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Collective self-esteem and perceived stress among the non-infected general public in China during the 2019 coronavirus pandemic: A multiple mediation model

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ABSTRACT

This study aimed to investigate the multiple mediating effects of perceived social support and anxiety between collective self-esteem and perceived stress during the 2019 coronavirus disease (COVID-19) pandemic. From February 18 to 25, 2020, 1921 participants aged 18–68 were recruited to complete the questionnaire online. The results showed that collective self-esteem reduced the perceived stress by increasing perceived social support and decreasing anxiety, and their chain mediation path. Our findings identified the important factors in reducing perceived stress and their relationship, which can be used to develop interventions to improve the mental health of the general public during the COVID-19 pandemic.

1. Introduction

The high contagiousness of the 2019 coronavirus disease (COVID-19) pandemic and the concomitant hindrances to life/work have significantly increased the perceived stress of the non-infected general public, which is harmful to their mental and physical health (Wang et al., 2020; Zhao, Lan, Li, & Yang, 2020). Notably, a large number of studies have shown that self-esteem plays an important role in reducing perceived stress (Abouserie, 1994; Hubbs, Doyle, Bowden, & Doyle, 2012; Hudd et al., 2000; Kesting, Bredenpohl, Klenke, Westermann, & Lincoln, 2013). Specifically, the concept of self-esteem can be segmented into the individual level (personal self-esteem) and the collective level (collective self-esteem; Crocker & Major, 1989). Personal self-esteem is one's evaluation of self-worth (Crocker & Wolfe, 2001; Du, King, & Chi, 2017; Rosenberg, 1965), while collective self-esteem is one's value assessment of the collectivity one belongs to and one's membership of this collectivity (Crocker & Major, 1989). As a serious global catastrophe, COVID-19 is beyond the control of individuals and most of the important measures against COVID-19 (e.g., distribution of relief supplies, mobilization of medical personnel) must be conducted throughout the whole country (Anderson, Heesterbeek, Klinkenberg, & Hollingsworth, 2020; Lloyd-Sherlock, Ebrahim, Geffen, & McKee, 2020), which stress the importance of collectivity (Tziner, 1982; Wang et al., 2020). Therefore, the main aim of the present study is to

investigate the influence of collective self-esteem on the perceived stress of the non-infected general public during COVID-19, and the collectivity of collective self-esteem in this study refers to the country.

As an important community resource, social support can help people alleviate the seeming uncontrollability of problems, which is the main cause of perceived stress (Heaney & Israel, 2008). A large number of studies have provided evidence that perceived social support could effectively relieve perceived stress (Budge, Adelson, & Howard, 2013; Dean & Lin, 1977), which was also confirmed by the latest research about COVID-19 (Li et al., 2020; Xiao, Zhang, Kong, Li, & Yang, 2020). Moreover, individuals with higher collective self-esteem tend to seek social support when facing difficulties (Barker, 2009; Gangadharbatla, 2008), which reminds us that collective self-esteem may reduce the perceived stress through the mediation of perceived social support.

Anxiety is conceptualized as an emotional state that includes worry, nervousness, apprehension, as well as physical symptoms (Spielberger & Sydeman, 1994). Much evidence has shown that higher anxiety was significantly associated with higher perceived stress (Bergdahl & Bergdahl, 2002; Hand, Phillips, & Dudgeon, 2006; Lee, 2012; Sanzarrillo, Garcíacampayo, Rubio, Santed, & Montoro, 2002). Besides, according to terror management theory, self-esteem is the main force to buffer against anxiety (Burke, Martens, & Faucher, 2010; Rosenblatt, Greenberg, Solomon, Pyszczynski, & Lyon, 1989). A meta-analysis of longitudinal studies has provided support for this theory,

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showing that higher self-esteem significantly predicted lower levels of anxiety (Sowislo & Orth, 2013). Importantly, many studies demonstrated that collective self-esteem could buffer better against anxiety when the importance of collectivity was recognized (Gupta, Rogers-Sirin, Okazaki, Ryce, & Sirin, 2014; Lam, 2007; Xie, Leong, & Feng, 2008; Zhang, 2005). Therefore, we assume that collective self-esteem could reduce the perceived stress by relieving anxiety.

It is worth mentioning that perceived social support and anxiety are not separate mediators. According to the cognitive theory of emotion, negative emotions (anxiety) usually arise when we appraise our life pessimistically. (Beck, 1971; Folkman & Lazarus, 1985; Oatley & Johnsonlaird, 1987). Social support can help people reinterpret events or problems in a more positive and constructive light, which helps relieve anxiety (House, Umberson, & Landis, 1988; Thoits, 1995). Therefore, collective self-esteem may reduce perceived stress through the chain mediation of perceived social support and anxiety.

In conclusion, the current study aimed to investigate the influence of collective self-esteem on the perceived stress of the non-infected general public during COVID-19. Furthermore, we hypothesized that collective self-esteem could reduce the perceived stress through the indirect paths of perceived social support and anxiety separately, and their chain mediating path. The proposed multiple mediation model is shown in Fig. 1. Compared with the traditional simple mediating effect, the multiple mediating effect in this study is more likely to reveal the complex mechanism between collective self-esteem and perceived stress, which can guide subsequent research. Furthermore, the current study will identify the important factors buffering perceived stress, and their relationship, which helps enact psychological interventions for the non-infected general public during COVID-19.

2. Materials and methods

2.1. Participants

Fig. 2 shows the development trend of the COVID-19 pandemic in China from February 4 to March 9, 2020. Existing confirmed cases continued to increase until February 17 and then decreased. Our survey was conducted from February 18 to February 25, 2020, a period when the existing confirmed cases gradually declined in number.

A total of 2023 participants were recruited to complete the questionnaire via an online survey platform called "SurveyStar," from February 18 to 25, 2020. Among them, 102 participants (13 unhealthy participants (e.g., with a fever), 1 suspected case, 1 cured case, and 87 first-line workers) were excluded, resulting in a final sample of 1921 participants (mean age = 29.28, SD = 10.66, range = 18–68). Because of program failure during data collection, 968 participants did not report their gender. The remaining 953 participants constituted 291

males and 662 females. 82.9% (n = 1593) of participants had a college degree or above. Participants were asked to choose "Yes" or "No" on their work status (e.g., Do you start to work outside the home?), and only 13.0% (n = 250) of participants had started to work outside the home. Besides, participants were asked to rate their attention to COVID-19 (e.g., to what extent do you take an interest in information on COVID-19?) from 1 (little) to 5 (extreme), and 71.9% (n = 1381) of them paid great attention (more than or equal 4) to COVID-19. All participants provided written informed consent and were paid 5 yuan (approximately \$0.70 US) as an incentive. The study was approved by the local institutional review board (Grant No. IRB20200218).

2.2. Materials

2.2.1. Collective self-esteem scale (CSES)

Collective self-esteem was assessed by CSES (Luhtanen & Crocker, 1992), which includes 16 items. Each item was rated from 1 (strongly disagree) to 7 (strongly agree), with higher scores indicating higher collective self-esteem. Moreover, the collectivity in the current study referred to the country (questions such as "I am a worthy member of the country I belong to", and "I feel good about the country I belong to"). Cronbach's α for the present study was 0.88.

2.2.2. Perceived social support scale (PSSS)

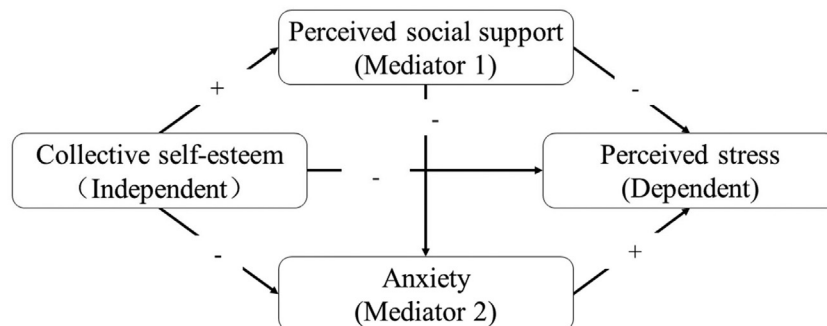
Perceived social support was measured by PSSS (Zimet, Powell, Farley, Werkman, & Berkoff, 1990). There are 12 items, which are rated from 1 (strongly disagree) to 7 (strongly agree), with higher scores indicating higher perceived social support (questions such as "There are some people in my life who care about my feelings"). Cronbach's α for the present study was 0.91.

2.2.3. Self-rating anxiety scale (SAS)

Levels of anxiety during the previous seven days were measured by the 20-item SAS (Zung, 1971). All responses were distributed on a 4-point Likert scale (1 = never, 4 = very often), with higher scores indicating higher levels of anxiety (questions such as "I feel more nervous and anxious than usual"). Cronbach's α for the present study was 0.80.

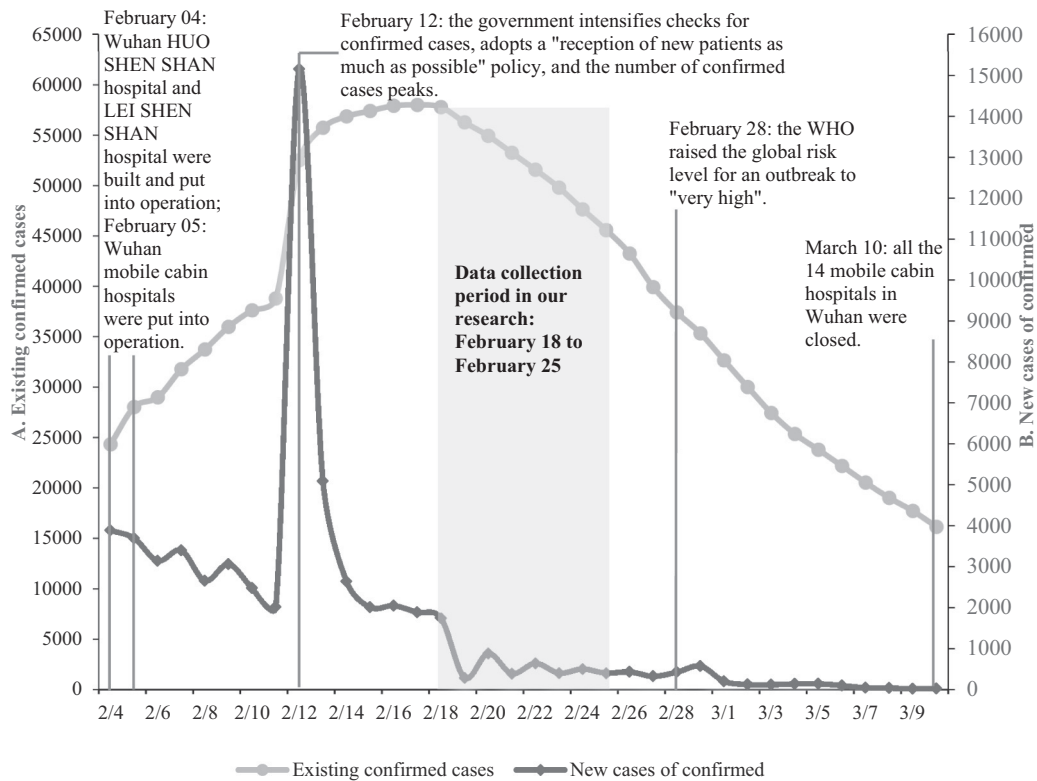
2.2.4. Perceived stress scale (PSS)

10-item PSS was conducted to assess the perceived stress over the past month (Cohen, Kamarck, & Mermelstein, 1983). This scale assessed the extent to which individuals believe their lives are overloaded, unpredictable and uncontrollable. Participants rated the items from 0 (never) to 4 (very often), with higher scores indicating higher stress (questions such as "In the last month, how often have you been upset because of something that happened unexpectedly?"). Cronbach's α for the present study was 0.81.



Indirect effect 1: Collective self-esteem → Perceived social support → Perceived stress
 Indirect effect 2: Collective self-esteem → Anxiety → Perceived stress
 Indirect effect 3: Collective self-esteem → Perceived social support → Anxiety → Perceived stress

Fig. 1. The proposed multiple mediation model.



Note: 1. All the events recorded in the figure took place in 2020; 2. Data source: National Health Commission of China; 3. The deadline for data acquisition is March 10, 2020.

Fig. 2. The development trend of the COVID-19 pandemic in China from February 4 to March 9, 2020.

2.3. Statistical analyses

Descriptive statistics and Pearson correlation analysis were conducted using IBM SPSS Statistics 22.0. Model 6 of the PROCESS macro was conducted to examine the multiple mediating effect of perceived social support and anxiety (Hayes, 2017). Furthermore, the bootstrapping method (5000 bootstrap samples) with 95% confidence intervals was conducted to test the significance of indirect effects (Hayes, 2017).

3. Results

3.1. Correlations for all variables

The results of Pearson correlations are presented in Table 1. As expected, collective self-esteem was negatively correlated with perceived stress ($r = -0.26, p < 0.001$). Perceived social support was positively correlated with collective self-esteem ($r = 0.42, p < 0.001$) and negatively correlated with perceived stress ($r = -0.26,$

Table 1
Correlations for all variables (N = 1921).

	Mean	SD	CSES	PSSS	SAS	PSS
CSES	89.93	11.50	1.00			
PSSS	63.82	9.78	0.42***	1.00		
SAS	40.08	8.40	-0.29***	-0.30***	1.00	
PSS	15.86	5.55	-0.26***	-0.26***	0.52***	1.00

Note. CSES = Collective Self-Esteem Scale; PSSS = perceived social support scale; SAS = Self-Rating Anxiety Scale; PSS = perceived stress scale.

*** $p < 0.001$.
** $p < 0.01$.
* $p < 0.05$.

$p < 0.001$). Anxiety was negatively correlated with collective self-esteem ($r = -0.29, p < 0.001$) and positively correlated with perceived stress ($r = 0.52, p < 0.001$). Moreover, perceived social support was negatively correlated with anxiety ($r = -0.30, p < 0.001$).

3.2. Multiple mediating analysis

Controlling for age, education, work or not (whether participants started to work outside the home), and their attention to COVID-19, a multiple mediating analysis was conducted (see Table 2 and Fig. 3).

Table 2
Multiple mediating models between collective self-esteem and perceived stress (N = 1921).

Predictors	Model 1 (PSSS)		Model 2 (SAS)		Model 3 (PSS)	
	B	t	B	t	B	t
Age	0.13	6.09***	-0.11	-5.99***	-0.07	-6.15**
Education	1.36	7.32***	-1.14	-6.81***	-0.12	-1.17
Work or not	0.04	0.07	1.04	1.97*	0.58	1.83*
Attention	0.68	2.51*	0.69	2.86**	-0.07	-0.46
CSES	0.35	19.97***	-0.16	-9.42***	-0.05	-4.41***
PSSS			-0.16	-7.86***	-0.04	-2.93**
SAS					0.30	22.02***
R ²	0.21		0.15		0.31	
F	100.25***		58.21***		121.09***	

Note. Attention = Attention to COVID-19; CSES = Collective Self-Esteem Scale; PSSS = perceived social support scale; SAS = Self-Rating Anxiety Scale; PSS = perceived stress scale; the dependent variable in Models 1-3 was separately perceived social support, anxiety, and perceived stress.

*** $p < 0.001$.
** $p < 0.01$.
* $p < 0.05$.

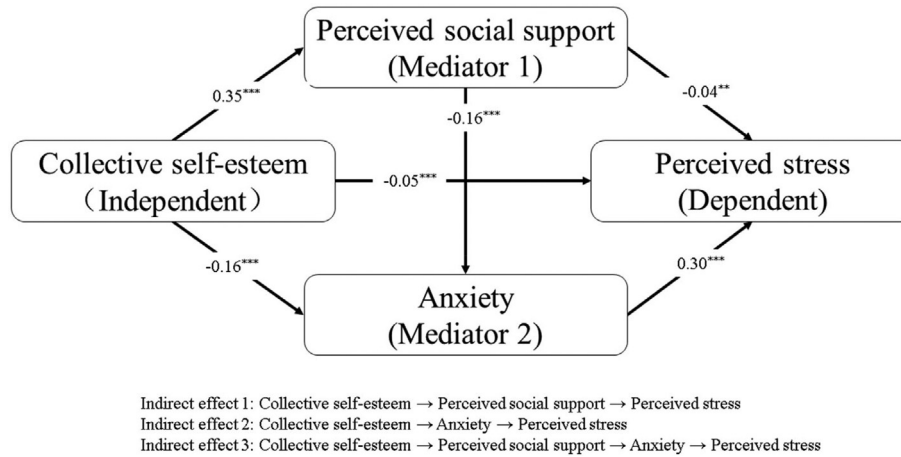


Fig. 3. Multiple mediating paths between collective self-esteem and perceived stress.

Table 3
Multiple mediating paths between collective self-esteem and perceived stress.

	Effect	BootSE	BootLLCI	BootULCI	Relative effect
Direct effect	-0.05	0.012	-0.069	-0.023	
Indirect effect 1	-0.01	0.005	-0.023	-0.003	10.61%
Indirect effect 2	-0.05	0.006	-0.060	-0.037	38.87%
Indirect effect 3	-0.02	0.003	-0.022	-0.012	13.68%
Total indirect effect	-0.08	0.008	-0.093	-0.063	63.24%

Note. Indirect effect 1 = CSES-PSSS-PSS; Indirect effect 2 = CSES-SAS-PSS; Indirect effect 3 = CSES-PSSS-SAS-PSS.

Results showed that higher collective self-esteem significantly predicted higher perceived social support ($B = 0.35, t = 19.97, p < 0.001$; see Model 1 of Table 2). Collective self-esteem ($B = -0.16, t = -9.42, p < 0.001$) and perceived social support ($B = -0.16, t = -7.86, p < 0.001$) negatively predicted levels of anxiety (see Model 2 of Table 2). Higher collective self-esteem ($B = -0.05, t = -4.41, p < 0.001$) and perceived social support ($B = -0.04, t = -2.93, p < 0.001$) were predictors of lower perceived stress, and anxiety positively predicted perceived stress ($B = 0.30, t = 22.02, p < 0.001$; see Model 3 of Table 2) After controlling for perceived social support and anxiety, collective self-esteem could significantly predict perceived stress, which indicates that perceived social support and anxiety were partial mediators between collective self-esteem and perceived stress. Moreover, the bootstrap method indicated that the mediation effect of perceived social support (Effect = -0.01 , Boot SE = 0.005 , Boot 95%CI = $[-0.023, -0.003]$) and anxiety (Effect = -0.05 , Boot SE = 0.006 , Boot 95%CI = $[-0.060, -0.037]$), and their chain mediation were all significant (Effect = -0.02 , Boot SE = 0.003 , Boot 95%CI = $[-0.022, -0.012]$), and they separately accounted for 10.61%, 38.87% and 13.68% of the total effect (Table 3).

4. Discussion

The current study principally investigated the influence of collective self-esteem on perceived stress in the non-infected general public during COVID-19 and the multiple mediating effects of perceived social support and anxiety. Results showed that collective self-esteem could reduce perceived stress through the indirect paths of perceived social support and anxiety, and their chain mediating path.

Consistent with our hypothesis, collective self-esteem was effective in reducing perceived stress. In general, individuals with higher self-esteem could respond better to threats and frustrations, which is important for reducing perceived stress (Abouserie, 1994; Hubbs et al., 2012; Hudd et al., 2000; Kesting et al., 2013). Importantly, a serious catastrophe can be more effectively addressed by the collectivity

(Tziner, 1982; Wang et al., 2020); therefore, we may speculate that the relationship between collective self-esteem and perceived stress may be enhanced during COVID-19. Finally, the collectivity in the current study referred to the country, which indicated the individual's value assessment of their own country and their citizenship of this country can effectively reduce perceived stress during COVID-19.

Multiple mediating analysis further revealed the reasons why collective self-esteem could reduce perceived stress. The first reason is individuals with higher collective self-esteem could perceive more social support. Social support is defined as an important resource deriving from the social relationship, which means a good social relationship is the precondition of more social support (Heaney & Israel, 2008). Individuals with higher collective self-esteem usually emphasize their social relationships and tend to ask for help when facing difficulties (Barker, 2009; Gangadharbatla, 2008), which, arguably, makes them perceive more social support during COVID-19. Furthermore, perceived stress is essentially a sense of uncontrollability (Cohen et al., 1983), which can be effectively relieved by perceived social support (Budge et al., 2013; Dean & Lin, 1977; Heaney & Israel, 2008).

Another reason is that collective self-esteem could buffer against anxiety. Terror management theory has demonstrated that self-esteem plays an important role in relieving anxiety, which is confirmed by many studies (Burke et al., 2010; McFarlin & Blascovich, 1981; Rosenblatt et al., 1989; Sowislo & Orth, 2013). Furthermore, based on this theory, many researchers have investigated the influence of collective self-esteem on anxiety, and results were consistent with the current study, indicating that collective self-esteem could also be effective in relieving anxiety (Gupta et al., 2014; Lam, 2007; Xie et al., 2008; Zhang, 2005). Above all, the conception of "emotion-focused coping" suggested that reducing negative emotions such as anxiety is an effective way to reduce perceived stress (Lazarus & Folkman, 1984). Also, evidence showed that lower anxiety was significantly associated with lower perceived stress (Bergdahl & Bergdahl, 2002; Hand et al., 2006; Lee, 2012; Sanzcarrillo et al., 2002), which was further confirmed by our study.

Finally, collective self-esteem could reduce perceived stress through the chain mediation of perceived social support and anxiety, which is in line with our hypothesis. An important function of perceived social support is to provide emotional comfort (House et al., 1988), which can make us more optimistic (Thoits, 1995). Anxiety is usually caused by our pessimistic appraisal of our life (Beck, 1971; Folkman & Lazarus, 1985; Oatley & Johnsonlaird, 1987), for which it can be effectively relieved by perceived social support. Moreover, the effect of chain mediation was stronger than the mediation of perceived social support, which reminds us the general public might perceive more emotional support from the country.

There are some limitations. First, 968 participants did not report their gender because of a program failure during data collection, for which we only analyzed the data with gender information again to control the potential influence of gender differences ($N = 953$, 291 males and 662 females). Results showed that the chain mediating effect (Effect = -0.02 , $Boot SE = 0.004$, $Boot 95\%CI = [-0.024, -0.010]$) was stable. Second, the current study mainly explored the influence of collective self-esteem on perceived stress. Future studies could carefully examine other types of self-esteem. Finally, the present study was a cross-sectional design that cannot confirm causality. Further research should adopt experimental or longitudinal designs to explore the causal assumptions in this study.

5. Conclusion

In all, the current study showed that collective self-esteem could reduce perceived stress through the indirect paths of perceived social support and anxiety, and their chain mediating path. These findings have important implications for enacting psychological interventions, which should show the efforts and achievements of the country in combating the pandemic and provide emotional support for the non-infected general public during COVID-19.

CRedit authorship contribution statement

Haopeng Chen: Conceptualization, Methodology, Formal analysis, Writing - original draft. **Xiaolin Zhao:** Conceptualization, Writing - review & editing. **Mei Zeng:** Conceptualization, Formal analysis. **Jiwen Li:** Conceptualization, Formal analysis. **Xi Ren:** Formal analysis, Investigation. **Mengning Zhang:** Formal analysis, Investigation. **Yadong Liu:** Formal analysis, Investigation. **Juan Yang:** Conceptualization, Methodology, Writing - review & editing, Supervision.

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