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The mediating role of reliance in the relationship between anxiety and stress mindset during the COVID-19 period

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Abstract: Objective: To investigate how reliance mediates the relationship between anxiety and stress mindset among Xi'an residents during the COVID-19 period, and to examine their mental health during the epidemic lockdown. Methods: Using a convenience sampling method, we surveyed 1394 Xi'an residents from January to February 2022 with the General Information Questionnaire, the Stress Mindset Measure, the State-Trait Anxiety Inventory and the Connor and Davidson's Resilience Scale. Results The 1394 residents had an average age of 25.23±6.04 years and scored 53.47±9.30 for trait anxiety, 27.98±5.23 for stress mindset and 99.70±15.25 for reliance. There was a significant positive correlation between trait anxiety and stress mindset (r=0.567, p<0.01), between reliance and stress mindset (r=0.281, p<0.01), and between trait anxiety and reliance (r=0.234, p<0.01). Gender differences were statistically significant for trait anxiety (t=4.199, p<0.01), reliance (t=5.648, p<0.01) and stress mindset (t=4.499, p<0.01). Trait anxiety had a positive effect on stress mindset (b=0.342, p<0.01), as did reliance (b=0.045, p<0.01). Reliance partially mediated the relationship between trait anxiety and stress mindset. Conclusions: Reliance partially mediated the relationship between trait anxiety and stress mindset among the 1394 residents in Xi'an during the COVID-19 period. Multiple factors such as gender, occupation, marital status and physical health need to be considered in the process of controlling the epidemic.

1. Introduction

After the outbreak of COVID-19 in 2020, China responded quickly and actively with a "scientifically accurate and dynamic zero" epidemic prevention policy that has greatly safeguarded economic development and the health of the population, but in the process, the mental health of the population also needs to be studied and attended to. Studies have proven that the COVID-19 period has caused negative psychological effects on many people. These include common psychological conditions such as anxiety and depression. Anxiety refers to the complex emotions of anxiety, fear, anxiety and dissatisfaction in the face of impending crises and risks. Anxiety Cattell classifies anxiety into two parts: state anxiety and trait anxiety, where state anxiety is a temporary state of anxiety triggered by a situation, which exists immediately and has a certain level of intensity. In contrast, trait anxiety is a fixed and long-term personality trait or characteristic of a person, and people with high

trait anxiety can easily feel intense stress and tension in stressful situations. The trait anxiety is a fixed and chronic personality trait or trait. Past research has shown that there is a correlation between reliance and anxiety Reliance can reduce the negative effects of anxiety.

Reliance refers to the ability to recover from negative experiences[1] and its presence has a positive effect on a person's psychological development. This ability develops throughout a person's life and helps them to cope with different life situations, to regulate psychological changes in themselves in a timely manner and to prevent them from being affected by the profound and long lasting effects of stress. As a buffer against stressful or traumatic events, mental resilience can counteract the distress caused by stressful events and predict people's mental health[2].

Stress mindset refers to a person's perception of stress and includes both stress-is-enhancing and stress-is-debilitating mindset. The stress mindset is the perception of stress as a facilitator of performance and productivity, health and well-being, and learning and growth, while the stress mindset is the perception of stress as a detractor of these aspect[3]. There is growing evidence that mindfulness not only affects outcomes in the domains of intelligence and ageing[4], but also influences how people respond to stressful situations. Stress mindset associated with people's satisfaction with their health and life, and people with stress-is-enhancing mindset show more adaptive physiological and behavioural responses in the face of stress[3].

Taken together, both Reliance and stress-is-enhancing mindset influence to some extent how well individuals cope with stress and also influence their anxiety response. According to Mathews et al. negative interpretations in ambiguous situations will influence changes in individual trait anxiety[5]. Since the city of Xi'an was closed for 32 days at the end of 2021 due to epidemic prevention and control, which brought about health, safety, food, income and other issues under ambiguous conditions and brought a great sense of insecurity, we chose trait anxiety as a quantitative criterion for residents' stress level in our study.

2. Objects and methods

2.1 Object

The study selected people who lived in Xi'an during the city closure period, and residents were selected by convenience sampling method from January to February 2022. 1550 questionnaires were distributed and 1484 questionnaires were collected, and after excluding those with obvious regular responses, 1394 valid questionnaires were obtained, and the effective rate of questionnaire collection was 93.9%.

2.2 Research Tools

2.2.1 General information questionnaire

Referring to Kingman's study, the questionnaire was designed with eight questions including gender, age, and community situation.

2.2.2 Stress Mindset Measure (SMM) [3]

This scale was developed in 2013 by Crum et al. It uses a 5-point scale with two dimensions: stress-is-enhancing mindset and stress-is-debilitating mindset, and it can accurately measure residents' perceptions of stress with good reliability and validity, even in domestic cultures.

2.2.3 State-Trait Anxiety Inventory Form Y (STAI-Y)

Developed by Spielberger et al. in 1979, it is widely used for psychological assessment of anxiety conditions and related investigations in various groups due to its simplicity and ease of use. It can be divided into State Anxiety, which explores short-term reactions, and Trait Anxiety, which explores long-term states, with 20 items each, and the internal consistency coefficient of both subscales is 0.8941.2.4 Connor and Davidson's Resilience Scale (CD-RISC)

A 5-point scale with 25 questions was used, and the three-factor scale of Xiao Nan et al. was divided into three factors: toughness, optimism and strength. Among them, the toughness dimension is 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22 and 23 questions, the optimism dimension is 1, 5, 7, 8, 9, 10, 24 and 25 questions, and the strength dimension is 2, 3, 4 and 6 questions[6].

2.3 Statistical methods

Cross-sectional statistics were used in this project, and data analysis of the obtained results was performed using SPSS22.0 statistical software, while the mediating effect test was implemented through the process plug-in in SPSS methods. Statistical inference was performed using independent sample t-test and one-way ANOVA, two-way comparison was performed using LSD test, correlation between variables was explored by Pearson correlation analysis, and functional relationship between variables was explored by linear regression. The study used the Wen Zhonglin et al. The study used the three-step regression mediating effect test method of Wen Zhonglin et al: first, the regression of trait anxiety and stress mindset; then the regression of trait anxiety and Reliance; and finally the regression of trait anxiety, Reliance and stress mindset. According to James and Brett mediating variable presence condition test mediating effect, test level α=0.05 (two-sided).

3. Results

3.1 Basic information and correlation analysis

The age of 1394 residents was 25.23 ±6.04 years, of which 882 (63.3%) were male and 511 (36.7%) were female. Occupational distribution, marital status, and other circumstances in the epidemic are shown in Table 1. Trait anxiety was positively and significantly correlated with stress mindset($r=0.567$, $p<0.01$), Reliance was positively and significantly correlated with stress mindset($r=0.281$, $p<0.01$), and trait anxiety and Reliance were positively and significantly correlated ($r=0.234$, $p<0.01$).

Table 1: Demographic data of 1394 residents of Xi'an during the period of COVID-19 period

Projects	Grouping	Frequency	Composition ratio (%)
Gender	Male	882	63.3
	Female	512	36.7
Age (years)	≤18	113	8.2
	18~25	761	54.6
	25~32	342	24.5
	>32	176	12.7
Career	Students	438	31.4
	Science and education / culture / health	153	11.0
	Enterprise workers	383	27.5
	Government/Institutions	162	11.6
	Self-employed / Freelance	255	18.3

	Retirees	3	0.2
Marital Status	Unmarried	907	65.1
	Married	477	34.2
	Divorced/widowed	10	0.7
Chronic Diseases	Yes	180	12.9
	No	1214	87.1
Exposure to suspected COVID-19 patients	Yes	62	4.4
	No	1332	95.6
Community situation	With confirmed diagnosis	103	7.4
	No confirmed diagnosis	1235	88.6
	Not sure	56	4.0
Community Immunization	Good	1237	88.7
	General	150	10.8
	Bad	7	0.5

3.2 Common method deviation test

Since the questionnaire mainly adopts subjects' self-report method, this survey method may make common method bias exist among them. In order to solve such problems, firstly, in the data collection, we conducted corresponding controls to reduce the possibility of subjects' wrong answers due to inertia, such as using anonymous tests and setting reverse questions. The first step was to control the data collection to reduce the possibility of incorrect responses due to inertia, such as using anonymous tests and setting reverse questions. To analyze the data, we used the Harman one-factor test. The results showed that among all the factors, there were 9 factors with eigenvalues to be greater than 1, and the explanation rate of variance for the first factor was 26.11%. As can be seen above, the explanation rate is less than the critical value of 40% in the traditional method, which indicates that the common method bias is not significant and the data can be further analyzed.

3.3 Comparison of Trait Anxiety, Stress Mindset and Reliance by Demographic Characteristics

The results of the survey are detailed in Table 3, where residents' trait anxiety score was 53.47±9.30, stress mindset score was 27.98±5.23, and Reliance score was 99.70±15.25. The differences in trait anxiety scores ($t=4.199$, $p<0.01$), reliance scores ($t=5.648$, $p<0.01$) and stress mindset scores ($t=4.499$, $p<0.01$) were statistically significant by gender. Male residents had higher trait anxiety compared to female resident sources, but they had more optimistic attitudes toward stress and better reliance. The trait anxiety score ($F=8.760$, $P<0.01$, $F=6.335$, $P<0.01$), reliance score ($F=7.451$, $P<0.01$, $F=16.786$, $P<0.01$), and stress mindset score ($F=9.398$, $P<0.01$, $F= 8.709$, $P<0.01$) were statistically significant differences. As shown in Table 2, whether or not to contact patients with suspected COVID-19 significantly affects the trait anxiety and stress related mentality of residents; The effectiveness of community recognition and prevention significantly affects residents' stress-related attitudes and dependence; And the prevalence of chronic diseases, significantly affecting residents' trait anxiety.

Table 2: Comparison of trait anxiety, reliance and stress mindset of different demographic sociological characteristics in Xi'an during the period of neoconiosis

Projects	Grouping	Trait anxiety	Reliance	Stress mindset
Gender	Male	54.24±9.37	101.44±14.77	28.43±5.39
	Female	52.10±9.02	96.70±15.61	27.18±4.84
t		4.199	5.648	4.499
p		**0.000**	**0.000**	**0.000**
Career	Students	51.80±8.60	96.35 ±15.89	26.68±4.8

	Science and education / culture/ health	55.27±9.59	101.29±14.91	28.84±5.38
	Enterprise workers	52.84±8.42	101.47±13.69	28.08±4.87
	Government/Institutions	56.48±10.95	103.12±13.50	29.19±5.59
	Self-employed / Freelance	54.21±9.64	99.71±16.49	28.75±5.51
	Retirees	61.67±16.50	94.67±26.65	29.00±10.15
F		8.760	7.451	9.398
p		**0.000**	**0.000**	**0.000**
Marital Status	Unmarried	52.85±9.09	97.99±15.54	27.55±5.10
	Married	54.56±9.54	102.93±14.10	28.78±5.35
	Divorced/widowed	57.60±11.13	99.80±18.64	28.30±6.77
F		6.335	16.786	8.709
P		**0.002**	**0.000**	**0.000**
Chronic Diseases	Yes	54.99±9.53	99.23±15.36	28.57±4.97
	No	53.25±9.25	99.77±15.24	27.89±5.26
t		2.349	-0.434	1.639
p		**0.019**	0.663	0.101
Exposure to suspected COVID-19 patients	Yes	58.03±10.72	100.50±15.01	30.02±5.84
	No	53.26±9.18	99.66±15.27	27.88±5.18
t		3.447	0.424	3.151
p		**0.001**	0.971	**0.002**
Community situation	With confirmed diagnosis	55.19±10.24	100.26±13.60	29.43±5.20
	No confirmed diagnosis	53.30±9.26	99.90±15.30	27.86±5.25
	Not sure	54.05±8.18	94.23±16.22	27.86±4.48
F		2.085	3.786	4.299
p		0.125	**0.023**	**0.014**
Community Immunization	Good	53.63±9.32	101.02±14.70	28.15±5.30
	Genral	52.17±9.08	89.47±15.52	26.67±4.46
	Bad	52.86±9.55	85.71±18.13	26.00±3.70
F		1.682	43.793	5.841
p		0.186	**0.000**	**0.003**
Total		53.47±9.30	99.70±15.25	27.98±5.23

3.4 Regression analysis

Pearson correlation analysis showed that there was a correlation between trait anxiety, stress mindset and reliance, $p<0.01$. In addition, trait anxiety was significantly positively correlated with stress mindset($r=0.654$, $p<0.01$), trait anxiety was significantly positively correlated with reliance ($r=0.353$, $p<0.01$), and stress mindset was significantly positively correlated with reliance significantly positively correlated ($r=0.345$, $P<0.01$) for each specific dimension as shown in Table 3.

Regression analyses were conducted on the correlation analysis of trait anxiety, reliance and stress mindset among the city residents during the city closure in Xi'an. The results showed that there was a positive effect of trait anxiety on stress mindset ($b=0.342$, $P<0.01$) and a positive effect of reliance on stress mindset ($b=0.045$, $P<0.01$) during the city closure in Xi'an.The regression equation was:

Stress mindset = 5.245 + 0.342*trait anxiety + 0.045*reliance

Table 3: Correlations among the dimensions of trait anxiety, reliance and stress mindset

Dimensionality	M±SD	1	2	3	4	5	6
1.Positive anxiety	2.49±0.61	1					
2.Negative anxiety	2.95±0.57	.201[a]					
3.Toughness	3.98±0.64	.063[b]	.625[a]				
4.Optimistic	4.08±0.63	-.016	.641[a]	.876[a]			
5.Strength	3.92±0.70	.059[b]	.596[a]	.767[a]	.777[a]		
6.Stress-is-debilitating mindset	3.32±0.97	.600[a]	.194[a]	.122[a]	.040	.125[a]	
7.Stress-is-enhancing mindset	3.67±0.78	.212[a]	.480[a]	.431[a]	.418[a]	.424[a]	.113[a]

ps:ap < 0.01, bp < 0.05.

3.5 Mediating effects

Table 4: Test of mediating effects of reliance on trait anxiety and stress mindset among Xi'an residents during the period of COVID-19

Dependent variable	Independent variable	Regression equation	Standardized regression coefficients	t	p	R^2	ΔR^2	F	p
Stress mindset	State Anxiety	(1)Y=8.309+0.368*X	0.654	32.249	0.000	0.428	0.427	1040.002	0.000
Reliance	State Anxiety	(2)M=68.752+0.579*X	0.353	14.070	0.000	0.125	0.124	197.954	0.000
Stress mindset	State Anxiety	(3)Y=5.245+0.342* X+0.045*M	0.608	28.418	0.000	0.442	0.442	551.869	0.000
	Reliance		0.130	6.074	0.000				

The data in Table 4 show that regression equation (1) with stress mindset as the dependent variable and trait anxiety as the independent variable, trait anxiety had a positive effect on stress mindset (t=32.249, p < 0.01, c=0.368); regression equation (2) with reliance as the dependent variable and trait anxiety as the independent variable, trait anxiety had a positive effect on reliance (t= (t = 14.070, P < 0.01, a = 0.579); regression equation (3), with stress mindset as the dependent variable and trait anxiety and reliance as independent variables, after adding reliance as a variable, the effect of residents on stress mindset during the city closure of Xi'an decreased, and the standardized regression coefficient decreased from 0.368 to 0.342 (t = 28.418, P < 0.01, c' = 0.342) and reliance influenced stress mindset(t = 6.074, p < 0.01, b = 0.130), i.e. reliance had a positive effect on trait anxiety and trait anxiety influenced stress mindset through the mediating effect of reliance. There was a difference between the standardised regression coefficients and c' (0.342) was smaller than c (0.368), indicating that reliance was a partial mediator in the relationship between trait anxiety and stress mindset during the Xi'an city closure period, with an effect size of 0.026 and a partial mediating effect of 7.01% of the total effect.

4. Conclusion

4.1 Impact of epidemic control on mental health

For residents who may have been exposed to a suspected COVID-19, there is greater anxiety in the face of the risk of infection, but at the same time a more optimistic attitude towards stress, while confirmed diagnosis and good or bad epidemic control in the community have an impact on psychological resilience and stress mindset, specifically, good epidemic control management leads to

greater psychological resilience and more confidence in complex stressful situations. However, these two trait anxieties did not produce a difference and, taken together, it seems likely that the above may be due to the larger scope of the community and the strong containment of the epidemic.

It is also worth noting that on the gender dimension, men had higher trait anxiety, reliance and stress mindset than women; retired people had significantly greater trait anxiety than other people, and were less able to recover from stress than other people types, possibly because retired people are generally older and more financially stressed, and the COVID-19 period for which older people are more vulnerable to death risk; students have the lowest stress mindset, and they perceive the stress caused by the closure as a negative distraction, which may be due to the strictest closure control in schools, which greatly affects students' studies, exams and lives; married people have the greatest reliance, while divorced/widowed people have the greatest anxiety, and the presence of chronic illnesses can also make residents' trait anxiety significantly greater than that of residents without ill residents. This reminds us that in controlling the epidemic, we need to take into account the multiple gender, occupational, marital and physical health factors of the population in order to better protect people's livelihoods and prevent and control the epidemic.

4.2 Relationship between anxiety, reliance and stress mindset

According to the data, we can see that there is a correlation between trait anxiety and stress mindset and reliance, with a higher correlation between trait anxiety and stress mindset obtained by the residents of Xi'an under the conditions of city closure, which means that when the resident's anxiety is higher, his positive perception of the overall epidemic prevention and control is also more positive. This can be explained by our national policy of precise epidemic prevention and good livelihood protection. As we have seen earlier, good community preparedness has a direct impact on people's perception of stress and their ability to recover from anxiety, including the positive correlation between trait anxiety and reliance, which can also be explained in this way.

In the dimensional analysis, trait anxiety is a factor of both positive and negative anxiety, with positive anxiety being the condition associated with responding as calm and peaceful on the State-Trait Anxiety Scale, and negative anxiety being the opposite. From the correlations between the dimensions, we can see that the reliance dimension of resilience and strength correlate with both positive and negative anxiety of trait anxiety, with the correlation for negative anxiety being particularly pronounced, due to the fact that resilience and strength represent the person's ability to persist and improve their circumstances in the face of negative and adversarial circumstances. However the optimism dimension and negative anxiety were significantly correlated, which is consistent with previous studies. Among the stress mindset dimensions, the stress-is-debilitating mindset is related to the positive anxiety and negative anxiety, and the toughness and strength dimensions, but not to optimism, because when a person perceives stress as harmful, and he is likely to be more pessimistic, whereas on the stress-is-enhanceing mindset, in addition to being significantly related to the above mentioned dimensions, it is also significantly related to optimism, i.e. if a person perceives that stress improves his performance, then he is indeed likely to be more optimistic, which is consistent with Ben-Avi's study.

After conducting this series of correlational analyses of the data, we conducted regression analyses to explain how much trait anxiety and reliance, play a role in our perceptions of stress. The results showed that trait anxiety had a positive effect on stress mindset and reliance had a positive effect on stress mindset among Xi'an residents during the COVID-19 period. Based on the test for mediating effects, we can understand that both trait anxiety and reliance had a positive effect on stress mindfulness, and that reliance partially moderated the relational effect of trait anxiety on stress mindset after the inclusion of the variable reliance.

4.3 Research significance

This study focused on the mental health of Xi'an residents during the COVID-19 period, and analyzed the trait anxiety, stress mindset and mental resilience of 1,394 Xi'an residents. However, the limitations of this study are that, firstly, we only conducted a cross-sectional study of 1394 residents and did not conduct a follow-up and follow-up study; furthermore, the study only analysed the influence of these three psychological factors, however, in a complex and uncertain ambiguous environment, all kinds of psychological conditions are subject to fluctuations. Finally, there is no specific discussion of the impact of different containment measures on the population, as some people may be unable to work outside the home while others may be able to communicate and engage with the community during the epidemic control, and therefore the study is still inadequate in analysing the variability in the degree of ambiguity.

Based on the limitations mentioned above, then we can start with these aspects: firstly, a longitudinal tracking study to compare the differences between people in the period of epidemic closure and the period of non-epidemic closure to explore the impact of epidemic prevention and control on mental health; secondly, expanding the factors studied to explore the changes in a wide range of psychological factors in the situation; and thirdly, specifically studying the different effects on residents under different conditions of ambiguity risk. Thirdly, the impact of different ambiguity risk conditions on the population will be specifically studied.

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