

The Relationship Between Perceived Stress and Overall Well-Being During the COVID-19 Epidemic: A Moderated Mediation Model

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Submitted: 28 Mar 2022; Accepted: 31 Mar 2022; Published: 20 May 2022.

Citation: Minqi Yang, Hanxiao Guo, Chen Jie, Xicheng Guo, Kexin Tian, Chunyu Qu. (2022). The Relationship Between Perceived Stress and Overall Well-Being During the COVID-19 Epidemic: A Moderated Mediation Model. *Archives of Infect Diseases & Therapy*, 6(2), 147-153.

Abstract

Objective: To explore the relationship between perceived stress and well-being of Chinese people and the mechanism underlying the association during the COVID-19 epidemic.

Methods: An online survey was conducted in the general population to (N = 498) using the Chinese Perceived Stress Scale, General Well-Being Schedule, Short Dark Triad, and Safety Questionnaire.

Results: (a) perceived stress was significantly negatively correlated with overall well-being and sense of security, (b) sense of security played a partial mediating role between perceived stress and overall well-being, (c) the Dark Triad played a moderation role in the path from perceived stress to sense of security. These results provide insight into the subjective well-being and underlying psychological processes associated with the perceived stress. The implication of these findings were interpreted and discussed.

Keywords: Perceived Stress, Overall Well-Being, Sense of Security, Dark Triad

Introduction

China was the first country that identified the novel coronavirus disease (COVID-19) which broke out in December 2019. And subsequently the World Health Organization (WHO) declared the COVID-19 outbreak an international public health emergency on January 30, 2020 [1, 2]. Even though Chinese authorities had imposed lockdown measures in an unprecedented effort to contain the COVID-19 outbreak since On January 23, China still had born the large burden of morbidity and mortality until of midst of February 2020. The outbreak of the epidemic has impacted Chinese people physically and psychologically. For instance, people in China suffered poor sleep quality, depressive symptoms, and generalized anxiety disorder during the COVID-19 epidemic [3]. In the current study, we aimed to explore the relationship between perceived stress and well-being of Chinese people and the mechanism underlying the association during the relatively severe period (from February to April in 2020).

Perceived stress is defined as the subjective perception of an individual's internal and external stress events, which can alter a person's cognitive function and affect his or her emotional and physiological status [4]. Previous studies have shown that people with higher stress perceptions, whether elderly or adolescents, have worse sleep quality and are more prone to psychological

problems [5, 6]. Katana and colleagues found perceived stress is closely related to positive emotions which has an extremely important impact on subjective well-being [7].

Overall well-being (OWB) is an interpretation of quality of life based on subjective experience and environmental and personal filters [8]. The relationship between well-being and stress has been examined both in terms of the negative effects of stress on well-being. Some research has demonstrated the negative effects of stress on well-being [9-11]. A study of university students showed that happiness was significantly and negatively related to perceived stress and that happiness was a negative predictor of perceived stress [12]. Based on literature reviewing, we postulated that perceived stress would be negatively correlated with overall well-being (Hypothesis 1).

Security as a Mediator

The sense of security is defined as an actual state of non-threat that is subjectively felt by individuals or groups. It is an individual's premonition of possible danger or risk, which involves a sense of strength or weakness when facing troubles [13]. It has been argued that the sense of security is a basic notion of people, a cognitive response to risk factors in the environment acquired by individuals assessing the perception that they may be threatened by realistic stimuli [14].

According to a survey at the peak of the epidemic, people's feelings of insecurity and negative emotions have been greatly affected by the epidemic [15]. When facing stressful situations, individuals are likely to exaggerate the adverse consequences of threatening life events, so as to fall into negative emotions such as anxiety, worry, decreased sleep quality and depression [16]. Besides, an experimental study found lower levels of stress perceptions were associated with higher attachment security scores [17]. It is therefore hypothesized that increased perceptions of stress would be associated with lower sense of security (Hypothesis 2).

The sense of security is an important component of people's basic psychological needs, which reflects people's cognition and feeling of threats to their survival and safety [18].

Individuals with a strong sense of security do not regard others as a threat, nor do they think they will be emotionally hurt by others, but actively participate in the relationship with others do not experience negative emotions such as isolation, anxiety, hostility and pessimism, trust themselves and others more, and strive to undertake difficult tasks to achieve higher life goals.

Regarding the relationship between the sense of security and subjective well-being, the previous studies demonstrated that the higher level of sense of security was associated with higher level of subjective well-being. For example, people with low sense of security have low interpersonal trust, lack trust in others and have difficulty in obtaining stable social connection [15]. Another research showed that people's perceived insecurity had a negative effect on their perceived happiness at work [19]. In a survey conducted in China, the sense of economic security was shown to increase the subjective well-being of citizens

[20]. In addition, a study using a sample of left-behind children found that the sense of security not only significantly predicted well-being, but also played a fully mediating role in the relationship between social exclusion and well-being [21]. Therefore, security may be a bridge that connects the perception of stress with the overall well-being of the individuals during the COVID-19 pandemic. In other words, the sense of security may mediate the relationship between perceived stress and overall well-being (Hypothesis 3).

Dark Triad as a Moderator

According to the Dark Triad theory, Machiavellism is characterized by manipulating others to obtain personal interests, psychopathy is characterized by low anxiety, ruthlessness, impulse and antisocial, and narcissism is characterized by high exaggeration, longing for others' appreciation and emphasizing self needs [22, 23]. The three "dark" traits share the characteristics of low humanity, low virtue, low empathy and interpersonal manipulation. Different personality traits can affect the sense of security by strengthening or weakening the individual's perception of changes in the external environment. For example, one research showed that under the same working conditions, people who are high in agreeableness are good at communication, easy to establish good interpersonal relationships with others, and had lower perceived work insecurity [24]. Whereas Dark Triad has negative impacts on security. A study by Han shows that the higher the level of Machiavellian and narcissism, the lower the level of interpersonal security. Another study using a sample of Chinese and American teenagers showed that the higher narcissism is associated with lower sense of security in social status [25]. Thus, we postulated that Dark Triad could modulate the effect of perceived stress on the sense of security (Hypothesis 4). The hypothetical model of this study was shown in Figure 1.

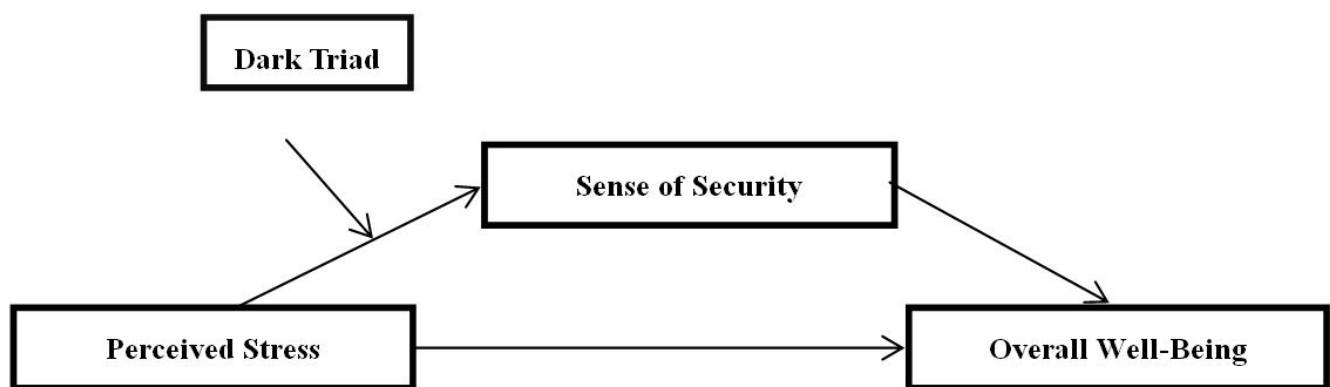


Figure 1: Hypothetical Model for the Mediating Role of Sense of Security and the Moderating Role of Dark Triad

Materials and Methods

Participants

We have used a sample of 498 participants which consisted of 393 (78.9%) females and 105 males (21.1%) (Mage = 34.5 years, SDage = 8.7 years) in an online survey during the COVID-19 quarantine (February, 2020 to March, 2020) in China. After obtaining approval from ethics review board of the Institution, the survey was distributed at the beginning of February, 2020 right after China declared a state of emergency and implemented quarantine measures aimed at preventing the spread of

COVID-19. Participants were informed that their participation is anonymous, they could withdraw from the study at any moment and all data would be treated with confidentiality.

Measures

Chinese Perceived Stress Scale (CPSS)

CPSS is a 14-item, self-report and validated measure, which is designed to assess perceived stress [26]. The Chinese version was also well validated [27]. Each item was rated on a five-point Likert scale (1 = never, and 5 = always). All items are summed

to create a total score, ranging from 14 to 70, with higher scores representing higher elevations of perceived stress. In this study, The CPSS showed adequate internal consistency ($\alpha = .84$).

General Well-Being Schedule (GWB)

GWB is used to evaluate subjects' statements of well-being [28]. Each item was rated on a five-point Likert scale (1 = quite a lot, and 5 = none). The higher scores indicate higher overall happiness. The Cronbach's α was .86 for entire scale in the current study.

Short Dark Triad (SD3)

The Dark Triad refers to a cluster of personality traits consisting of three mutually independent antisocial personality traits: Machiavellianism, narcissism, and psychopathy. Jones and Paulhus in developed the Dark Triad scale in 2014, which includes three Machiavellian, narcissistic, and psychopathic subscales [29]. The short dark triad scale was translated and revised by Geng et al, and the Machiavellianism subscale had a Cronbach's α coefficient of 0.700 and a retest reliability of 0.741 at 6-week intervals [30]. SD3 consisted of 9 items, all of which were scored on a 5-point Likert scale, ranging from 1 to 5 points from completely disagree to completely agree. The total score ranged from 9 to 45, with higher scores indicating a higher degree of Machiavellianism. It showed good internal consistency in the current sample with Cronbach's $\alpha = 0.83$.

Descriptive Data and Correlations

Table 1: Descriptive Statistics and Correlations Between the Variables

	<i>M±SD</i>	1	2	3	4	5	6	7
1 Perceived Stress	26.27±6.20	1						
2 Sense of Security	51.91±10.42	-0.47**	1					
3 Overall Well-Being	76.27±13.51	-0.64**	0.39**	1				
4 Dark Triad	69.31±12.42	0.16**	0.03	-0.28**	1			
5 Machiavellianism	28.63±5.35	0.19**	-0.06	-0.17**	0.67**	1		
6 Psychopathy	17.32±6.49	0.20**	-0.04	-0.34**	0.83**	0.31**	1	
7 Narcissism	23.37±4.83	-0.06	0.20**	-0.08	0.71**	0.20**	0.45**	1

** $p < 0.01$, ** $p < 0.05$

Analysis of the Mediating Role of Security

The Bias-Corrected Bootstrap method is used to verify the mediation model through Model 4 in the PROCESS macro program. Perceived stress is the independent variable, sense of security is the mediating variable, and overall well-being is the dependent variable. The results are shown in Figure 1. Perceived stress can

Safety Questionnaire (SQ)

SQ is a 16-item, self-report and validated measure designed to assess two factors: (a) interpersonal security, and (b) definite control [13]. The sense of interpersonal security factor has 8 items, mainly involving interpersonal communication and reflecting the individual's safety experience; the sense of deterministic control factor also has 8 items, mainly reflecting the individual's sense of prediction, certainty and life control. Each item was rated on a five-point Likert scale (-2 = very consistent, and 2 = very non-compliant). The higher the score, the stronger the sense of security experienced. In the present study, the Cronbach's α for this sample was 0.88.

Statistical Processing

All the collected data were analyzed and processed using IBM SPSS Statistics (version 21) by means of descriptive statistics, correlation analysis, mediation effect test, and moderation effect test.

Results

Common Method Bias Test

Harman's single factor test is generally used to test the common method bias. According to the results, there are 16 factors with characteristic roots greater than 1, accounting for 59.23% of the total variance. The variance variation described by the first factor is 11.87%, which is less than 40% of the critical standard. It shows that there is no serious common method deviation in the data of this study.

negatively predict overall well-being ($\beta = -0.59, p < 0.01$) and sense of security ($\beta = -0.46, p < 0.01$); sense of security can positively predict overall well-being ($\beta = .11, p < 0.01$), indicating that the sense of security plays a partial mediating role between perceived stress and overall well-being (Figure 2).

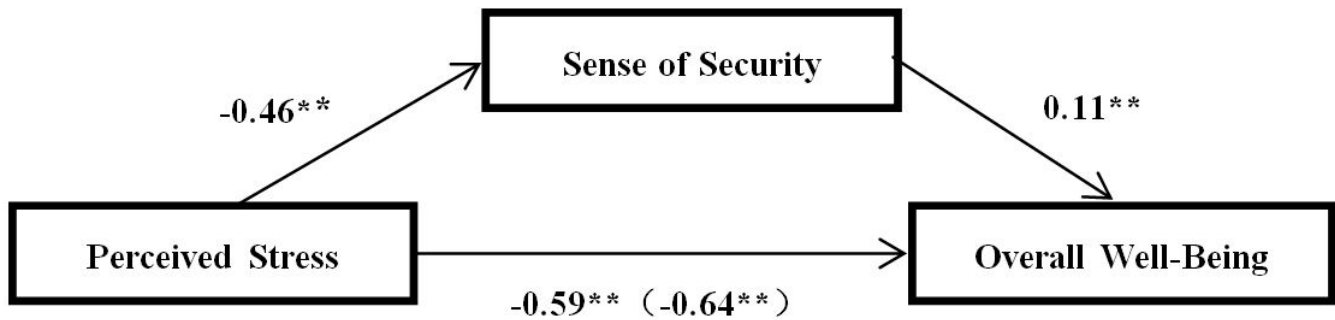


Figure 2: Path Diagram of the Relationship Between Perceived Stress, Sense of Security, and Overall Well-Being

Analysis of the Moderation Effect of the Dark Triad

The model 7 in the PROCESS macro program is used to verify the moderation model, and the results are shown in Table 2. Perceived stress significantly negatively predicts the sense of security ($\beta = -0.46$, $p < 0.01$), and the interaction term of perceived stress and the dark triad significantly predicts the sense of security

($\beta = 0.17$, $p < 0.01$). In addition, perceived stress negatively predicts overall well-being ($\beta = -0.59$, $p < 0.01$), and the predictive effect of security on overall well-being is also significant ($\beta = 0.11$, $p < 0.01$). On this basis, the moderated mediating effect is established (Table 2).

Table 2: The Moderated Mediation Model

Outcome variable	Predictors	R	R2	F	β	t
Sense of security		0.51	0.26	34.34**		
	Gender				0.01	0.27
	Age				-0.03	-0.80
	Perceived stress				-0.46	-11.01**
	Dark triad				0.10	2.47*
Overall well-being	Dark triad * Perceived stress				0.17	3.84**
		0.65	0.42	89.89**		
	Gender				0.07	1.94
	Age				0.26	0.72
	Sense of security				0.11	2.86**
	Perceived stress				-0.59	-14.89**

Note: * $p < .05$, ** $p < 0.01$

In order to further analyze the moderating effect of the dark triad, the dark triad scores are divided into two groups according to 1 SD above the mean and 1 SD below the mean, as shown in Figure 3. For individuals with higher dark triad scores (M+1SD), the negative predictive effect of perceived stress on sense of security was significant ($\beta = -0.29$, $p < 0.01$); while individuals with lower dark triad scores (M-1SD), the negative predictive effect of perceived stress on sense of security is significant ($\beta = -0.61$, $p < 0.01$).

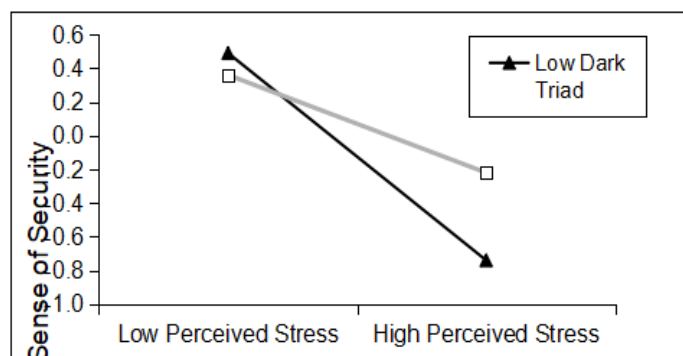


Figure 3: Simple Slope Analysis

Discussion

Our findings supported our hypotheses about the significant effects as well as the direction of effects. The study provided a unique way to explain the results within the context of the epidemic. Firstly, although females typically tended to report greater perceived stress than their male counterparts, according to prior findings, our results showed that there was not significantly differences between men and women in the face of COVID-19 [31]. The reason for this is that previous studies on stress perception have been conducted in the safer context of everyday life, and gender differences are reduced in the face of public health events that cause major panic, such as COVID-19.

Hu's findings suggest that differences about perceived stress may partly stem from females simply having more stress "opportunities" for what methods they use to restore mental balance and maintain mental health after a traumatic or stressful experience [32]. However, because elevated stress levels can inhibit perceived stress, future research may be necessary to examine the extent to which women are more likely to have their stress perceptions become pronounced than their adaptation to stress. At what level of stress do they show weakness rather than adaptation?

Results showed that sense of security partially mediated the relation between perceived stress and overall well-being, supporting our initial conjecture that sense of security is negatively related to perceived stress, which in turn is positively associated with overall well-being, that is, perceived stress can not only directly affect the overall well-being, but also indirectly affect the overall well-being through the sense of security. This is consistent with the results of previous studies: stress will reduce people's quality of life and psychological health level and work efficiency. Studies have also found that the higher the level of perceptual stress, the lower the score of security, both life and work [33]. In the light of Ann's definition, security should be understood in two perspectives: (1) objective, security is related to external, objective factors that are important for a proper life, and (2) subjective, it is individual, objective assessment of the state of possession or availability of essential goods relating to the individual experience [34]. At a subjective level, stress perceptions vary according to individual experience and cognitive structure. For example, university students have a significantly higher perception of stress in the face of an epidemic due to their lack of experience and crisis coping strategies, whereas older people, in contrast, have a lower perception of stress and appear more calm and collected when an epidemic is raging [35, 36]. As a result, when stress is excessive and exceeds the psychological resources available for stress reduction, the younger cohort will feel less secure and less happy. In the context of COVID-19, although the development of a vaccine provides some assurance of life safety, the capricious, mutating nature of the virus makes it necessary for individuals to maintain a state of psychological equilibrium [36]. For this reason, those who have a lower perception of stress and maintain this healthy state of mind throughout the pandemic will not only reduce the stress caused by the mutation and spread of the virus, which in turn improves one's overall well-being, but will also perform better in everyday life post-pandemic. This is especially true given our finding that even after controlling for feelings of safety, stress perception remains an important factor in prediction.

The Moderating Effect of Dark Triad

Dark triad moderated the effect of perceived stress on sense of security. In line with our hypothesis and previous studies, the higher level of the dark triad, the safer individuals feel. Dark triad was positively associated with sense of security [37, 38]. Furthermore, this study also found that the dark triad plays a moderation role between perceived stress and sense of security.

Machiavellianism and psychopathic personality traits both play a moderation role, while narcissism does not. When the individual perceives greater stress, individuals with high Machiavellianism and high levels of psychosis have a less degree of security reduction. This may be because Machiavellianism and psychopaths are extremely selfish and often pay attention to the threats to themselves caused by changes in the external environment [39]. Once personal interests are threatened, they will use tactics or extreme measures to manipulate others to achieve the purpose of self-defense, and further enhance their sense of security. Narcissists are often boastful, arrogant, and blindly optimistic [40]. Therefore, when faced with the same stress, their sense of security may not be more strongly threatened than other individuals. The results of this study show that the three components of the dark triad are

heterogeneous. Among them, the "dark" Machiavellianism and psychopathic personality traits can alleviate the negative impact of perceived stress on individual security. In a sense, the two have a certain adaptive function.

This study also found that the dark triad plays a moderation role between perceived stress and sense of security, among which Machiavellianism and psychopathic personality traits both play a moderation role. Although the findings showed a significant negative correlation between the dark triad itself and overall well-being, the interaction effect suggested that the dark triad could be combined with perceived stress to maximize sense of security. Secondly, the stronger a person's Machiavellian and psychopathic state, the less negative the effect of perceived stress on sense of security, which broadens the field of related research.

In addition, as COVID-19 has a very wide reach, interventions for the dark triad may be particularly beneficial in enhancing the collective goal seeking of those affected and stimulating a sense of community. However, current research does not specifically address the measurement constructs of COVID-19, and therefore additional research is needed. Furthermore, how can effective interventions be delivered in isolated social states?

For university students, short online seminars, online counseling, books, articles and courses on the dark triad and sense of safety may be viable alternatives to in-person interventions to maintain some sense of well-being in the context of an epidemic. For community residents, active participation in community protection and sharing updates about the epidemic may be a good approach. However, it is also worth examining whether different interventions at different stages of the epidemic's development would yield different positive outcomes. For example, countries such as the UK, Japan and the USA, which have experienced multiple waves of the virus with increasing severity, have experienced significant success in containing the spread of COVID-19 in China. For those countries still experiencing large waves of COVID-19, there may be a particular need to intervene in the Dark Triad, while those countries that have successfully contained the virus could focus on the post-pandemic psychological topics.

Conclusion

In summary, this study represented an important step in exploring how perceived stress may be related to overall well-being among Chinese during the COVID-19 pandemic. The results show that perceived stress can not only directly reduce the overall well-being of the individual, but also reduce the overall well-being by reducing the individual's sense of security. Sense of security serves as one mechanism by which perceived is associated with overall well-being, it mediates the influence of perceived stress on overall well-being. In addition, the dark triad modulates the effect of perceived stress on the sense of security, and people with high levels of dark personality can alleviate the negative impact of stress perception on security. Interaction effects provide positive implications showing that it may be coupled with sense of security to further mitigate the onset of perceived stress while promoting overall well-being.

Limitation and Future Direction

Our study has several limitations. First, the cross-sectional nature of the study limits causal inference and future research may utilize experimental or longitudinal designs to further test the given model. This is important given that overall well-being may better manifest sometime after the stressful event. Although our study was conducted amid an ongoing pandemic, the study did not specifically measure variables related to COVID-19. Future research may opt to measure COVID-19 specific stressors and examine overall well-being when the pandemic passes. Given the dynamic development of the pandemic, overall well-being after short-term or acute stress response may also yield noteworthy findings. Future research can also make the field design targeted interventions for tackling specific areas of concern, such as the COVID-19 pandemic, as well as future issues to come.

Interest Declarations

The authors declared no conflict of interest including any financial, personal or other relationships with people or organizations.

Acknowledgements

None.

References

1. Mahase, E. (2020). China coronavirus: WHO declares international emergency as death toll exceeds 200. *BMJ: British Medical Journal (Online)*, 368.
2. Ren, Y., Zhou, Y., Qian, W., Li, Z., Liu, Z., Wang, R., ... & Zhang, X. (2020). Letter to the Editor "A longitudinal study on the mental health of general population during the COVID-19 epidemic in China". *Brain, behavior, and immunity*, 87, 132.
3. Velavan, T. P., & Meyer, C. G. (2020). The COVID-19 epidemic. *Tropical medicine & international health*, 25(3), 278.
4. Van Eck, M., Berkhof, H., Nicolson, N., & Sulon, J. (1996). The effects of perceived stress, traits, mood states, and stressful daily events on salivary cortisol. *Psychosomatic medicine*, 58(5), 447-458.
5. Cai, Y., Wang, J., & Hou, L. (2021). Resilience improves the sleep quality in disabled elders: the role of perceived stress. *Frontiers in Psychology*, 12, 134.
6. Chang, K. K. P., Wong, F. K. Y., Chan, K. L., Wong, F., Ho, H. C., Wong, M. S., ... & Yang, L. (2020). The Impact of the Environment on the Quality of Life and the Mediating Effects of Sleep and Stress. *International Journal of Environmental Research and Public Health*, 17(22), 8529.
7. Katana, M., Röcke, C., Spain, S. M., & Allemand, M. (2019). Emotion regulation, subjective well-being, and perceived stress in daily life of geriatric nurses. *Frontiers in psychology*, 10, 1097.
8. Langlois, A., & Anderson, D. E. (2002). Resolving the quality of life/well-being puzzle: Toward a new model. *Canadian Journal of Regional Science*, 25(3), 501-512.
9. Suh, E., Diener, E., & Fujita, F. (1996). Events and subjective well-being: only recent events matter. *Journal of personality and social psychology*, 70(5), 1091.
10. Taylor, R. J., & Chatters, L. M. (1988). Church members as a source of informal social support. *Review of religious research*, 193-203.
11. Zika, S., & Chamberlain, K. (1987). Relation of hassles and personality to subjective well-being. *Journal of Personality and Social Psychology*, 53(1), 155.
12. MAHIGIR, M. S. Z. (2014). The Relationship Between Happiness and Attachment with God and the Perceived Stress in the Students of Payam-e Nour University, Sarableh. *International J. Soc. Sci. & Education*, 4, 118-123.
13. LIJuan, A., & Zhong, C. (2003). A Review of Research on Sense of Security. *Chinese Journal of Behavioral Medicine and Brain Science*, 6, 698-699.
14. Bar-Tal, D., & Jacobson, D. (1998). A psychological perspective on security. *Applied Psychology*, 47 (1), 59-71.
15. Wu, Wenting, & Chen, Li. (2021). Relationship between progress of COVID-19 and psychological security in residents during the epidemic of COVID-19. *Chinese Mental Health Journal*, 350-352.
16. Succi, V., Rossi, R., Talevi, D., Crecini, C., Tempesta, D., & Pacitti, F. (2020). Sleep, stress and trauma. *J. Psychopathol*, 26(1), 92-98.
17. Carnelley, K. B., & Rowe, A. C. (2007). Repeated priming of attachment security influences later views of self and relationships. *Personal Relationships*, 14(2), 307-320.
18. Milberg, A., Friedrichsen, M., Jakobsson, M., Nilsson, E. C., Niskala, B., Olsson, M., ... & Krevers, B. (2014). Patients' sense of security during palliative care—what are the influencing factors?. *Journal of pain and symptom management*, 48(1), 45-55.
19. Hu, S. M., & Zhong, H. (2015). Relationship between job insecurity and job well-being: Moderating effect of perceived employability. *Chinese Journal of Clinical Psychology*, 23(2), 321-325.
20. Galinha, I. C., Oishi, S., Pereira, C., Wirtz, D., & Esteves, F. (2013). The role of personality traits, attachment style, and satisfaction with relationships in the subjective well-being of Americans, Portuguese, and Mozambicans. *Journal of Cross-Cultural Psychology*, 44(3), 416-437.
21. Shi, B., Xu, L., & Jingjing, X. (2009). Migrant children's well-being and security and their relationship to social exclusion. *Psychological Science (China)*, 32(06), 1452-1454.
22. Schiemann, S. J., & Jonas, E. (2020). Streben nach Macht fern von Ethik: Die „dunkle Triade“ bei Führungskräften und die Folgen für Organisationen. *Organisationsberatung, Supervision, Coaching*, 27(2), 251-263.
23. Hughes, A., Brewer, G., & Khan, R. (2020). Sexual coercion by women: The influence of pornography and narcissistic and histrionic personality disorder traits. *Archives of sexual behavior*, 49(3), 885-894.
24. Helbling, L., & Kanji, S. (2018). Job insecurity: Differential effects of subjective and objective measures on life satisfaction trajectories of workers aged 27–30 in Germany. *Social Indicators Research*, 137(3), 1145-1162.
25. Gai, X. R., Lei, L., Fu, X. J., & Wang, X. C. (2016). The association among narcissism, social status insecurity and cyberbullying: A cross culture study. *Psychological Research*, 9(6), 73-80.
26. Cohen, S., Kamarck, T., & Mermelstein, R. (1983). Una medida global de estrés percibido. *Journal de Salud y conducta social*, 24, 385-396.
27. Liu, W., Yi, J., Zhong, M., & Zhu, X. (2015). Measurement

- invariance of the perceived stress scale in college men and women. *Chinese Journal of Clinical Psychology*, 23(5), 944-946.
28. Fazio, A. F. (1977). A concurrent validation study of the NCHS General Well-Being Schedule. *Vital and health statistics. Series 2, Data evaluation and methods research*, 09(73), 1-53.
29. Jones, D. N., & Paulhus, D. L. (2014). Introducing the short dark triad (SD3) a brief measure of dark personality traits. *Assessment*, 21(1), 28-41.
30. Geng, Y. G., Sun, Q. B., Huang, J. Y., Zhu, Y. Z., & Han, X. H. (2015). Dirty dozen and short dark triad: A Chinese validation of two brief measures of the dark triad. *Chinese Journal of Clinical Psychology*, 23(2), 246-250.
31. Miguel, F. K., Machado, G. M., Pianowski, G., & de Francisco Carvalho, L. (2021). Compliance with containment measures to the COVID-19 pandemic over time: Do anti-social traits matter?. *Personality and individual differences*, 168, 110346.
32. Hu, Y., Ye, B., & Im, H. (2021). Hope and post-stress growth during COVID-19 pandemic: The mediating role of perceived stress and the moderating role of empathy. *Personality and Individual Differences*, 178, 110831.
33. Dongdong, F., Changqin, L. U., & Ling, S. O. (2008). Job insecurity well-being and job performance: The role of general self efficacy (article written in Chinese) *Acta psychologica sinica*, 50(04), 448-455.
34. Maslow, A. H., Hirsh, E., Stein, M., & Honigmann, I. (1945). A clinically derived test for measuring psychological security-insecurity. *The Journal of general psychology*, 33(1), 21-41.
35. Wang, Y., Cao, X., Li, F., & Wang, D. (2021). When Collaborating in Constructive Task with Spouse: Attachment Orientation Predicts Exploratory Behavior Among Older Couples. *Frontiers in Psychology*, 12.
36. Fung, H. H., & Carstensen, L. L. (2006). Goals change when life's fragility is primed: Lessons learned from older adults, the September 11 attacks and sars. *Social cognition*, 24(3), 248-278.
37. Egan, V. (2014). Positively unpleasant: The Dark Triad, happiness and subjective well-being. *Personality and Individual Differences*, 60, S16-S17.
38. Egan, V., Chan, S., & Shorter, G. W. (2014). The Dark Triad, happiness and subjective well-being. *Personality and individual differences*, 67, 17-22.
39. Jungst, M., Schreurs, B., Jawahar, J., & Serban, N. (2021). Differential benefits of social resources for low versus high Machiavellians: A three-study constructive replication. *Personality and Individual Differences*, 177, 110823.
40. Pfattheicher, S. (2016). Testosterone, cortisol and the Dark Triad: Narcissism (but not Machiavellianism or psychopathy) is positively related to basal testosterone and cortisol. *Personality and Individual Differences*, 97, 115-119.

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