correlation coefficient (r). Non-significant variables were excluded from subsequent regression analyses. A multiple regression model was then conducted to examine the relationship among positive affect and negative affect, sense of coherence, social rhythms and positive mental health. We set the statistical significance level at 0.05 for all analyses ($p < 0.05$).

3. Results

3.1. Comparison of Variables across Demographic Characteristics

The means and standard deviations (SDs) of positive mental health, positive af-

fect and negative affect, sense of coherence and social rhythm scores as per sex, ethnicity and only child status are described in Table 1. The independent t-test revealed no significant differences in the scores for positive mental health, positive affect, negative affect, sense of coherence and social rhythm were found ($ps > 0.05$).

3.2. Correlation Analysis of Factors and Positive Mental Health

The Pearson correlation analysis results showed that the positive affect was significantly positively correlated with positive mental health (r = 0.451, $p < 0.001$) and sense of coherence (r = 0.381, $p < 0.001$), but negatively correlated with the social rhythm (r = −0.317, $p < 0.001$). The negative affect was significantly negatively correlated with positive mental health (r = −0.415, $p < 0.001$) and sense of coherence (r = −0.537, $p < 0.001$)), but positively correlated with the social rhythm (r = 0.295, $p < 0.001$). Sense of coherence was significantly positively correlated with positive mental health (r = 0.600, $p < 0.001$) but negatively correlated with the social rhythm (r = −0.426, $p < 0.001$). The social rhythm was negatively with positive mental health (r = −0.441, $p < 0.001$). Overall, according to the correlational analyses, positive mental health was positively correlated with positive affect and sense of coherence, but negatively correlated with negative affect and social rhythm ($ps < 0.001$, see Table 2).

3.3. Multiple Regression Analysis on Positive Mental Health

A multiple regression model was used to examine how sense of coherence, positive affect, negative affect and social rhythm would predict positive mental health among Chinese university students while controlling for demographic differences, in the case of isolation and containment during the COVID-19. The results showed the more positive affect and the higher the sense of coherence, predicted a higher level of positive mental health. Conversely, the more negative affect, the more irregular social rhythm predicted a lower level of positive mental health. Specifically, an individual with more positive affect, higher sense of

Table 2. Correlations between positive mental health, emotion, sense of coherence and social rhythm (n = 519).

	PMH	PANAS-PA	PANAS-NA	SOC	Social rhythm
PMH	1				
PANAS-PA	0.451***	1			
PANAS-NA	−0.415***	−0.024	1		
SOC	0.600***	0.381***	−0.537***	1	
Social rhythm	−0.441***	−0.317***	0.295***	−0.426***	1

*$p < 0.05$,**$p < 0.01$, ***$p < 0.001$. a. PMH, Positive Mental Health; PANAS, Positive Affect and Negative Affect Scale; PA, positive affect; NA, negative affect; SOC, Sense of Coherence.

Table 3. Multiple regression results for relationships between emotion, sense of coherence, social rhythm and positive mental health (n = 519).

Variables	*B*	*S.E.*	β	*t*
Constant	16.209	1.943		8.342
PANAS-PA	0.220***	0.030	0.270	7.3808
PANAS-NA	−0.136***	0.029	−0.184	−4.637
SOC	0.274***	0.036	0.330	7.580
Social rhythm	−0.205***	0.047	−0.161	−4.396

*$p < 0.05$, **$p < 0.01$, ***$p < 0.001$. a. PMH, Positive Mental Health; PANAS, Positive Affect and Negative Affect Scale; PA, positive affect; NA, negative affect; SOC, Sense of Coherence.

coherence, less negative affect and regular social rhythm will achieve higher levels of positive mental health, in the case of isolation and containment during the COVID-19. As shown in Table 3. The overall explained variances (R^2) for all predicted variables in the model were 46.7%.

4. Discussion

The present study examined positive mental health among Chinese university students during the COVID-19 epidemic control period and further examined the relationships between emotion, sense of coherence, social rhythm and positive mental health. The results showed positive mental health was positively correlated with positive affect and sense of coherence, but negatively correlated with negative affect and social rhythm. Furthermore, the more positive affect and the higher the sense of coherence, predicted higher indices of positive mental health. Conversely, more negative affect and more irregular social rhythm predicted lower indices of positive mental health. In this study, we focus on the effect of the related factors on positive mental health in order to provide the resources needed to improve the mental health of individuals affected by the epidemic. Positive mental health helps us better cope with the uncertainties and risk factors of the pandemic.

Emotional health is a very important part of mental health. The effect of positive affect and negative affect on positive mental health are both significant in this study. Studies have found more negative emotions such as anxiety and depression caused by the pandemic (Brooks et al., 2020). According results in this study, both the enhancement of positive affect and the reduction of negative affect during the pandemic contribute to the maintenance of positive mental health. During the lockdown of Xi'an, it is reported that college students isolated in their dormitories have actively adopted a variety of ways to regulate their moods: indoor sports, painting, reading, calligraphy practice, some creative new ideas, online video chatting and so on. These activities helped them get through the negative feelings of indoor isolation. Learning more emotional regulation methods can help students experience more positive emotions, thus helping them

maintain positive mental health.

Sense of coherence can affect the mental health of individuals (Takeuchi, 2013; Jiménez et al., 2015). This study reconfirms the strong association between sense of coherence and positive mental health and that sense of coherence can predict positive mental health. Students with a high sense of coherence have confidence that allows them to find coherence in the world in which they live. Even in instances where that coherence is threatened by stressors, such as lockdown, such students can readily cope with stressors and overcome stressful situations.

As expected, a more irregular social rhythm, including going to bed, eating meals and chatting with others irregularly, was predictive of lower positive mental health. Previous research has shown that irregular social rhythms lead to lower levels of positive mental health (Margraf et al., 2016). In an enclosed space, the individual's social rhythm is disrupted easily. The reduction in external interactions brought about by social isolation makes it difficult to maintain a normal rhythm. Our study suggests that university students, with online teaching, social isolation and communication difficulties, which may cause irregular social rhythm and then affect their mental health. Thus, a relatively regular schedule may lower the negative aspect of body and mental health, and lead to better positive mental health.

5. Limitations and Further Research

Despite the gained knowledge of our investigation of university students in China, the following limitations should be taken into account when interpreting our findings. First, convenience sampling was used in this study, which resulted in imbalance in the number of students in each grade. It was mainly freshmen and seniors, with a smaller number of sophomores and juniors. Thus, it was not possible to compare differences in each variable across grades. Second, the participants in this study were from one university in one city. The generalizability of the results of this study is limited because of the differences between universities in different regions. In a country as large and diversified as China, study of a wider range of participants is needed. Further studies involving students from different regions and types of universities in China are needed to further explore positive mental health and related factors. Third, a limited number of variables were considered in the present study, and more variables such as physical activity and personality could be included in future studies.

In spite of the limitations, these data give insights into positive mental health, emotion, sense of coherence, social rhythm and the relationships between them in university students under the control of quarantine caused by COVID-19 in China. The study shows the importance of keeping positive emotion, high sense of coherence and regular social rhythm for maintaining our positive mental health as we gradually learn to get along better with the coronavirus.

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Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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