Article

Explaining Stress during the COVID-19 Pandemic among Chinese Police Officers

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Abstract Policing can be stressful, especially during public crises such as the coronavirus disease 2019(COVID-19) pandemic. Using survey data from 600 police officers in a large city in West China, this study examines the prevalence of police stress increase during the pandemic's peak month, compared pre-pandemic, and assesses a range of personal and work-related risk and protective factors of police stress. We found that Chinese officers suffered widespread, increased levels of stress during the peak pandemic month. Sources of police stress primarily came from changes in workloads and fear of contracting COVID-19. Perceived effectiveness of agency protection of officers against the COVID-19 risk, sufficient amount of sleep, and increased family time significantly reduced stress. These results bear important research and policy implications.

Introduction

Policing can be a stressful occupation, especially during public crises such as the coronavirus disease 2019 (COVID-19) pandemic. As first responders, the police face elevated risks of contracting the coronavirus and shoulder new and unfamiliar responsibilities, including enforcing emergency regulations and protecting public health (Perry and Jonathan-Zamir, 2021). Some officers bear increased workloads and overtime, while others suffer from heightened concerns about the health and safety of their own and loved ones (Frenkel et al., 2021). Increased occupational stress can adversely affect officers' physical and mental health, potentially contaminating their decision-making process and undermining police–community relations (Shane, 2010). It is therefore imperative to examine the antecedents of police stress during health crises. Although recent studies have discussed the effects of COVID-19 on police mental health (Drew and Martin, 2020; Jennings and Perez, 2020; Stogner *et al.*, 2020), only two

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have empirically investigated police stress (Yuan *et al.*, 2020; Frenkel *et al.*, 2021), leaving many questions unanswered.

Using survey data garnered from police officers in a large Chinese city, this study assesses an array of stress generators and alleviators related to organizational and occupational environments and personal situations. Particularly, this study considers the influences of previously unstudied yet potentially relevant predictors of stress during the pandemic, including changes in workloads, use of coercive measures, perceptions of public compliance, and family time.

China presents an interesting location for studying police stress. As the origin of the COVID-19 outbreak, China is the first country worldwide to experience widespread COVID-induced anxiety and depression, especially during the early peak of February 2020 (Qiu *et al.*, 2020). The Chinese police likely suffered elevated levels of stress. Secondly, the government utilized exceptionally restrictive measures to combat the pandemic, such as massive lockdown, electronic surveillance, and mandatory mask and quarantine, relying heavily on the police as the enforcement arm of the state. Although the authoritarian governmental response may receive populace support or tolerance mostly, it can generate increased stress among both police officers and citizens adjusting to these draconic measures.

Learning from the experience of Chinese police can further our understanding of police stress during crises in an authoritarian country and other countries that attempt to take an invasive approach to tackle the pandemic. Given that some developing and well-established democracies also adopt certain authoritarian political behaviours and over-policing practices to control COVID-19 spreading, concerns arise about the decline of global democracy with these counter-virus measures (Thomson and Ip, 2020). Findings of this study can shed light on the influence of governmental control over COVID-19 on first responders' psychological health, which carries important implications for police–community relations and police legitimacy.

Police stress during the COVID-19 pandemic

Policing is a stressful occupation, illustrated by higher rates of mental health problems, misuse of alcohol, and suicide among officers than the general population (Hartley *et al.*, 2011; Menard and Arter, 2013; Syed *et al.*, 2020). Stress and associated adverse conditions can severely undermine police performance, increasing officers' burnout, clouding their decision making, and impairing their ability to handle critical situations, both in the West (Verhage *et al.*, 2018; Kelley *et al.*, 2019) and in China (Wang *et al.*, 2014).

The COVID-19 pandemic creates additional stressors for police officers, including the requirements for enforcing evolving and often unclear instructions (Maskály *et al.*, 2021) and the fear of COVID-19 infection and death (Jennings and Perez, 2020; Stogner *et al.*, 2020; Frenkel et al., 2021). The very nature of police work requires officers to interact with community members frequently, exposing them to higher risks of contracting the virus (Frenkel et al., 2021). Patently, the constant exposure to death is also emotionally taxing. Frenkel et al. (2021) found that the infection risk is one of the main stressors in a sample of European police officers early in the pandemic.

Beyond routine duties, the police in many countries are entrusted to enforce new, strict, and likely unpopular governmental restrictions of public behaviour. These policies may be challenged by citizens on different grounds (Stogner *et al.*, 2020), increasing the stress and pressure of the police (Shirzad *et al.*, 2020). Additional challenges arise when police administrators fail to provide officers with adequate protection from the coronavirus or issue clear and helpful guidelines on COVID-19 enforcement (Frankel *et al.*, 2020). Agencies with slow or ineffective policy and practice adjustments to the pandemic can generate added organizational and operational stressors for frontline officers.

Another potential stress generator is increased workloads. In a global study conducted by

Maskály *et al.* (2021), about three-quarters of police administrators from 27 countries indicated that the number of warnings for violations of COVID-19 rules increased dramatically and about one-half said that the number of fines also grew. Similarly, the Chinese police have engaged in widespread and strict enforcement of COVID-19 quarantine and tracing activities (Dai *et al.*, 2021), as well as forceful crackdowns on COVID-19 related crimes (Jiang and Xie, 2021), potentially increasing their stress levels.

Officer and agency coping practices against COVID-19, meanwhile, could alleviate stress. Evidence shows that organizational support promotes officer job satisfaction and mitigates burnout and secondary traumatic stress (Miller *et al.*, 2017; Wu *et al.*, 2017). In the context of COVID-19, providing officers with adequate personal protective equipment (PPE) and minimizing officer risks of contraction can strengthen organizational support. Postponing in-person training and allowing remote work (Maskály *et al.*, 2021) may also reduce offices' feelings of risk and unpreparedness (Farrow, 2020), signalling the agency's care for officer health and well-being and capability of dealing with emergencies and crises. In contrast, deficient leadership and poor communication were the key organizational stressors for officers early in the pandemic (Frenkel et al., 2021).

Occupational alleviators could also ease officer stress during the pandemic. Increased public compliance may lessen stress, as compliance is essential for police effectiveness. People may get used to new COVID-19 regulations over time and comply out of habits. Alternatively, as the pandemic lingers, citizens may experience fatigue from isolation and become dissatisfied or impatient about unnecessary or ineffective restrictions on their liberties, yielding non-compliance (Grace, 2021). A recent study found that not all Australians complied fully with the lockdown restrictions, and compliance decreased slightly over time (Murphy *et al.*, 2020). Although there is no research assessing Chinese willingness to obey the police, laws, or regulations during the pandemic, a pre-pandemic study shows the majority of Chinese citizens surveyed felt obligated to obey the law irrespective of their personal feelings (Jiang *et al.*, 2013). It is reasonable to expect increased citizen compliance to reduce police stress.

Lastly, constructive coping mechanisms in areas of self-care and family life may buffer the negative impact of COVID-19 on police stress. Staying physically active, eating a healthy diet, and getting sufficient sleep could improve people's health and well-being, lowering their stress (Hendy, 2014; Castillo, 2020). Additionally, family companionship and cohesion are particularly important during difficult times (Lazarus and Folkman, 1984; He *et al.*, 2002) and should be considered when studying police stress during the high-pandemic period.

Chinese policing during the pandemic and stress

The Chinese police, besides their usual duties, assume additional responsibilities during the pandemic peak periods, which potentially increased their stress levels. First, they participate in enforcing COVID-19 emergency measures, such as strict local lockdowns and mandatory quarantine, thus creating additional tasks they need to perform. By January 2020, all provinces, except Tibet, had instated the highest level of governmental response to the public health emergency (Jiang and Xie, 2021). The populace was quickly mobilized, and community-based social control measures were pervasively deployed to suppress the virus. Local governments and the police rely on the so-called 'grid-based governance' system to exercise tight community watch against the COVID-19 risk (Wei *et al.*, 2021). The system divides the social fabric of society into many grids (communities) and organizations and people within particular grids are held responsible for their own well-being, including collaboratively solving community problems (Wei *et al.*, 2021). In this system, the Chinese police take subsidiary roles of order maintenance with the main tasks involving 'settling

conflicts when citizens refuse to obey various quarantine rules or accept medical treatments' (Jiang and Xie, 2021, p. 1130).

Enforcement of some of anti-virus measures involved high-discretion and low-guidance activities (Farrow, 2020). For example, to enforce stay-at-home orders, Chinese police in high-risk areas reportedly sealed apartment doors to prevent residents from leaving their homes, provoking public outcry (Reuters, 2020). Although Chinese people are generally much more tolerant of tenacious governmental control than their Western counterparts (Wu *et al.*, 2021), widespread public resentment pushed the Minister of Public Security to require the police to 'adhere to the strict norms of fair and civilized law enforcement, strictly prohibiting excessive, rough, and violent enforcement' (People's Daily, 2020).

Secondly, the police have stepped up efforts in censorship and other information control, particularly on social media, which, in turn, imposed additional demands on their time. Many people are familiar with Dr Wenliang Li, the whistleblower who tried to warn fellow medical associates of a disease that looked like SARS via a group message posted on the leading social media app (WeChat) in China. Dr Li was reprimanded for 'spreading rumors' by Wuhan police and later was infected with COVID-19 and died, stirring nationwide public mourning and anger over the government's mishandling of the coronavirus outbreak (BBC, 2020). Despite the incident, social media censorship and surveillance have been further utilized to maintain social stability and reinforce government control. The Citizen Lab from the University of Toronto conducted daily tests on WeChat between 18 January and 14 May 2020, and identified as many as 2,174 censored keywords related to COVID-19 (The Citizen Lab, 2020).

Thirdly, the Chinese police have engaged in aggressive crackdowns on pandemic-related crimes, resulting in yet another demand on police officers' time and efforts. During the lockdown, such crime as manufacturing and selling of fake medical devices, online and telephone fraud, and price gouging have surged (Jiang and Xie, 2021). The Ministry of Public Security reported the police had handled 22,000 epidemic-related criminal cases and detained 4,260 suspects by late February 2020 (Xinhua News, 2020).

Finally, the Chinese police enforced comprehensive and stringent emergency measures during the pandemic, likely causing extra work for the already busy street-level officers and creating opportunities for selective or excessive enforcement due to the ambiguity in directions coupled with conflicting values and a lack of unequivocal public support. The amount and nature of police work during the pandemic likely aggravate the stress conditions of the already 'very unhappy' Chinese frontline officers (Scoggins and O'Brien, 2016).

Current study

The COVID-19 pandemic poses additional threats to the physical and mental health of police officers. Investigating stress generators and alleviators provides the necessary knowledge base for police administrators to mitigate officer stress in the current pandemic and, to the extent possible, proactively pre-empt police stress increase in future health crises. Based on the review of relevant literature, we proffer the following hypotheses:

> H1: Organizational stressors (e.g. increased workload) increase officer stress, net of control variables.
>
> H2: Personal stressors (i.e. fear of contracting COVID-19) enlarge officer stress, net of organizational stressors.
>
> H3: Organizational stress alleviators (e.g. availability of PPE, citizen compliance) have a negative effect on officer stress.
>
> H4: Personal stress alleviators (e.g. exercise, family time) have an adverse impact on officer stress.

Methods

Research project and site

This study uses survey data from a sample of Chinese police officers as part of a larger international project started by a group of US- and UK-based scholars in the summer of 2020. The project aims to study the nature, extent, and consequences of changes in policing in response to the pandemic. The research team, which included experienced scholars of Chinese policing, developed a uniform survey instrument for all participating countries, based on feedback from police scholars and administrators from these countries. A sub-group of the research team, composed of American and Chinese scholars, carried out the portion of the China project. The survey was translated from English into Chinese using the double-translation method (Brislin, 1980). The Chinese survey was pre-tested on a small group of Chinese officers, and minor adjustments of wording were made based on their feedback.

The research site is one of China's largest municipalities and a leading river port, transportation hub, and commercial and industrial centre in Western China. The city is administratively divided into more than 30 districts served by a police force of roughly 45,000 officers. On 24 January 2020, the city government activated its highest-level emergency response to the coronavirus. By the middle weeks of February 2020, the city recorded roughly 500–600 confirmed COVID-19 cases weekly. During the pandemic's peak months (i.e. January and February 2020), all local police officers had to report to duty, and vacations and holidays were cancelled. The police forces intensified their patrol and crime prevention activities during the outbreak, and officers were deployed to hospitals, public transportation hubs, and places with high population density and mobility. They had worked closely with public health agencies and local neighborhood resident committee staff to enforce counter-epidemic measures strictly. During the survey period (late January and early February 2021), China's reported COVID-19 cases have been extremely low, in double digits, and the survey city reported no new COVID-19 cases.

Data collection and sample

The city police department operates over 10 training centers throughout the city, offering short-term, in-service training to police officers. Data collection was conducted during 2 weeks (10 working days) in late January and early February of 2021 when police officers attended a half-day political training course in one of the training centres. The political training is mandatory for all frontline officers, including officers assigned to field stations, traffic divisions, and other specialized units. This training centre was selected because it was located in one of the most populated areas impacted by the pandemic. As the characteristics of the police population in the city are unknown, we cannot assess the degree of representativeness of the study sample to the police population in the city.

At the beginning of their training courses, officers were informed about the opportunity of participating in the project. After finishing their training, paper surveys were distributed to officers who expressed willingness to partake. Before handing out the surveys, researchers reiterated the project's purpose to officers and emphasized that participation is voluntary and anonymous. It took participants approximately 15 min to finish the survey. During the data collection period, roughly 700 officers attended the training, 656 officers expressed their willingness to participate and received the surveys, and 600 officers eventually completed and returned surveys. As shown in Table 1, most of the respondents were males (85%), worked at field stations (82%), and lived in urban neighborhoods. The average length of their policing experience was 13 years.

Table 1: Descriptive statistics of variables ($n = 600$)

Variable	Mean	SD	Min	Max
Dependent variable				
Level of stress	0.00	0.92	−3.68	1.39
Independent variables				
Organizational stress generators				
Increased workload	0.00	0.96	−1.93	1.68
Increased coercive encounters	0.00	0.92	−1.93	2.20
Personal stress generator				
Fear of COVID-19	2.30	0.75	1	4
Organizational stress alleviators				
Increased compliance	0.00	0.97	−3.70	1.70
Agency adequacy of PPE	3.32	1.05	1	5
Agency effectiveness of risk control	3.41	.93	1	5
Personal stress alleviators				
Exercise and diet	0.00	0.82	−2.12	1.95
Sleep	2.34	0.98	1	5
Increased family time	2.18	0.98	1	5
Control variables				
Personal characteristics				
Male	0.85	0.36	0	1
Education	3.23	0.61	1	4
Work-related characteristics				
Length of service	13.12	8.02	1	42
Field station	0.82	0.38	0	1
Supervisor	0.14	0.35	0	1
Criminal police	0.39	0.49	0	1
Community police	0.31	0.46	0	1
Public disorder police	0.19	0.39	0	1
Others	0.10	0.30	0	1
Area characteristics				
Urban areas	0.81	0.39	0	1
Small towns	0.15	0.36	0	1
Rural villages	0.04	0.20	0	1

Measures

Dependent variable. The dependent variable, level of stress, is a latent construct comprised of four items. Respondents were asked about personal changes in the following areas during the peak-pandemic month as compared with pre-pandemic: 'my health and well-being', 'the health and well-being of my loved ones', 'I feel stressed', and 'I feel anxious'. Responses include 'much less than before' (coded as 1), 'somewhat less than before' (2), 'no change' (3), 'somewhat more than before' (4), and 'much more than before' (5). Exploratory factor analysis (EFA) using principal axis factoring with Promax rotation was employed to form the factor with factor loadings (λ) ranging between 0.71 and 0.80 ($\alpha = 0.85$). A larger value on the factor score suggests a greater stress increase during the peak-pandemic month.

Independent and control variables. There are four categories of independent variables covering organizational stress generators, personal stress generators, organizational stress alleviators, and personal stress alleviators. All latent factors were formed by EFA. The first organizational risk factor, increased workload, is captured by a factor of three items ($\alpha = 0.88$). Respondents were asked, compared pre-pandemic, how their responding activities changed during the pandemic's peak month: 'the number of social disturbances (e.g. protests, demonstrations)', 'the number of public disorder (*zhi an*) offenses', and 'the number of criminal cases'. The response categories ranged from 1 indicating 'much less than before' to 5 denoting 'much more than before'. Factor loadings (λ) ranged between 0.72 and 0.94. A higher value on the factor represents a heavier workload relative to pre-pandemic. The second organizational stress generator, increased coercive encounters, is measured by respondents' self-report changes in the frequency of 'using hand control tactics to control suspects' and 'deploying control devices (e.g. tasers, batons, weapons) to control suspects' ($\alpha = 0.85$; $\lambda = 0.86$), based on the same response categories as the last measure. Finally, we include one personal stress generator, captured by a single item asking the respondents 'How fearful are you of contracting COVID-19?' (1 = not at all afraid, 2 = not very afraid, 3 = fairly afraid, 4 = very afraid). Although this question asks about the respondents' level of fear during the survey time, it is reasonable to

expect that officers who report higher levels of fear then likely also harboured higher levels of fear during the peak month of the pandemic.

The first organizational stress alleviator is increased compliance, gauging the degree of change in community members' compliance level, comparing prior to the pandemic and during the pandemic's peak month. Officers were asked to assess the effects of the pandemic and the police and local government response to the pandemic on community members' willingness to 'obey the police', 'obey the laws in general', 'obey COVID-19 laws and regulations', and 'cooperate with the police in general'. Response categories range from 1 representing 'made much worse' to 5 representing 'made much better'. These items have factor loadings (λ) varying from 0.83 to 0.93 ($\alpha = 0.93$). A higher score on this factor reflects an officer's perception that community members were more compliant during the pandemic peak month than pre-pandemic.

Two additional organizational stress alleviators were both single-item indicators that tap into agency protection against COVID-19 during the peak-pandemic month, including the availability of PPE and the effectiveness of organizational change to reduce risk. Both items were measured on a 5-point Likert scale (1 = strongly disagree, 5 = strongly agree).

Personal stress alleviators include three variables. Respondents were asked how much change occurred in three areas comparing pre-pandemic and peak-pandemic: 'I am physically active', 'I eat nutritious foods', and 'I get sufficient sleep'. Response options varied from 'much less than before' (coded as 1) to 'much more than before' (coded as 5). EFA suggests two factors: exercise and diet indicating being physically active and eating nutritious foods (both factor loadings $\lambda = 0.71$), and sleep. Furthermore, respondents were asked to report the change in the amount of family time during the peak month of the pandemic relative to prior to the pandemic (1 = much less than before, 5 = much more than before).

Control variables. A range of demographic, workplace, and contextual variables are controlled in the analyses. Demographic characteristics include sex and education. Male is a dummy variable (1 = male; 0 = female). Educational level is an ordinal variable (1 = high school diploma, 2 = associate degree, 3 = bachelor's degree, 4 = postgraduate degree). Workplace characteristics include length of police service measured in years, field station measures whether the respondent works in a police field station (1 = yes; 0 = no). Additionally, we control for supervisory status (1 = yes; 0 = no) and work assignment, which includes four dummy variables representing respectively criminal police (reference group), community police, public disorder police, and others. Finally, three dummy variables, representing urban areas (reference group), small towns, and rural villages separately, indicate the respondent's residential area.

Results

Levels of stress

Table 2 reports the percentage distributions of the four items that make up the stress measure. Most of the officers reported that they had experienced elevated stress levels during the pandemic's peak month, compared with the pre-pandemic period. About three-quarters of the respondents said that they were more concerned about their personal and loved ones' health and well-being, and that they were feeling more stressed and anxious than before. Notably, a quarter of the respondents expressed that their concerns for personal health and well-being, concerns for loved ones' health and well-being, feeling of stress, and feeling of anxiety have dramatically increased (i.e. 'much more than before'). Only a single-digit percentage of the

Table 2: Percentage distributions of the police stress items ($n = 600$)

Response categories	Concerned for personal health and well-being	Concerned for loved ones' health and well-being	Feel stressed	Feel anxious
Much less than before (1)	3.0%	3.2%	1.3%	1.0%
Somewhat less than before (2)	5.0	4.5	2.0	2.7
No change (3)	21.0	20.3	17.7	24.8
Somewhat more than before (4)	48.7	49.2	52.3	46.8
Much more than before (5)	22.3	22.8	26.7	24.7
Somewhat more and much more (4/5)	71.0	72.0	79.0	71.5
Mean (SD)	3.82 (0.93)	3.84 (0.93)	4.01 (0.80)	3.91 (0.83)

respondents reported reduced levels of stress during the peak-pandemic month compared pre-pandemic.

Correlates of stress

Table 3 reports the standardized coefficients from ordinary least squares (OLS) regression models.[1] Model 1 tests H1 regarding the effects of organizational stressors on officer stress, net of controls. Overall, the model explains a small proportion of the variance in the dependent variable ($R^2 = 0.04$). Stress is positively associated with an increased workload ($\beta = 0.14$, $P < 0.01$), supporting H1. However, increased coercive encounters ($\beta = 0.03$, $P > 0.05$) is not significant. Two control variables significantly shape stress, with more educated officers expressing higher levels of stress ($\beta = 0.12$, $P < 0.01$) and officers who live in rural villages reporting lower levels of stress than their urban area counterparts do ($\beta = -0.09$, $P < 0.05$).

Model 2 tests the relationship between the personal stressor and stress (H2), showing that the model explains a modest proportion of the variance in stress ($R^2 = 0.08$). Adding fear of contracting COVID-19 into the analysis, however, significantly improves model fit ($F_{(1,600)} = 25.48$), and officers who report greater fear demonstrate higher levels of stress ($\beta = 0.20$, $P < 0.001$). The same variables from Model 1 remain statistically significant and the sizes of their effects have only slightly attenuated, suggesting that the organizational and personal stressors exert largely independent effects on officers' stress.

Model 3 assesses the effects of organizational stress alleviators. We again see a modest amount of variance explained ($R^2 = 0.12$), and a significantly improved model fit with the addition of these new variables ($F_{(3,600)} = 8.83$). Consistent with H3, perceptions of effective organizational risk control significantly reduce the levels of stress officer experience ($\beta = -0.10$, $P < 0.05$). However, the availability of PPE does not significantly affect levels of stress ($\beta = -0.06$, $P > 0.05$), and increased perception of citizen compliance is actually associated with elevated levels of stress ($\beta = 0.18$, $P < 0.001$), disproving H3. The other

[1] The dependent variable, level of stress, has a Skewness value of −0.72 and Kurtosis value of 1.51, which fall within the acceptable ranges of skewness and kurtosis bounds of normally distributed data (Tabachnick and Fidell, 2013). Multicollinearity is not an issue because all the variance inflation factors are lower than 2 and all tolerances are higher than 0.60 (Hair *et al.*, 1995).

Table 3: OLS regression results on police stress ($n = 600$)

	Model 1		Model 2		Model 3		Model 4	
	β	SE	β	SE	β	SE	β	SE
Independent variables								
Organizational stress generators								
Increased workload	0.14**	0.05	0.13**	0.05	0.14**	0.05	0.11*	0.04
Increased coercive encounters	0.03	0.05	0.03	0.05	0.06	0.05	0.03	0.05
Personal stress generator								
Fear of COVID-19			0.20***	0.05	0.19***	0.05	0.17***	0.05
Organizational stress alleviators								
Increased compliance					0.18***	0.04	0.18***	0.04
Agency adequacy of PPE					−0.06	0.04	−0.05	0.04
Agency effectiveness of risk control					−0.10*	.04	−0.09*	0.04
Personal stress alleviators								
Exercise and diet							0.21***	0.04
Sleep							−0.09*	0.04
Increased family time							−0.22***	0.04
Control variables								
Personal characteristics								
Male	−0.05	0.11	−0.02	0.11	−0.01	0.11	0.00	0.10
Education	0.12**	0.06	0.11**	0.06	0.10*	0.06	0.09*	0.06
Work-related characteristics								
Length of service	0.06	0.00	0.07	0.00	0.06	0.00	0.06	0.00
Field station	0.01	0.11	0.01	0.11	0.01	0.11	−0.00	0.10
Supervisor	0.01	0.11	0.01	0.11	0.02	0.11	−0.00	0.10
Community police	−0.01	0.10	−0.01	0.10	−0.01	0.09	−0.03	0.09
Public disorder police	0.03	0.11	0.02	0.11	0.03	0.10	0.01	0.10
Others	0.01	0.14	0.00	0.14	0.02	0.16	−0.01	0.13
Area characteristics								
Small towns	−0.01	0.11	−0.01	0.10	−0.04	0.10	−0.06	0.10
Rural villages	−0.09*	0.19	−0.09*	0.19	−0.09*	0.19	−0.09*	0.18
R^2	0.04		0.08		0.12		0.20	

*$P < 0.05$,
**$P < 0.01$,
***$P < 0.001$;
β denotes standardized coefficient.

variables in the model remain largely unchanged from Model 2 in terms of the direction and magnitude of effect.

Lastly, Model 4 analyses the independent effects of personal stress alleviators on stress (H4). The addition of the personal stress alleviators significantly improves the model fit ($F_{(3,600)} = 9.33$) and further explains the variance in stress ($R^2 = 0.20$). Two personal stress alleviators, amount of sleep ($\beta = -0.09$, $P < 0.05$) and amount of family time ($\beta = -0.22$, $P < 0.001$), lower police level of stress as expected. The amount of family time is the strongest predictor in the model. The healthy lifestyle of staying physically active and eating nutritious

food, meanwhile, is positively related to stress, contradicting H4. The effects of other variables remain consistent from prior models, even though the sizes of some effects diminish to a certain degree.

Discussion

Drawing upon survey data from hard-to-reach Chinese police officers, this study gauges the prevalence of increased stress during the peak pandemic month and investigates a host of personal- and organizational-related risk and protective factors of stress. Some key findings deserve further discussion. Foremost, Chinese officers experienced widespread, increased levels of stress during the peak-pandemic month. Interestingly, preliminary evidence from five European countries shows that officers were only mildly affected by the pandemic in terms of their stress levels (Frenkel et al., 2021), indicating that the severity of the COVID-19 pandemic does not necessarily correspond to officer levels of stress change across societies.

A source of Chinese police stress elevation comes from increased workloads. It appears that the Chinese police's deep involvement in enforcing counter-pandemic rules as well as expanded responsibilities of cracking down pandemic-related crimes and intensifying populace control and monitoring lead to their increased workloads and subsequently higher levels of stress. These enforcement activities, nonetheless, do not need to be coercive to stimulate officer stress, since an increase in the use of control tactics and devices to restrain suspects is not a significant predictor of stress exacerbation.

An even stronger source of stress is rooted in officers' fear of contracting COVID-19. Understandably, officers who report a higher fear of contracting the coronavirus suffer more stress. Over one-third of the respondents reported that they are very afraid or afraid of contracting the virus. Previous research has observed a significant impact of fear of contracting COVID-19 on following mandatory rules of isolation (Kowalczuk and Gębski, 2021) and voting (Chirwa *et al.*, 2021), and this study illustrates that such fear also drives up police stress.

Regarding the organizational stress alleviators, perceived effectiveness of agency protection of officers against the risk of COVID-19 can shield officers from heightened stress. Additionally, positive perceptions of organizational performance are likely to improve officers' job morale and satisfaction, subsequently lowering their stress levels. It is noticed that being equipped with sufficient PPE during the pandemic's peak month, by itself, does not reduce stress. Perhaps a more comprehensive approach to minimize officers' risk of contracting COVID-19 is necessary to ease officers and quell their stress. Such an approach can include police administrators' commitment to supporting officers through actions and communications and agencies' holistic efforts to improve system performance and address individual officers' needs and concerns (Dennerlein *et al.*, 2020).

Another stress reliever is increased family time, which protects officers from augmented stress. Although the pandemic imposes great challenges on many families, such as financial insecurity and hardships, caregiving burden, disrupted routines, and confinement-related stress (Prime *et al.*, 2020), family support is instrumental in reducing police stress, especially in a culture that is highly family oriented (Fan, 2000). Unfortunately, Chinese officers tended to spend less time with family because of increased workloads and suspended vacations and holidays during the pandemic. Our data showed that nearly 70% of the respondents stated that they had much less or somewhat less family time than before. Maintaining a work–family balance, which has already been difficult to achieve for many officers during normal times, is especially challenging yet particularly helpful for officers if they want to stay healthy and build resilience against stress in handling the pandemic.

An unexpected finding is the positive relationship between exercise/diet and increased stress. While previous research found that a healthy lifestyle reduces stress (Castillo, 2020), one may speculate that healthy living can be a coping reaction to stress. Officers who have high levels of stress are more likely to seek out healthy daily routines to maintain physical well-being and prevent COVID-19. Indeed, a study of Polish adults shows that people who are very afraid of getting sick and who follow the isolation rules most strictly have changed their eating behaviors the most by adopting safer food purchasing behaviours, having more regular eating times, and eating healthier food (Kowalczuk and Gębski, 2021). It is thus plausible that officers who have experienced elevated levels of stress are more likely to stay physically active and eat nutritious food for self-protection. It is, nonetheless, also possible that making more efforts to maintain regular physical activity and to purchase and prepare healthy foods presents a source of stress for officers who are already overworked. Meanwhile, sufficient sleep helps with stress. The amount of sleep that officers could have during a pandemic peak may not be up to their own decision or preference though. With increased workloads, officers who did not have sufficient sleep suffered from growing stress.

The positive connection between increased citizen compliance and increased stress is more perplexing. We wonder if any confounder accounts for both. For example, an area's collective fearful sentiments towards COVID-19 may be a confounder. Fear can raise local residents' willingness to comply with the law and the police as well as officers' stress levels. Indeed, Murphy *et al.* (2020) revealed that Australians were more compliant with the police when they considered COVID-19 a greater health risk. Likely, in an area with stronger group views of the severity and risks of COVID-19, residents are more compliant, while the police are more stressed.

Several limitations of this study should be acknowledged. Data were collected from a non-random sample of police officers in one city; thus, results cannot be generalized to all police officers in that city, certainly not to all officers in the nation. Unfortunately, non-random samples are common in policing research conducted in China. In fact, to our knowledge, not a single study to date on police attitudes and behaviours relies on random samples from mainland China. Nonetheless, it is highly likely that the prevalence and level of increased police stress revealed in this study are lower than those in high-risk areas including Wuhan. Future research should attempt to collect data from more geographic areas, particularly the Hubei area where Wuhan locates.

Utilizing self-report data, this study has the potential issue of social desirability bias (Krumpal, 2013). That is, officers may be unwilling to reveal information about their attitudes and behaviours that are considered sensitive or incriminating. Therefore, if practical, future studies should consider using new technology (e.g. mobile phones and wearables) to document police stress levels and changes over time (Reid *et al.*, 2009). These physiological data can supplement traditional measures of the stress response, tapping into the multiple areas of psychological, behavioural, cognitive, and biological reactions to stressors (Crosswell and Lockwood, 2020). Relatively, as most questions are retrospective, they suffer such usual problems as recall inaccuracy or incompleteness, although this may be less a concern in this study given that COVID-19 is a once-in-a-century public health disaster and the respondents likely retain the memory of their experience during the brief pandemic peak period in their city.

Despite a range of predictor and control variables incorporated in this study, additional risk and protective factors are left out and should be examined. For example, media influence from both traditional and new media types may be substantial. Overconsumption of sensational news may promote excessive stress among the officers. People are likely to have learned about horrific deaths and other sufferings of the pandemic from

the media. Content analysis of media reporting and depiction of COVID-19 can uncover the effects of media exposure on stress.

This study's findings bear some important implications for policy and practices, given the harmful consequences of stress on police performance (Shane, 2010). Our results suggest that even in an authoritarian country that enforces stringent counter-COVID-19 measures and has the coronavirus under control within relatively short period, police officers endure high levels of stress. The prevalence of heightened stress among Chinese officers should prompt concerted efforts to reduce their stress during disasters and emergencies. Policy implications from this study are also useful for reducing police stress and promoting officer health in other countries.

Since we found that effective risk-reduction measures adopted by agencies reduce officer stress, when facing similar challenges in the future, police agencies must keep officers' psychological health and well-being at the top of their priority list by swiftly adopting effective organizational changes to minimize officers' risk of health hazards and enhance their preparedness. Officers should be provided with adequate protection, including equipment, resource, knowledge, and techniques, against the risks of both contraction and stress. Particularly, resources should be appropriated to frontline officers (Wu and Wen, 2020).

Police administrators should also evaluate COVID-19 related policies and tactics to ensure that they do not create unnecessarily burdensome workloads for officers who are already overworked as street-level law enforcers and order keepers. Chinese officers are particularly vulnerable to excessive workloads given their traditionally broad roles and functions embedded in a tight social control mentality. We found that excessive work that affects officers' rest, cutting back on their sleep time, is particularly harmful. Thus, strong and supportive leadership is essential to shield line officers from excessive workloads and create a culture that is caring for police health and encouraging officers to seek help (Tucker, 2015). Furthermore, given the centrality of family in buffering against the risk of stress in the context of COVID-19, police agencies should be family-friendly and avoid creating situations that increase police work–family conflict, especially during difficult times.

For improved personal health, officers should learn to cope with both chronic and acute stress, such as that stemming from COVID-19. Police organizations in both China and around the world should offer training to officers on strengthening their stress regulation skills, and officers should welcome such learning of negative feelings and emotions management. Finally, although a certain level of fear about COVID-19 contraction could benefit rational conduct, disproportionate fear can bring heightened levels of stress and anxiety, causing adverse health and social consequences. The highly restrictive nature of the Chinese government response creates stress for both police and the public. Countering misinformation about COVID-19 and avoiding 'coronaphobia' is healthy for all, including the police (Arora *et al.*, 2020).

References

Arora, A., Jha, A. K., Alat, P., and Das, S. S. (2020). 'Understanding Coronaphobia'. *Asian Journal of Psychiatry* **54**: 102384.

BBC. (2020). *Li Wenliang: 'Wailing Wall' for China's Virus Whistleblowing Doctor*, 23 June. https://www.bbc.com/news/world-asia-china-53077072 (accessed 18 March 2021).

Brislin, R. W. (1980) Translation and content analysis of oral and written material. In Triandis, H. C., Berry, J. W. (Eds.), Handbook of cross-cultural psychology. Vol. 2. Boston, MA: Allyn and Bacon. Pp. 389–444.

Castillo, C. C. (2020). 'Analysis of the Stress, Anxiety and Healthy Habits in the Spanish Covid-19 Confinement'. *Health Science Journal* **14**(2): 707.

Chirwa, G. C., Dulani, B., Sithole, L. et al. (2021). 'Malawi at the Crossroads: Does the Fear of Contracting COVID-19 Affect the Propensity to Vote?'. *The European Journal of Development Research* 1–23.

Crosswell, A. D. and Lockwood, K. G. (2020). 'Best Practices for Stress Measurement: How to Measure Psychological Stress in Health Research'. *Health Psychology Open* **7**(2): 2055102920933072.

Dai, M., Xia, Y., and Han, R. (2021). The impact of lockdown on police service calls during the COVID-9 pandemic in China. *Policing: A Journal of Policy and Practice*. paab007. 10.1093/police/paab007.

Dennerlein, J. T., Burke, L., Sabbath, E. L. et al. (2020). 'An Integrative Total Worker Health Framework for Keeping Workers Safe and Healthy during the COVID-19 Pandemic'. *Human Factors* **62**(5): 689–696.

Drew, J. M., and Martin, S. (2020). 'Mental Health and Well-Being of Police in a Health Pandemic: Critical Issues for Police Leaders in a post-COVID-19 Environment'. *Journal of Community Safety and Well-Being* **5**(2): 31–36.

Fan, Y. (2000). 'A Classification of Chinese Culture'. *Cross Cultural Management: An International Journal* **7**(2): 3–10.

Farrow, K. (2020). 'Policing the Pandemic in the UK Using the Principles of Procedural Justice'. *Policing: A Journal of Policy and Practice* **14**(3): 587–592.

Frenkel, M. O., Giessing, L., Egger-Lampl, S. et al. (2021). 'The Impact of the COVID-19 Pandemic on European Police Officers: Stress, Demands, and Coping Resources'. *Journal of Criminal Justice* **72**: 101756.

Grace, S. (2021). 'Policing Social Distancing: Gaining and Maintaining Compliance in the Age of Coronavirus'. *Policing: A Journal of Policy and Practice* **14**(4): 1034–1053.

Hair, J. E., Jr, Anderson, R. E., and Tatham, R. L. (1995). *Multivariate Data Analysis*, 5th edn. New York, NY: Macmillan Publishing Company.

Hartley, T. A., Burchfiel, C. M., Fekedulegn, D., Andrew, M. E., and Violanti, J. M. (2011). 'Health Disparities in Police Officers: Comparisons to the U.S. general Population'. *International Journal of Emerging Mental Health* **13**(4): 211–220.

Hartmann, M. R., and Hartmann, R. K. (2020). 'Frontline Innovation in Times of Crisis: Learning from the Corona Virus Pandemic'. *Policing: A Journal of Policy and Practice* **14**(4): 1092–1103.

He, N., Zhao, J., and Archbold, C. (2002). 'Gender and Police Stress'. *Policing: An International Journal of Police Strategies & Management* **25**(4): 687–708.

Jennings, W. and Perez, N. (2020). 'The Immediate Impact of Covid-19 on Law Enforcement in the United States'. *American Journal of Criminal Justice* **45**(4): 690–701.

Jiang, F. and Xie, C. (2021). 'Roles of Chinese Police Amidst the COVID-19 Pandemic'. *Policing: A Journal of Policy and Practice* **14**(4): 1127–1137.

Jiang, S., Wu, Y., and Wang, J. (2013). 'Citizens' Obligation to Obey the Law: An Empirical Study of Guangzhou'. *China. International Journal of Offender Therapy and Comparative Criminology* **57**(4): 495–518.

Kelley, D. C., Siegel, E., and Wormwood, J. B. (2019). 'Understanding Police Performance under Stress: Insights from the Biopsychosocial Model of Challenge and Threat'. *Frontiers in Psychology* **10**: 1800.

Kowalczuk, I. and Gębski, J. (2021). 'Impact of Fear of Contracting COVID-19 and Complying with the Rules of Isolation on Nutritional Behaviors of Polish Adults'. *International Journal of Environmental Research and Public Health* **18**(4): 1631.

Krumpal, I. (2013). 'Determinants of Social Desirability Bias in Sensitive Surveys: A Literature Review'. *Quality & Quantity* **47**(4): 2025–2047.

Lazarus, R. S. and Folkman, S. (1984). *Stress, Appraisal, and Coping*. New York, NY: Springer.

Maskály, J., Ivković, S. K., and Neyroud, P. (2021). 'Policing the COVID-19 Pandemic: Exploratory Study of the Types of Organizational Changes and Police Activities across the Globe'. *International Criminal Justice Review*. **31**(3): 266-285 https://doi.org/10.1177/10575677211012807.

Menard, K. S. and Arter, M. L. (2013). 'Police Officer Alcohol Use and Trauma Symptoms: Associations with Critical Incidents, Coping, and Social Stressors'. *International Journal of Stress Management* **20**(1): 37–56.

Miller, A., Unruh, L., Wharton, T., Liu, X. A., and Zhang, N. J. (2017). 'The Relationship between Perceived Organizational Support, Perceived Coworker Support, Debriefing and Professional Quality of Life in Florida Law Enforcement Officers'. *International Journal of Police Science & Management* **19**(3): 129–139.

Murphy, K., Williamson, H., Sargeant, E., and McCarthy, M. (2020). 'Why People Comply with COVID-19 Social Distancing Restrictions: Self-Interest or Duty? '. *Australian & New Zealand Journal of Criminology* **53**(4): 477–496.

People's Daily. (2020). *The Ministry of Public Safety: Forbid Excessive, Rough, and Violent Enforcement*, February 19. http://legal.people.com.cn/n1/2020/0219/c42510-31594891.html (accessed 21 March 2021).

Perry, G. and Jonathan-Zamir, T. (2021). 'Expectations, Effectiveness, Trust, and Cooperation: Public Attitudes towards the Israel Police during the COVID-19 Pandemic'. *Policing: A Journal of Policy and Practice* **14**(4): 1073–1091.

Prime, H., Wade, M., and Browne, D. T. (2020). 'Risk and Resilience in Family Well-Being during the COVID-19 Pandemic'. *American Psychologist* **75**(5): 631–643.

Qiu, J., Shen, B., Zhao, M. et al. (2020). 'A Nationwide Survey of Psychological Distress among Chinese People in the COVID-19 Epidemic: Implications and Policy Recommendations'. *General Psychiatry* **33**(2): e100213.

Reid, S. C., Kauer, S. D., Dudgeon, P. et al. (2009). 'A Mobile Phone Program to Track Young People's Experiences of Mood, Stress and Coping'. *Social Psychiatry and Psychiatric Epidemiology* **44**(6): 501–507.

Reuters. (2020). *Sealed In: Chinese Trapped at Home by Coronavirus Feel the Strain*. https://www.reuters.com/article/us-china-health-quarantine/sealed-in-chinese-trapped-at-home-by-coronavirus-feel-the-strain-idUSKCN20G0AY (accessed 24 March 2021).

Scoggins, S. E. and O'Brien, K. J. (2016). 'China's Unhappy Police'. *Asian Survey* **56**(2): 225–242.

Shane, J. M. (2010). 'Organizational Stressors and Police Performance'. *Journal of Criminal Justice* **38**(4): 807–818.

Shirzad, H., Abbasi Farajzadeh, M., Hosseini Zijoud, S. R., and Farnoosh, G. (2020). 'The Role of Military and Police Forces in Crisis Management Due to the COVID-19 Outbreak in Iran and the World'. *Journal of Police Medicine* **9**(2): 63–70.

Stogner, J., Miller, B. L., and McLean, K. (2020). 'Police Stress, Mental Health, and Resiliency during the COVID-19 Pandemic'. *American Journal of Criminal Justice* **45**(4): 718–730.

Syed, S., Ashwick, R., Schlosser, M. et al. (2020). 'Global Prevalence Risk Factors of Mental Health Problems in Police Personnel: A Systematic Review and Meta-Analysis'. *Occupational and Environment Medicine* **77**(11): 737–747.

Tabachnick, B. G. and Fidell, L. S. (2013). Using multivariate statistics. Boston, MA: Pearson.

The Citizen Lab. (2020). *Censored Contagion II A Timeline of Information Control on Chinese Social Media During COVID-19*, 25 August. https://citizenlab.ca/2020/08/censored-contagion-ii-a-timeline-of-information-control-on-chinese-social-media-during-covid-19/ (accessed 18 March 2021).

Thomson, S. and Ip, E. C. (2020). COVID-19 emergency measures and the impending authoritarian pandemic. Journal of Law and the Biosciences, **7**(1), lsaa064, https://doi.org/10.1093/jlb/lsaa064.

Tucker, J. (2015). 'Police Officer Willingness to Use Stress Intervention Services: The Role of Perceived Organizational Support (POS), Confidentiality and Stigma'. *International Journal of Emergency Mental Health and Human Resilience* **17**(1): 304–314.

Verhage, A., Noppe, J., Feys, Y., and Ledegen, E. (2018). 'Force, Stress, and Decision-Making within the Belgian Police: The Impact of Stressful Situations on Police Decision-Making'. *Journal of Police and Criminal Psychology* **33**(4): 345–357.

Xinhua News. (2020). *Chinese Police Handle 22,000 Epidemic-Related Criminal Cases*, 26 February. http://www.xinhuanet.com/english/2020-02/26/c_138820185.htm (accessed 18 March 2021).

Wang, Y., Zheng, L., Hu, T., and Zheng, Q. (2014). 'Stress, Burnout, and Job Satisfaction: Case of Police Force in China'. *Public Personnel Management* **43**(3): 325–339.

Wei, Y., Ye, Z., Cui, M., and Wei, X. (2021). 'COVID-19 Prevention and Control in China: Grid Governance'. *Journal of Public Health. Online First* **43**(1): 76–81.

Wu, G. and Wen, M. (2020). 'Predicting Three Dimensions of Police Officer Stress: Does Rural or Urban Setting Matter?'. *Policing: An International Journal* **43**(3): 435–449.

Wu, Y., Sun, I. Y., Chang, C. K. M., and Hsu, K. K. L. (2017). 'Procedural Justice Received and Given: Supervisory Treatment, Emotional States, and Behavioral Compliance among Taiwanese Police Officers'. *Criminal Justice and Behavior* **44**(7): 963–982.

Wu, Y., Sun, I. Y., and Hu, R. (2021). 'Cooperation with Police in China: Surveillance Cameras, Neighborhood Efficacy and Policing'. *Social Science Quarterly* **102**(1): 433–453.

Yuan, L., Zhu, L., Chen, F. et al. (2020). 'A Survey of Psychological Responses during the Coronavirus Disease 2019 (COVID-19) Epidemic among Chinese Police Officers in Wuhu'. *Risk Management and Healthcare Policy* **13**: 2689–2697.