Prison officers' experiences of aggression: implications for sleep and recovery

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Teaser text

Prison officers are at high risk of aggression from prisoners. This study found that such experiences were associated with poorer sleep. Moreover, officers who had been subjected to aggression at work tended to report excessive vigilance for danger and have more difficulties 'switching off' from work, which were also related to poor sleep. Our findings suggest that improving the safety climate in prisons would enhance officers' quality of sleep with benefits for wellbeing and performance.

Abstract

Background: Prison officers are at high risk of assault that can impair their mental as well as physical health. Such experiences can also disrupt sleep, with negative implications for wellbeing and job performance. To manage this risk, insight is needed into the mechanisms by which experiencing aggression from prisoners can affect officers' sleep quality. By impairing recovery processes, work-related hypervigilance and rumination might be key factors in this association.

Aims: To examine prison officers' personal experiences of aggression and associations with sleep quality. Also to consider whether work-related hypervigilance and rumination mediate the relationship between exposure to aggression and sleep.

Methods: We assessed prison officers' experiences of aggression and violence, work-related hypervigilance and rumination via an online survey. The PROMIS was used to measure the quality of sleep.

Results: The study sample comprised 1,806 prison officers (86.8% male). A significant relationship was found between the frequency of experiences of aggression at work and the quality of sleep. Work-related hypervigilance and rumination were significantly associated with sleep quality and mediated the relationship between workplace aggression and sleep quality.

Conclusions: Our findings suggest that enhancing the safety climate in prisons might improve officers' quality of sleep that, in turn, could benefit their wellbeing and performance. Implementing individual-level strategies to help prison officers manage hypervigilance and rumination, and therefore facilitate recovery, should also be effective in improving their sleep.

Key words: aggression and violence; sleep; rumination; prison employees.

Key learning points

What is already known about this subject:

Prison officers are at high risk of aggression from prisoners that can have wide-ranging effects on their mental as well as physical health.

Although exposure to violence at work can disrupt sleep, little is known about prison officers' experiences and the role played by recovery processes such as rumination and hypervigilance.

What this study adds:

Our findings identify how experiencing aggression at work can potentially threaten the quality of prison officers' sleep.

We also find evidence that work-related hypervigilance and rumination may be key mechanisms by which experiences of aggression affects officers' sleep.

What impact this may have on practice or policy:

Our findings highlight the risks of experiencing aggression at work on officers' sleep and the direct and indirect effects of rumination and hypervigilance. Interventions to enhance the workplace safety climate and help prison officers manage hypervigilance and dysfunctional rumination are likely to benefit individuals, colleagues and prisoners.

Introduction

Working in a correctional setting is emotionally demanding and prison officers are at greater risk of work-related stress and burnout than most other occupational groups [1-2]. Research using the Health and Safety Executive Management Standards framework found that the psychosocial hazards experienced by prison officers in the United Kingdom (UK) exceed recommended levels, particularly for job demands, working relationships and role [2-3]. Officers are also regularly exposed to more job specific hazards, such as managing prisoner distress, self-harm and attempted and completed suicide [2,4-5].

Prison officers are frequently expected to deal with aggressive behaviour, either between prisoners or targeted at themselves. This is a major concern, given that both prisoner-on-prisoner assaults and direct attacks on staff have increased substantially over the last decade [2,5]. Research findings show that prison staff are at greater risk of non-fatal injuries from violent acts than any other occupational group [6]. An additional threat for many officers is forcible exposure to new psychoactive substances in their place of work, which is recognised as an emerging major health and safety risk [7]. Unsurprisingly, given the high-risk working environment, prison officers are particularly vulnerable to mental health problems, with studies finding that levels of post-traumatic stress disorder (PTSD) are higher than police and emergency responders and similar to military veterans [8-10]. Working in unpredictable and potentially dangerous environments also has implications for officers' recovery processes, with studies highlighting the difficulties they have detaching psychologically from work [11] that, in turn, can impair the quality of sleep [12].

This study investigates the effects of personal experiences of aggression from prisoners on prison officers' sleep. As they typically work shifts, officers are already vulnerable to disordered sleep, which is characterised by difficulties falling and remaining asleep, waking up too early, and feeling unrefreshed upon waking [13]. As stress is a common cause of sleep difficulties [14],

working in a high-pressure environment is likely to intensify the risks posed by non-standard working hours. Indeed, studies of prison officers [15-17] have found that between 42% and 45% of respondents showed signs of insomnia that were attributed to their experiences at work. Research has also found that exposure to violence at work (as well as experiences of incivility more generally), can lead to disordered sleep and recurring nightmares [1,18]. The stressful, unpredictable and potentially dangerous working environment in prisons therefore have potential to cause or exacerbate any sleeping difficulties officers experience.

To develop interventions to help prison officers recover from adverse experiences at work and recoup their mental and physical resources, it is crucial to identify the mechanisms by which experiences of aggression from prisoners affect their sleep quality. This study examines two potential pathways: via work-related hypervigilance and rumination. People employed in safety-related roles with a high risk of harm to themselves and others are vulnerable to hypervigilance, which is a state of continuous alertness for hidden threats in a potentially hostile environment. A recent study of security staff working in the United States [19] found strong relationships between work-related hypervigilance and a range of negative symptoms such as exhaustion, physical symptoms of stress and poor sleep. While being vigilant for danger is adaptive when working in a potentially threatening environment, the heightened cognitive and physiological activation that characterises hypervigilance is not easily resolved when in a place of safety [20]. In the context of the present study, this suggests that experiences of aggression at work may engender chronic hypervigilance that, in turn, could lead to disordered sleep.

Work-related perseverative cognition, or rumination, is another potential pathway by which officers' experiences of aggression might impact on their sleep. Rumination is defined as repeated or chronic activation of the cognitive representation of one or more psychological stressors [21]. Studies have found that ruminating about work concerns can impair physical, psychological and emotional recovery processes and reduce sleep quality [22]. Moreover, a previous study of prison

officers found that difficulties detaching themselves from work-related worries and concerns can intensify the negative effects of aggression and violence on work-life balance [23].

This study examines prison officers' experiences of aggression at work and how this relates to sleep quality. Work-related hypervigilance and rumination are also assessed as potential mediators of this association.

Method

Data were obtained from an online survey in early 2020. The POA (an association representing most of the prison, correctional and secure psychiatric workers in the UK) made a link to the survey available to their members. Background information was obtained on sex, age, ethnicity and length of employment in the prison sector.

Experiences of aggression and violence at work were assessed by a measure developed for use in studies of UK prison officers [3]. This examines the frequency of personal exposure to several types of aggression, including verbal threats, intimidation and physical assault. As recent research has highlighted the scale of exposure of prison officers to new psychoactive substances by prisoners [7] and its potential for harm, this was included as a potentially aggressive act. Responses were requested on a 5-point scale where 1 = never/or almost never, 2 = rarely (e.g. once or twice a year), 3 = sometimes (e.g. once or twice a month), 4 = often (e.g. once or twice a week and 5 = regularly (once a day or more). Higher scores denoted more frequent exposure to aggression at work.

Further questions asked for details about any physical assaults that respondents might have experienced, including when the most recent assault occurred, the severity of the attack, whether respondents took time off to recover and, if so, the number of days taken.

Work-related hypervigilance was measured using a scale developed by Fritz et al [19]. This assesses the extent to which people feel the need to be on guard for potential danger and feel concerned that relaxing might make them vulnerable to dangerous situations. Items were assessed on a five-point scale ranging from 1 “Not at all” to 5 = “Very much so”, with higher scores representing higher levels of hypervigilance (Cronbach’s alpha = 0.92).

Rumination was measured using a scale from the Work-related Rumination Questionnaire [11] that examines respondents’ level of agreement to statements about feeling tense, annoyed, irritated, fatigued and troubled by work-related issues during their free time. Items were assessed on a 5-point scale ranging from 1 = “strongly disagree” to 5 = “strongly agree”. Higher scores denoted greater rumination (Cronbach’s alpha = 0.95).

Sleep quality was measured with the eight-item PROMIS [24]. Responses to statements that examined perceptions of sleep quality, depth and restoration are obtained on a five-point scale ranging from 1 = “Not at all” to 5 “Very much”. Higher scores represented poorer quality sleep (Cronbach’s alpha = 0.92). The extent of sleep disturbance for the sample was calculated according to the scale protocol and the mean score across items used in the analysis.

Descriptive statistics were used to examine prison officers’ personal experiences of aggression, Pearson correlations identified relationships between variables and bootstrapping with bias-correcting confidence estimates tested the potential mediating effects of hypervigilance and rumination.

Results

The online survey was completed by 1,806 prison officers (87% male) working on a full-time basis in public sector prisons in the United Kingdom (UK) that house adult and young offenders. Respondents identified as predominantly white British/Irish/other white background (97%) and their

age ranged from 19 to 66 years (M = 47.36, SD = 9.45). Length of employment in correctional environments ranged from one to 34 years (M = 18.39, SD = 9.93).

The types of aggression most frequently endorsed by prison officers were verbal abuse, verbal threats and intimidation, with 64%, 54% and 50% of respondents respectively reporting these experiences often or regularly (once or twice a week or once a day or more). A high proportion of prison officers reported being regularly exposed to psychoactive substances, with 27% experiencing this sometimes (once or twice a month or more), 22% often (once or twice a week) and 19% regularly (once a day or more). Although physical assault was less common, 16% reported such experiences sometimes (once or twice a month) with 6% doing so often (once or twice a week) and 2% regularly (once a day or more). See Table 1 for further details.

Table 1 about here

Analysis of the additional questions on physical assault indicated that 57% of respondents reported having been physically assaulted by a prisoner at some point in their career. Thirty percent of these indicated that their most recent experience of assault was within the last six months, 12% during the previous year, and 17% between one and two years ago. Forty percent of assaults were described by officers as ‘minor’, 45% ‘moderate’ and 15% ‘serious’. More than four respondents out of ten (43%) who had been assaulted had taken time off work to recover, with the number of sick days ranging from one to 305 (M = 30.37, SD = 50.41).

The severity of sleep disturbance was calculated [24] and 54% of the sample showed signs of at least ‘moderate’ impairment (scoring between 60 and 69.9), with 19% at a ‘severe’ level (scoring above 70) [25].

Table 2 about here.

Table 2 shows the descriptive data and correlations between the main study variables. It should be noted that the level of work-related hypervigilance was high (4.19 on a 5-point scale). The

frequency of exposure to aggression from prisoners was positively related to hypervigilance (r = .54, p<.001), rumination (r = .43, p<.001) and sleep disturbance (r = .27, p<.001). Work-related hypervigilance and rumination were also positively associated with sleep disturbance (r = .19, p<.001 and r = .58, p<.001) respectively). For all correlations but one (between hypervigilance and sleep quality), the strength of the coefficient between study variables reaches Cohen's threshold [25] for a medium-sized effect and meets the threshold for 'real-world' relevance (i.e. ≥.3).

We used the bootstrapping method with bias-correcting confidence estimates to test for the potential mediating effects of hypervigilance and rumination (using the PROCESS 2.1 macro). The 95% confidence interval of the indirect effects was obtained with 5,000 bootstrap resamples. An indirect effect is statistically significant if a zero is not included in the 95% confidence interval of the bootstrap estimate. The indirect effects (IE=.0807) of rumination on sleep quality was significant: 95% CI = (.0531 to .1098). Also significant was the indirect effect (IE=.0497) of hypervigilance on sleep quality: 95%CI = (.0083 to .0933). See Table 2 for more details.

Table 2 about here

Discussion

This study highlights the extent to which prison officers are subjected to a range of aggressive behaviours by prisoners. We found evidence that such experiences may impair their sleep quality, both directly and indirectly via work-related hypervigilance and rumination. These findings have implications, not only for the wellbeing of prison officers themselves but also for the health and safety of their colleagues and the prisoners in their charge. In accordance with previous studies that have found a high prevalence of sleep disturbance among prison employees [15-17], more than half of our sample scored at levels indicating at least moderate impairment and almost one-fifth severe

impairment. Inadequate sleep is a recognised health hazard, with wide-ranging consequences for personal and professional life, impairing social functioning, decision-making and judgement and increasing the risk of errors and accidents [13]. Our findings therefore suggest that poor sleep among prison officers, whether in response to unsafe working conditions or other causes, may threaten the functioning of prisons, as well as prison officers' wellbeing, personal relationships and quality of life. Previous research has found that attacks on prison staff, as well as violence within the prisoner population more generally, are more common in institutions that are short-staffed and where staff lack experience [26]. Increasing staffing levels and improving training on the use of protective strategies and de-escalation techniques therefore have the potential to reduce the incidence of aggression in prisons and enhance the safety climate in general.

We found some evidence to support two mechanisms by which officers' experiences of aggression might impact on their sleep: rumination and hypervigilance. The cross-sectional design of the study, however, cannot demonstrate causality. The need to detach oneself from work-related concerns to replenish mental and physical resources is well recognised, especially in emotionally demanding and risky jobs [3]. Our findings support previous research highlighting the damaging effects of rumination for health and wellbeing, as well as the potential risks for job performance [11]. In accordance with other studies of people working in high-risk environments [19], officers commonly reported being highly vigilant for signs of danger. The greater the personal exposure to aggression, the higher the risk of hypervigilance. Our findings suggest a process by which prison officers respond to working under potentially hazardous conditions by becoming excessively alert to hidden threats. The heightened arousal characterised by hypervigilance is subsequently imported into the home environment, disrupting sleep. Poor sleep is likely to be a particular challenge for people working in correctional settings, as maintaining a high degree of alertness over an entire shift will be exhausting, meaning that adequate recovery opportunities are essential to recoup depleted mental and physical resources.

Interventions are needed to raise awareness among officers and line managers of the signs and potential impact of hypervigilance and how it might occur after exposure to violent incidents. As excessive vigilance to danger is a symptom of PTSD, a referral to occupational health might be required but the suspicion and distrust that are associated with hypervigilance [19] may cause some resistance. The high level of hypervigilance found in this study suggests that organisational-level interventions are needed, but identifying an 'optimum' level of vigilance will be challenging in an environment where the risk of assault and injury to oneself and others is high. Redesigning shifts might be considered to ensure that roles requiring a high level of alertness are balanced with opportunities for officers to decrease their cognitive and physiological arousal before leaving. Efforts to accommodate employees' preferences for shift patterns may also help improve psychological detachment and aid recovery.

Organisational-level interventions are undoubtedly required, but strategies to help officers disengage from work psychologically should mitigate the effects of distressing experiences on sleep and wellbeing more generally. Mindfulness meditation can reduce dysfunctional rumination and improve emotion management in people who do highly stressful work [27] and there is some evidence that carefully tailored training can improve wellbeing in employees in custodial settings [28]. Expressive writing can also reduce hypervigilance and maladaptive rumination [29]. Both strategies, and other interventions designed to reduce emotional arousal, have the potential to improve the quality of sleep and improve recovery [30].

This study has identified relationships between experiences of violence at work and sleep and highlighted the importance of psychological detachment and recovery. Nonetheless, it has several limitations. As with many other studies using online surveys [3,7] we cannot identify a response rate as the number of prison officers who were exposed to the survey is unknown[1]. Moreover, this study

[1] The *POA represents 30,000 Prison, Correctional and Secure Psychiatric Workers across the public and private prison sectors. It is unable to provide a breakdown of the different grades of members and who were exposed to the*

may be open to selection bias, as the officers who had been subjected to aggression from prisoners and/or who were experiencing more difficulties with sleep might have been more motivated to respond. Conversely, however, those who were most affected may have been too preoccupied with work-related concerns to take part. The study's cross-sectional and correlational design means that we cannot make causal inferences about the direct and indirect effects observed. Finally, the study relies entirely on self-report, but this seems inevitable as judgements of rumination, hypervigilance and sleep quality need to reflect individual experience. The need to obtain employees' perceptions of work-related hypervigilance, rather than attempting to identify any 'objective' level of danger, has also been highlighted, [19]. It is nonetheless possible that officers who are more prone to hypervigilance and rumination, possibly related to PTSD, believe that aggression occurs more frequently in their working environment.

More research is needed to examine the impact of the safety climate at work on prison officers' wellbeing and effectiveness. Longitudinal research using daily diaries would help identify the immediate and longer-term effects of exposure to aggression at work on sleep quality and the implications for health and performance. The role played by hypervigilance and rumination and other recovery behaviours should also be further examined. Intervention studies are particularly important, as they can identify the organisational and individual level strategies that can help support officers following aggressive incidents. This is particularly important as disrupted sleep is likely to result in a cycle that can increase vulnerability to future incidents for individual officers, their colleagues and the prisoners in their care.

References

survey link. Consequently we are unable to provide specific details of the percentage of the working officers who participated.

1. Walker EJ, Jackson CA, Egan HH, Tonkin M. Workability and mental wellbeing among therapeutic prison officers. *Occ Med* 2015;**65**(7):549-551.
2. Clements AJ, Kinman G. A forgotten profession: The need to invest in the wellbeing of prison officers. In: Birch P, Sicard, L, eds. *Prisons and Community Corrections*. Routledge, 2020: 86-100.
3. Kinman G, Clements AJ, Hart J. Work-related wellbeing in UK prison officers: A benchmarking approach. *Int J Workplace Health Manag* 2016;**9**:290–307
4. Dennard S, Tracy DK, Beeney A, Craster L, Bailey F, Baureek A, Barton M, Turrell J, Poynton S, Navkarov V, Kothari R. Working in a prison: Challenges, rewards, and the impact on mental health and well-being. *J Forensic Practice* 2021;**23**(2):132-149.
5. Ministry of Justice. *Safety in Custody Statistics* 2021. https://www.gov.uk/government/statistics/safety-in-custody-quarterly-update-to-december-2021 (23 May 2022, date last accessed).
6. Nonfatal Occupational Injuries and Illnesses Requiring Days Away from Work. Bureau of Labor Statistics, 2016 https://www.bls.gov/news.release/osh2.nr0.htm. (23 May 2022, date last accessed)
7. Kinman J, Clements A. *Survey of Work-related Wellbeing*. POA 2021 https://www.poauk.org.uk/media/1888/poa-survey-of-work-related-wellbeing-1.pdf (23 May 2022, date last accessed)
8. Denhof M, Spinaris, C. *Prevalence of Trauma-related Health Conditions in Correctional Officers: A profile of Michigan Corrections Organization members* (Desert Waters Correctional Outreach. https://www.mco-seiu.org/wp-content/uploads/2016/05/MCO-Paper_FINAL.pdf (22 May 2022, date last accessed).
9. Stevelink S. The mental health of prison staff in the UK Biobank: a comparison with the working population. Wellbeing in the UK Prison Sector. Society of Occupational Medicine https://www.som.org.uk/sites/som.org.uk/files/SOM%20Prison%20Worker%20Presentation%20final%2009032022.pdf (23 May 2022, date last accessed)
10. Regehr C, Carey M, Wagner S, Alden LE, Buys N, Corneil W, Fyfe T, Fraess-Phillips A, Krutop E, Matthews L, Randall C, White M, White N. Prevalence of PTSD, depression and anxiety disorders in correctional officers: A systematic review. *Corrections* 2019;**6**(3): 229–241
11. Querstret D, Cropley M. Exploring the relationship between work-related rumination, sleep quality, and work-related fatigue. *J Occ Health Psychol* 2012;**17**(3):341.

12. Magnavita N, Garbarino S. Sleep, health and wellness at work: a scoping review. *Int J Env Res Pub Health* 2017;**14**(11):1347.
13. Chaput JP, Dutil C, Featherstone R, Ross R, Giangregorio L, Saunders TJ, Janssen I, Poitras VJ, Kho ME, Ross-White A, Carrier J. Sleep duration and health in adults: an overview of systematic reviews. *Appl Physiol Nutr Metab* 2020;45(10):218-231.
14. Åkerstedt T, Wright KP. Sleep loss and fatigue in shift work and shift work disorder. *Sleep Med Clin* 2009;**4**(2):257-271.
15. Guan N, Zhang J, Wang X. Sleep quality and mood of prison police officers. *Chinese Mental Health Journal.* 1991. https://pesquisa.bvsalud.org/portal/resource/pt/wpr-586479. (26 May 2022, date last accessed)
16. James L, Toda N, Best S. The negative impact of prison work on sleep health. *J Ind Med* 2017;**60**(5), 449–456
17. Sygit-Kowalkowska E, Piotrowski A, Hamzah I. Insomnia among prison officers and its relationship with occupational burnout: the role of coping with stress in Polish and Indonesian samples. *Int J Env Res Pub Health* 2021;**18**(8):4282.
18. Lerman AE, Harney J, Sadin M. Prisons and mental health: Violence, organizational support, and the effects of correctional work. *Crim J Behav* 2021;**49**(2), 181–199
19. Fritz C, Hammer LB, Guros F, Shepherd BR, Meier D. On guard: the costs of work-related hypervigilance in the correctional setting. *Occ Health Sci* 2018;**2**(1):67-82.
20. Brosschot JF, Gerin W, Thayer JF. The perseverative cognition hypothesis: A review of worry, prolonged stress-related physiological activation, and health. *J Psychosom Res* 2006;**60**(2):113-24.
21. Cropley M, Zijlstra FR. Work and rumination. In: Langan-Fox J, Cooper CL, eds. *Handbook of Stress in the Occupations*. Elgar, 2011: 487-503.
22. Van Laethem M, Beckers DG, de Bloom J, Sianoja M, Kinnunen U. Challenge and hindrance demands in relation to self-reported job performance and the role of restoration, sleep quality, and affective rumination. *J Occ Org Psychol* 2019;**92**(2):225-254.
23. Kinman G, Clements AJ, Hart J. Working conditions, work–life conflict, and well-being in UK prison officers: The role of affective rumination and detachment. *Crim Just Behav* 2017;**44**(2):226-239.
24. Yu L, Buysse DJ, Germain A, Moul DE, Stover A, Dodds NE, Johnston KL, Pilkonis PA. Development of short forms from the PROMIS™ sleep disturbance and sleep-related impairment item banks. *Behav Sleep Med* 2012;**10**(1):6-24.

25. Cohen, J. (1988). *Statistical Power Analysis for the Behavioral Sciences* (2nd ed.). Hillsdale, NJ: Erlbaum
26. Howard League for Penal Reform. *Breaking Point: Understaffing and Overcrowding in Prisons.* https://howardleague.org/wp-content/uploads/2016/03/Breaking-point-10.07.2014.pdf. (23 May 2022, date last accessed).
27. Kinman G, Grant L, Kelly S. 'It's my secret space': The benefits of mindfulness for social workers. *Br J Soc Work* 2020;**50**(3):758-777.
28. Davies J, Ugwudike P, Young H, Hurrell C, Raynor P. A pragmatic study of the impact of a brief mindfulness intervention on prisoners and staff in a Category B prison and men subject to community-based probation supervision. *Int J Offender Ther Comp Criminol* 2021;**65**(1):136-156.
29. Kerusauskaite S, Simione L, Chiarella SG, Calabrese L, Sardilli S, Girolami D, Raffone A. Mindfulness and self-compassion mediate increased psychological wellbeing in penitentiary officers with a mental training based on mindfulness, ethics and compassion. PsyArXiv. https://psyarxiv.com/c82pm/ (23 May 2022, date last accessed)
30. Baglioni C, Spiegelhalder K, Lombardo C, Riemann D. Sleep and emotions: a focus on insomnia. *Sleep Med Rev* 2010;**14**(4):227-238.

Table 1 Frequency of violence and intimidation by prisoners (%) (n = 1,806)

	Never	Rarely	Sometimes	Often	Regularly
Verbal threats	5.5	11.9	28.9	30.7	23.0
Verbal abuse	3.2	9.5	23.4	32.4	31.6
Intimidation	7.6	17.4	24.7	32.4	18.0
Physical assault	36.7	40.2	15.7	5.5	1.8
Exposure to NPS	14.3	17.9	27.3	21.6	18.9
Sexual harassment	81.3	11.2	4.0	1.7	1.8
Sexual assault	93.8	5.0	0.5	0.2	0.5

NPS = new psychoactive substances

Response options: Never/almost never; Rarely (e.g. once or twice a year); Sometimes (e.g. once or twice a month); Often (e.g. once or twice a week); Regularly (e.g. once a day or more),

Table 2: Descriptive statistics and correlations between study variables (n = 1,806)

Study variables	***M***	***SD***	**Range**	**1**	**2**	**3**	**4**
1. Violence/aggression	2.60	0.72	1 - 5	1.0			
2. Hypervigilance	4.19	0.81	1 - 5	0.54***	1.0		
3. Rumination	3.62	1.01	1 - 5	0.43***	0.08**	1.0	
4. Sleep quality	3.67	0.96	1 - 5	0.27***	0.19***	0.58 ***	1.0

** $P = 0.01$; *** $P = < 0.001$.

Fig. 1: Mediation effects of rumination and hypervigilance (n = 1,806)