



Woodfield, R., Boduszek, D., Willmott, D., & Webster, L. (2023). The moderating role of prison personnel years of service in the relationship between trauma and PTSD. *European Journal of Trauma & Dissociation*, 7(3), Article 100333.
<https://doi.org/10.1016/j.ejtd.2023.100333>

Document version
Peer reviewed version

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**The Moderating Role of Prison Personnel Years of Service in the Relationship between
Trauma and PTSD**

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Accepted for publication in the *European Journal of Trauma & Dissociation*

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Conflict of Interest: Authors declare that they have no conflict of interest.

The Moderating Role of Prison Personnel Years of Service in the Relationship between Trauma and PTSD

Abstract

Objective: The aim of this study was to investigate the moderating role of prison personnel's years of service working within a prison environment, on the relationship between the three trauma factors (self-harm/death, violent, environmental) measured by the Prison Personnel Trauma Measure (PPTM) and PTSD symptomology.

Method: A non-probability convenience sample of 1995 Prison Personnel in the UK completed the Prison Personnel Trauma Measure (PPTM), Hospital Anxiety and Depression Scale (HADS) and the Posttraumatic Stress Disorder Checklist Version 5 (PCL-5).

Results: Differential associations were identified between years of service, trauma and PTSD. Results showed specifically that years of service significantly moderated the relationship between violent trauma exposure and PTSD. Furthermore, it was identified this moderation occurred specifically in male personnel with higher years of service but not in female personnel. Years of service was not found to moderate the relationship between self-harm/death or environmental trauma exposure and PTSD in male or female personnel.

Conclusion: The findings clarify linkages among years of service, trauma and PTSD, and elucidates which types of trauma exposure may be moderated by years of service within a prison environment. Implications for PTSD symptomology development are discussed. It is also suggested that future studies may advance the understanding of the mechanisms of the relationship between trauma exposure in prison and potential moderating factors on the development of PTSD, Anxiety, and Depression.

Keywords: *Prison, Trauma Exposure, PTSD, Anxiety, Depression, Violence*

Highlights

- Aim was to investigate the moderation of years of service between prison personnel trauma exposure and PTSD symptomology.
- Measures were administrated to 1995 prison personnel (mostly prison officers) in the UK.
- Moderated regression analysis revealed that years of service significantly moderated the effects of PTSD when exposed to violent trauma.
- The moderating effect only occurred with male personnel and not within female personnel.

Introduction

Trauma exposure and the subsequent development of adverse psychological illness such as PTSD, Anxiety and Depression is a key consideration in trauma exposed occupations (Perrin et al., 2007; Corneil et al., 1999; Fulton et al., 2015). Working in a prison environment can induce both stress and trauma (Johnson et al., 2005; Spinaris et al, 2012; Denhof & Spinaris, 2013; Boudoukha et al., 2013; Denhof et al., 2014; Kinman et al., 2014; Woodfield et al., 2022) with Prison Officer's being routinely exposed directly and indirectly, to potentially traumatic incidents (Konda et al., 2013; Woodfield et al., 2022) in high magnitudes (Spinaris et al., 2012). Repeated exposure to trauma has been linked to an increased risk for the development of PTSD and comorbid psychological illness (Herman, 1997; Ford et al., 2001) as well as increasing the risk for full development of PTSD following re-traumatisation (Cukor et al., 2010; Smid et al., 2009).

The majority of research that has sought to identify potential moderators of trauma symptomology and trauma exposure in risk associated occupations has been carried out amongst military personnel. Within this population traumatic events are experienced with greater frequency, severity and diversity and are at an increased risk of repeated trauma exposure (Straud et al., 2019). A more recent strand of research suggests the same is also true for first line responders. Occupations including the police force, fire fighters, paramedics and

other first-line responders are also at an increased risk of experiencing trauma with 80% reporting having experienced traumatic events on the job and a prevalence rate of PTSD ranging from 8 to 22% (Klimley et al., 2018). Risk factors for the development of PTSD symptomology can be “non-occupational and occupation specific” (Lewis-Schroeder et al., 2018) and employer support post-trauma can impact an individual’s psychological response to the trauma and therefore recovery (Marchand et al., 2015). The implications of this research suggest that all occupations in which trauma exposure is high should be investigated in order to provide an evidence base on which to develop prevention and intervention strategies.

For prison personnel rates of diagnosable PTSD have been found to range from 19% (James & Todak, 2018) to 34% (Spinaris et al., 2012) and rates of depression as high as 59.7% (Liu et al., 2013). Work related stressors for this population include persistent levels of perceived threat which has been shown to be a significant predictor of PTSD (Boudoukha et al., 2013; McCaslin et al., 2006) and organisational structure and climate being significantly associated with levels of job stress and burnout (Finney et al., 2013).

Klimley et al. (2018) claim that what is “warranting attention is the role of protective and resiliency factors that may serve as buffers or mediators” (p.41) to PTSD within such populations. Their recent review also highlighted that these factors can be occupation specific. For example, for law enforcement resilience, life satisfaction, social support and hardiness were identified as protective factors, whereas for fire-fighters it was training and experience, social support and humour (Klimley et al., 2018).

Within risk associated occupations occupational experience may be a potentially overlooked moderator that may impede the development of PTSD and comorbidity following repeated trauma exposure. Experience in this context is defined by ‘time in service or position’ within a role and / or organisation, as opposed to the experience of repeated trauma. There is a paucity of such research within the PTSD literature, particularly in relation to trauma exposed occupations, considering time of service as a potential moderator. Research that has been conducted has again focused on military populations. For example, Richardson et al., (2020) investigated factors associated with post-traumatic stress amongst current and retired New Zealand military personnel and found that increased number of years in service, psychological flexibility and sleep were significantly associated with reduced odds of reporting symptoms of post-traumatic stress. The authors suggest that this is not necessarily reflective of a causal relationship between years of service and post-traumatic stress, rather the development of resilience over time.

Such a focus of research would also benefit other populations that experience repeated trauma exposure, in particular prison personnel since research has reported rates of PTSD in prison personnel to be equivalent to or even higher than in veterans who have served in Iraq and Afghanistan (James & Todak, 2018). What research within this population that has been conducted has found associations between burnout (Maslach, 1982) and levels of experience amongst Prison Officer's. Morgan et al. (2002) found less experienced officers reported higher levels of emotional exhaustion and depersonalisation, Harizanova & Tarnovska, (2013) have found younger and more inexperienced staff to have the highest levels of burnout in comparison to experienced officers. Other studies suggest that habituation in a professional occupational capacity may increase resilience and hardiness to trauma exposure amongst occupational cohorts such as police officers through the effects of 'police culture'. Police culture is a concept that proposes officers create a 'taboo' effect surrounding trauma exposure and development of psychological illness by not wishing to appear weak or unable to cope in front of colleagues (Papazoglou, 2013). However, such mechanisms of coping may also be detrimental and could affect the likelihood of developing PTSD because individuals may not face the symptoms of PTSD and deal with them effectively, thus exacerbating the symptomology (Violanti et al., 2013) a similar effect may also occur in Prison Officers's due to the high similarity and overlap of the two occupations.

The identification of personnel who for a number of possible factors show lower levels of, or no symptomology following repeated trauma exposure overtime may warrant further attention to ascertain if resilience and / or hardiness is potentially developed with occupational experience, or whether these potential protective variables remain independent of experience. Studies of "at risk" populations (Dugan & Coles, 1989), especially those who do not develop PTSD, or comorbid disorders are relevant to the understanding of what constitutes optimal functioning in individuals following trauma exposure, extreme stress, and adversity in life (Folkman & Moskowitz, 2000; Fredrickson et al., 2003).

Felsman and Vaillant (1982, p. 313) have long since highlighted "the task of predicting resiliency is complicated because there is no universally defined concept of what constitutes resilient behaviour. In some cases, resiliency is defined by the absence of psychopathology, prolonged stress response patterns (e.g., PTSD), or maladaptive coping. In other cases, resilience is defined by having superior coping, on average, over a longitudinal course of life-span development. In some studies, resilience is also defined as a personality variable (e.g., locus of control, ego resilience, hardiness) that is presumed to moderate outcome variables."

In consideration of a lack of research amongst trauma exposed occupations surrounding the possibility that years of occupational experience may serve as a potential moderator for the development of PTSD. The aim of the current study was to address these limitations through the use of moderated regression analysis in order to test the ability of occupational experience measured by 'years of service' to moderate the effects of the three trauma factors (self-harm/death, violent, environmental trauma exposure) measured by the PPTM (Woodfield et al., 2019) on PTSD symptomology amongst a sample of prison personnel. A further aim was to test this moderation between male and female personnel separately.

Method

Sample

Participants were recruited opportunistically from prison personnel based in the United Kingdom. In total $N = 1995$ prison personnel responded and returned completed surveys. Due to some of the returned surveys having significant missing data, $N = 1562$ respondents were included in the final analysis. The sample consisted of $n = 948$ male and $n = 614$ female participants. Their age ranged from 19 to 71 years ($M = 43.06$, $SD = 10.72$, $Median = 45$) and reported length of prison work experience ranged from 1 to 43 years ($M = 14.24$, $SD = 8.58$, $Median = 13$). One thousand and thirty-nine ($n = 1039$) of the participants were prison officers, $n = 288$ supervising officers, $n = 128$ custodial managers and governor grades, and $n = 107$ operational support grades. In typology of security classification $n = 284$ participants were from Category A establishments (prisoners whose escape would be highly dangerous to the public or national security), $n = 732$ from Category B (prisoners who do not require maximum security, but for whom escape still needs to be made very difficult), and $n = 546$ from Category C (prisoners who cannot be trusted in open conditions but who are unlikely to try to escape). Ninety ($n = 90$) participants were from female prison establishments, $n = 1002$ from male prisons, $n = 87$ from male young offending institutes, and $n = 383$ from mixed adult and young offending establishments. In relation to amount of direct contact with prisoners $n = 972$ of participants reported contact all of the working day, $n = 362$ most of the working day, $n = 152$ half of the working day, $n = 67$ approx. two hours per working day and $n = 9$ of participants reported no current direct contact with prisoners.

Measures

Prison Personnel Trauma Measure (PPTM) – is a 15-item self-rating questionnaire measuring prison personnel’s occupational trauma exposure (Woodfield et al., 2019). The PPTM utilizes a Likert-type rating scale for each item (from 1 "never" to 4 "21 or more times"), encapsulating three factors, exposure to Death and Self-Harm, Violence, and Environment. Items encapsulate a scenario specific to the occupational role requirement of prison personnel with relevance to prison officers (i.e., in their interactions with prisoners) as opposed to the organizational stressors that may be a consequence of managerial practices, institution policies, designated workloads, and influences of government policies and resource injection. The death and self-harm factor encapsulates witnessing of self-harm behaviour as well as witnessing death through self-inflicted or lethal force by prisoners. The environment factor encapsulates work in a prison that entails stress through isolation with little peer support as well as poor architecture with low visibility to peers whilst being surrounded by unlocked prisoners. The violence factor encapsulates witnessing as well as being subjected to violence directly and indirectly. The psychometric properties of the PPTM have been reported in previous studies (Woodfield et al., 2019). Internal consistency using Cronbach’s alpha in the current study for PPTM was .81 for self-harm/death, .83 for violent and .80 for environment, subscales.

Hospital Anxiety and Depression Scale (HADS) is a 14-item self-rating questionnaire measuring 'depression' and 'anxiety' (Zigmond & Snaith, 1983). The HADS uses seven days as a reference period. The depression scale (7 items, score range 0–21) measures mostly anhedonia (inability to feel pleasure in normally pleasurable activities) a phenomenon considered to be the central characteristic of major depressive disorder. The anxiety scale (7 items, score range 0–21) measures mostly symptoms of generalized anxiety disorder. The psychometric properties of the HADS have been reported in previous studies (Spinhoven et al., 1997, Hermann, 1997, Bjelland et al., 2002). The HADS is a well-established and widely used measure of anxiety and depression. Internal consistency using Cronbach’s alpha in the current study was .86 for anxiety and .82 for depression subscales.

The Posttraumatic Stress Disorder Checklist Version 5 (PCL-5) is a 20-item self-rating questionnaire (Blevins et al., 2015) Weathers et al., (2013) adapted the previous PCL-C (Weathers et al., 1994) so that items mapped directly onto DSM-5 (APA, 2013) symptom criteria for PTSD. The PCL-5 utilizes a Likert-type rating scale (from 1 "not at all" to 5 "extremely") for each item, where respondents indicate the extent of symptoms experienced

during the past 30 days. The quality of measurement characteristics of the PCL-C (Blanchard et al., 1996; Orsillo, 2002; Ruggiero et al., 2003) and its diagnostic utility (Bertelson et al., 2011; Gardner et al., 2012; Keen et al., 2008; McDonald & Calhoun, 2010) were well substantiated. The PCL-5 is among the most widely used PTSD screening devices in clinical and research settings (Elhai et al., 2005). Internal consistency using Cronbach's alpha in the current study for PTSD scale was .96.

Analytical Procedures

Descriptive statistics, correlation coefficients, and moderated regression were calculated using SPSS 27. A hierarchical moderated multiple regression analysis was applied to investigate the moderating role of years of service in the relationship between the three PPTM factors of trauma (self-harm/death, violent, environmental) and PTSD, Moderated Regression Analysis being the recommended method for testing interaction effects (Cohen & Cohen, 1983). The standardised solutions are reported for both male and female participants. Interactions were also plotted in order to provide correct interpretation as suggested by Boduszek et al. (2014; 2012); Cohen et al. (2014). Simple slopes for the relationship between trauma and PTSD were then compared for "high" levels of the moderator (years of service) (1 Standard Deviation above the Mean, medium (Mean) and "low" levels of the moderator (1 Standard Deviation below the Mean) using ModGraph 3.0 (Jose, 2013).

Results

Descriptive Statistics and correlations

Means (*M*) and standard deviations (*SD*) for age, years of service, self – harm / death, violent and environmental trauma exposure, anxiety, depression and PTSD are presented in Table 1 together with bivariate correlations. Results indicate significant positive associations between the number of traumatic events experienced, types of trauma, years of service, anxiety, depression, PTSD. Significant positive associations were observed between self – harm / death, violent trauma exposure and age of participants. Significant negative associations were also observed between high anxiety scores and lower scores on age and years of service.

Table 1

Descriptive statistics and correlations for Age, Years of Service, Death / Self – Harm Trauma, Violent, Environmental Trauma Exposure, Anxiety, Depression and PTSD.

Variable	Age	Exp	D / SH	VT	ET	Anx	Dep	PTSD
Age	1							
YofS	.76***	1						
D /SH	.09***	.18***	1					
VT	.05*	.16***	.78***	1				
ET	.03	.12***	.56***	.61***	1			
Anx	-.09***	-.08**	.20***	.23***	.23***	1		
Dep	.03	.04	.19***	.21***	.23***	.67***	1	
PTSD	-.00	-.01	.27***	.29***	.25***	.70***	.59***	1
<i>M</i>	43.08	14.25	9.02	21.24	9.76	18.49	15.32	44.67
<i>SD</i>	10.76	8.58	2.14	4.24	2.58	4.46	4.27	17.52
<i>Min</i>	19	1	3	8	4	7	7	20
<i>Max</i>	71	43	12	32	16	28	28	100

Note: * $p < .05$; ** $p < .01$; *** $p < .001$

Moderated Regression Analysis (full sample)

Hierarchical moderated regression analysis was performed to investigate the moderating effect of years of service on the relationship between self – harm / death, violent and environmental trauma exposure and PTSD symptoms. Preliminary analyses revealed no violation of the assumptions of normality, linearity, multicollinearity, and homoscedasticity. Multicollinearity was assessed via the tolerance statistic and variance inflation factor (VIF). The tolerance values were greater than 0.10 and the VIF values were below 10 as suggested acceptable (Tabachnick & Fidell, 2013) therefore, as the obtained values did not meet the thresholds set this suggested multicollinearity was unlikely to be a cause for concern. Full sample, PTSD, Anxiety, Depression; Tolerance Value (Self-Harm/Death; .37; Violent; .34; Environmental; .61; Years of Service; .97) VIF (Self-Harm/Death; 2.68; Violent; 2.95; Environmental; 1.64; Years of Service; 1.03).

In the first step of the analysis, the three PPTM factors of trauma exposure and years of service were entered. This model (model 1) was statistically significant ($F_{(4, 1475)} = 41.24, p < .001$) and explained 10% ($R^2 = .10$) of variance in PTSD. All three PPTM trauma exposure factors and years of service made a significant contribution to the model (see table 2). The second step of the analysis consisted of entering interaction terms, coding the interaction between the three PPTM trauma exposure factors and years of service. This model (model 2) was also statistically significant ($F_{(7, 1472)} = 25.18, p < .001$) and explained 11% ($R^2 = .11$) of variance in PTSD symptoms. All three PPTM factors, years of service, and the interaction between Experience and Violent trauma made a significant contribution to the model (see table 5.2). In the final model (model 3) age, anxiety and depression were added to model 2. The model explained 55% of variance in PTSD symptoms ($R^2 = .55; F_{(10, 1469)} = 176.13, p < .001$). Just as in model 2, violent trauma exposure and self-harm / death trauma exposure formed a statistically significant direct relationship with PTSD symptoms as well as, age, anxiety and depression. There was no significant direct relationship between environmental trauma exposure and PTSD symptoms. However, the relationship of the interaction term (years of service by violent trauma) and PTSD symptoms was statistically significant, indicating that the effect of violent trauma exposure on PTSD symptoms depends on years of service.

Table 2

Moderated effect of Years of Service on relationship between three PPTM factors and PTSD while controlling for Age, Anxiety, and Depression.

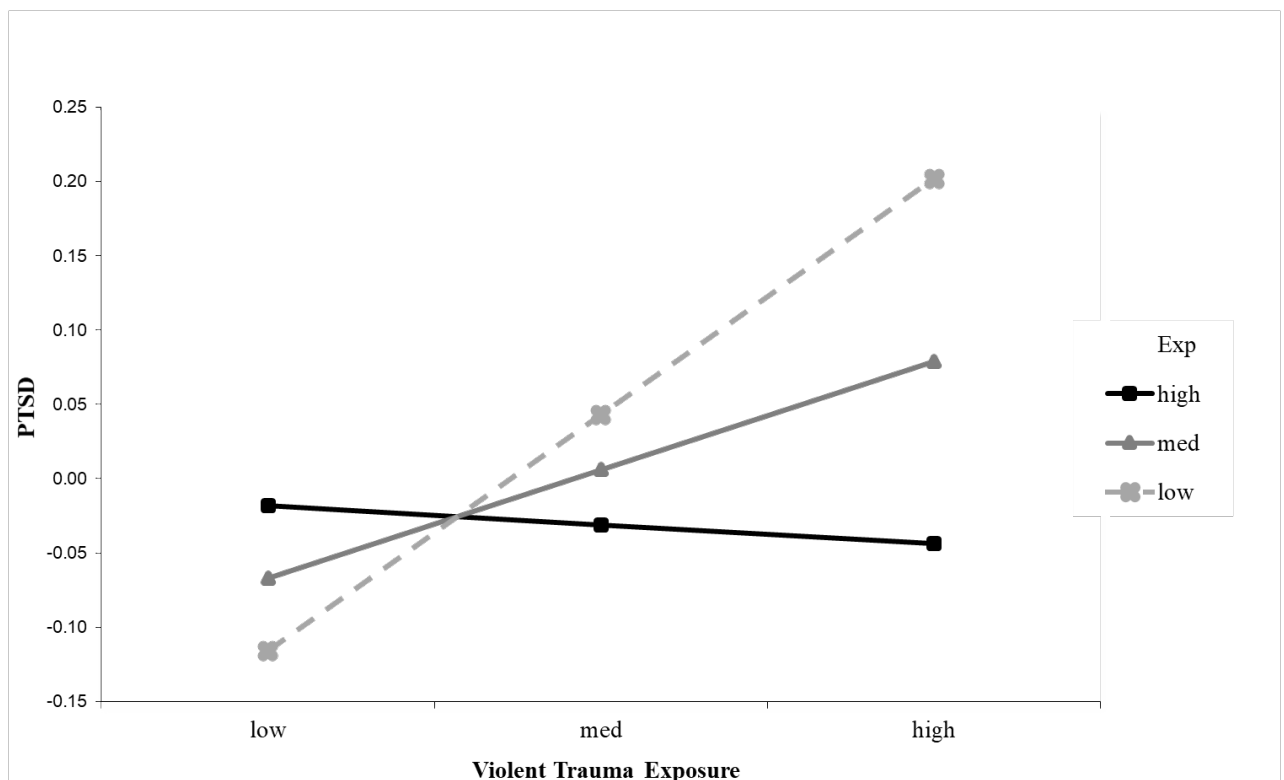
Model	Variable	β	SE	95% CI
1	Self – Harm / Death Trauma (SH / DT)	.09*	.04	.01/.17
	Violent Trauma (VT)	.17***	.04	.09/.25
	Environmental Trauma (ET)	.11**	.03	.05/.17
	Years of Service	-.06*	.03	-.11/-.01
2	Self – Harm / Death Trauma	.08*	.04	.00/.16
	Violent Trauma	.17***	.04	.08/.25
	Environmental Trauma	.12***	.03	.05/.18
	Years of Service	-.06*	.03	-.11/-.01
	YofS by SH / DT	.07	.04	-.01/.15
	YofS by VT	-.10*	.04	-.19/-.02
	YofS by ET	-.03	.03	-.09/.03
3	Self – Harm / Death Trauma	.06*	.03	.00/.12
	Violent Trauma	.07*	.03	.01/.13
	Environmental Trauma	.01	.02	-.04/.06
	Years of Service	-.04	.03	-.09//02
	YofS by SH / DT	.05	.03	-.01/.11
	YofS by VT	-.08*	.03	-.15/-.03
	YofS by ET	-.01	.02	-.06/.03
	Age	.06*	.03	.00/.11
	Anxiety	.54***	.02	.49/.58
	Depression	.21***	.02	.16/.25

Note: * $p < .05$; ** $p < .01$; *** $p < .001$

Simple slopes for the relationship between violent trauma exposure and PTSD symptoms were investigated for low (1 SD below the mean), medium (mean), and high (1 SD above the mean) years of service (see Figure 1). Violent trauma exposure was positively associated with PTSD symptoms for low levels (-1 SD) of years of service ($\beta = .16, SE = .04, p < .001$). A significant positive association between violent trauma exposure and PTSD symptoms was also found for medium (mean) years of service ($\beta = .07, SE = .03, p = .02$). The association between variables for high (+1SD) years of service and violent trauma exposure and PTSD symptoms was non-significant ($\beta = -.01, SE = .04, p = .77$).

Figure 1

The moderating role of years of service (experience) on the relationship between violent trauma exposure and PTSD symptomology.



Moderated Regression Analysis (male sample)

Hierarchical moderated regression analysis was performed to investigate the moderating effect of years of service on the relationship between self – harm / death, violent and environmental trauma exposure and PTSD symptoms among males. Preliminary analyses revealed no violation of the assumptions of normality, linearity, multicollinearity, and homoscedasticity. Multicollinearity was assessed via the tolerance statistic and variance inflation factor (VIF). The tolerance values were greater than 0.10 and the VIF values were below 10 as suggested acceptable (Tabachinck & Fidell, 2013) therefore, as the obtained values did not meet the thresholds set this suggested multicollinearity was unlikely to be a cause for concern. Male sample, PTSD, Anxiety, Depression; Tolerance Value (Self-Harm/Death; .41; Violent; .36; Environmental; .65; Years of Service; .99) VIF (Self-Harm/Death; 2.42; Violent; 2.80; Environmental; 1.53; Years of Service; 1.01).

In the first step of the analysis, the three PPTM factors of trauma exposure and years of service were entered. This model (model 1) was statistically significant ($F_{(4, 885)} = 21.53, p < .001$) and explained 9% ($R^2 = .09$) of variance in PTSD. Self-harm / death and environmental trauma exposure factors made a significant contribution to the model (see table 3). The second step of the analysis consisted of entering interaction terms, coding the interaction between the three PPTM trauma exposure factors and years of service. This model (model 2) was also statistically significant ($F_{(7, 882)} = 13.62, p < .001$) and explained 10% ($R^2 = .10$) of variance in PTSD symptoms. Self-harm / death and environmental trauma exposure factors and the interaction between years of service and Violent trauma made a significant contribution to the model (see table 5.3). In the final model (model 3) age, anxiety and depression was added to model 2. The model explained 55% of variance in PTSD symptoms ($R^2 = .55; F_{(10, 879)} = 108.69, p < .001$). Just as in model 2, self-harm / death trauma exposure formed a statistically significant direct relationship with PTSD symptoms as well as anxiety and depression. There was no significant direct relationship between environmental trauma exposure and PTSD symptoms. However, the relationship of the interaction term (years of service by violent trauma) and PTSD symptoms was statistically significant, indicating that the effect of violent trauma exposure on PTSD symptoms in males depends on years of service.

Table 3

Moderated effect of Years of Service on relationship between three PPTM factors and PTSD while controlling for Age, Anxiety, and Depression in males.

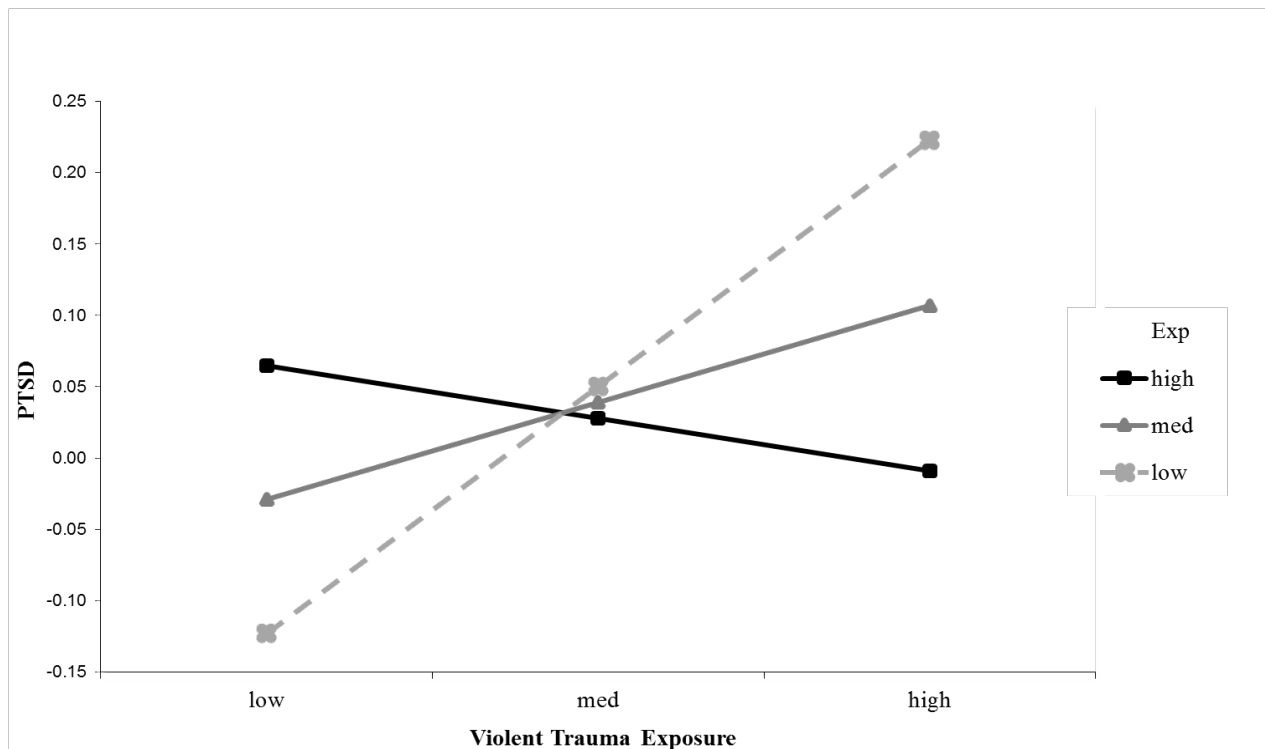
Model	Variable	β	SE	95% CI
1	Self – Harm / Death Trauma (SH / DT)	.17***	.05	.07/.29
	Violent Trauma (VT)	.08	.06	-.03/.20
	Environmental Trauma (ET)	.10*	.04	.02/.19
	Years of Service	-.04	.03	-.10/.02
2	Self – Harm / Death Trauma	.15**	.06	.06/.28
	Violent Trauma	.10	.06	-.01/.22
	Environmental Trauma	.11**	.04	.03/.20
	Years of Service	-.04	.03	-.10/.03
	YofS by SH / DT	.07	.05	-.04/.17
	YofS by VT	-.12*	.06	-.24/-.01
3	YofS by ET	-.03	.04	-.11/.05
	Self – Harm / Death Trauma	.10**	.04	.03/.19
	Violent Trauma	.06	.04	-.02/.15
	Environmental Trauma	-.02	.03	-.08/.04
	Years of Service	-.01	.03	-.08//06
	YofS by SH / DT	.04	.04	-.03/.11
	YofS by VT	-.10*	.04	-.19/-.03
	YofS by ET	-.00	.03	-.06/.05
	Age	.05	.04	-.02/.13
	Anxiety	.54***	.03	.49/.62
Depression	.21***	.03	.15/.27	

Note: * $p < .05$; ** $p < .01$; *** $p < .001$

Simple slopes for the relationship between violent trauma exposure and PTSD symptoms were investigated for low (1 SD below the mean), medium (mean), and high (1 SD above the mean) years of service (see Figure 2). Violent trauma exposure was positively associated with PTSD symptoms for low (-1 SD) years of service ($\beta = .17$, $SE = .04$, $p < .001$). A significant positive association between violent trauma exposure and PTSD symptoms was also found for medium (mean) years of service ($\beta = .07$, $SE = .03$, $p = .03$). The association between variables for high (+1SD) years of service and violent trauma exposure and PTSD symptoms was non-significant ($\beta = -.04$, $SE = .04$, $p = .41$).

Figure 2

The moderating role of years of service (experience) on the relationship between violent trauma exposure and PTSD symptomology in males.



Moderated Regression Analysis (female sample)

Hierarchical moderated regression analysis was performed to investigate the moderating effect of years of service on the relationship between self – harm / death, violent and environmental trauma exposure and PTSD symptoms among females. Preliminary analyses revealed no violation of the assumptions of normality, linearity, multicollinearity, and homoscedasticity. Multicollinearity was assessed via the tolerance statistic and variance inflation factor (VIF). The tolerance values were greater than 0.10 and the VIF values were below 10 as suggested acceptable (Tabachnick & Fidell, 2013) therefore, as the obtained values did not meet the thresholds set this suggested multicollinearity was unlikely to be a cause for concern. Female sample, PTSD, Anxiety, Depression; Tolerance Value (Self-Harm/Death; .34; Violent; .34; Environmental; .58; Years of Service; .94) VIF (Self-Harm/Death; 2.97; Violent; 2.96; Environmental; 1.72; Years of Service; 1.07).

In the first step of the analysis, the three PPTM factors of trauma exposure and years of service were entered. This model (model 1) was statistically significant ($F_{(4, 585)} = 20.50, p < .001$) and explained 12% ($R^2 = .12$) of variance in PTSD. Violent and environmental trauma exposure factors and years of service made a significant contribution to the model (see table 4). The second step of the analysis consisted of entering interaction terms, coding the interaction between the three PPTM trauma exposure factors and years of service. This model (model 2) was also statistically significant ($F_{(7, 582)} = 11.97, p < .001$) and explained 13% ($R^2 = .13$) of variance in PTSD symptoms. Violent and environmental trauma exposure factors and years of service again made a significant contribution to the model (see table 4). In the final model (model 3) age, anxiety and depression was added to model 2. The model explained 54% of variance in PTSD symptoms ($R^2 = .55; F_{(10, 579)} = 68.85, p < .001$). Just as in model 2, years of service formed a statistically significant direct relationship with PTSD symptoms as well as anxiety and depression. There was no significant direct relationship between all three PPTM trauma exposure factors and PTSD symptoms. The relationship of the interaction term (years of service by violent trauma) and PTSD symptoms was not statistically significant, indicating that the effect of violent trauma exposure on PTSD symptoms in females is not dependent on years of service.

Table 4

Moderated effect of years of service on relationship between three PPTM factors and PTSD while controlling for Age, Anxiety, and Depression in Females.

Model	Variable	β	SE	95% CI
1	Self – Harm / Death Trauma (SH / DT)	-.04	.06	-.15/.09
	Violent Trauma (VT)	.29***	.06	.14/.38
	Environmental Trauma (ET)	.13*	.05	.03/.22
	Years of Service	-.09*	.05	-.19/-.01
2	Self – Harm / Death Trauma	-.03	.06	-.16/.09
	Violent Trauma	.27***	.07	.12/.37
	Environmental Trauma	.12*	.05	.02/.22
	Years of Service	-.10*	.05	-.20/-.02
	YofS by SH / DT	.03	.07	-.10/.17
	YofS by VT	-.06	.07	-.19/.08
	YofS by ET	-.03	.06	-.14/.07
3	Self – Harm / Death Trauma	.01	.05	-.08/.10
	Violent Trauma	.07	.05	-.03/.10
	Environmental Trauma	.05	.04	-.02/.12
	Years of Service	-.10*	.05	-.21//-.02
	YofS by SH / DT	.06	.05	-.04/.15
	YofS by VT	-.10	.05	-.19/.01
	YofS by ET	-.01	.04	-.09/.07
	Age	.05	.04	-.03/.13
	Anxiety	.52***	.04	.43/.58
	Depression	.21***	.04	.14/.29

Note: * $p < .05$; ** $p < .01$; *** $p < .001$

Discussion

The aim of the current study was to explore the potential of occupational experience measured by ‘years of service’ to moderate the effects of PTSD symptomology following exposure to self-harm/death, violent, and environmental trauma as measured by the Prison Personnel Trauma Measure (PPTM; Woodfield et al., 2019) with a further aim being to identify the typology of trauma factor, and to draw comparisons between male and female participants, within a sample of UK based prison personnel.

Hierarchical moderated regression analysis was performed to investigate the moderating effect of years of service on the relationship between self – harm / death, violent and environmental trauma exposure and PTSD symptoms. Three models were tested whilst controlling for specific variables (*age, anxiety and depression*). Firstly, the three PPTM factors of trauma exposure and years of service were entered. All three PPTM trauma exposure factors and years of service made a significant contribution to the model. Secondly, interaction terms were entered into the model between the three PPTM trauma exposure factors and years of service. All three PPTM factors and years of service and the interaction between years of service and violent trauma made a significant contribution to the model. Lastly, age, anxiety and depression were added to model 2, and in model 3 violent trauma exposure and self-harm / death trauma exposure led to a direct relationship with PTSD symptoms which was statistically significant. No direct relationship of statistical significance was found between environmental trauma exposure and PTSD symptoms. However, the relationship of the interaction term (years of service by violent trauma) and PTSD symptoms was statistically significant, indicating that the effect of violent trauma exposure on PTSD symptoms depends on years of service.

In the next stage of the analysis hierarchical moderated regression analysis was again used, this time in the sample of male participants. Three models were again tested with the same interaction terms and controlled variables within this sample the relationship of the interaction term (years of service by violent trauma) and PTSD symptoms was statistically significant, indicating that the effect of violent trauma exposure on PTSD symptoms in males also depends on years of service. In the final analysis the data from the sample of female participants was used. As with the former two stages three models were again tested. Firstly, violent and environmental trauma exposure factors and years of service made a significant

contribution to the model. Secondly, when interaction terms were entered it was found violent and environmental trauma exposure factors and years of service again made a significant contribution to the model. Lastly, when age, anxiety and depression were added there was no significant direct relationship between all three PPTM trauma exposure factors and PTSD symptoms. Importantly, the relationship of the interaction term (years of service by violent trauma) and PTSD symptoms was not statistically significant, indicating that the effect of violent trauma exposure on PTSD symptoms in females does not depend on years of service.

The findings show that PTSD symptomology was moderated by years of service but only in regard to violent trauma exposure in male prison personnel as opposed to female personnel. Furthermore, no significant association between years of service and PTSD symptoms were found for the other two trauma factors in male or female personnel. Therefore, greater years of service in male prison personnel moderate the effects of PTSD development when they have been exposed to trauma involving the witnessing or perpetration of violence whereas male personnel with less years of service and female personnel in general exposed to the three trauma factors are unable to replicate this moderation.

As highlighted previously there is an absence of research exploring the factor of occupational experience as a potential moderator for the development of PTSD symptomology in prison personnel. The results do however support the finding of similar research within military populations which found males to be at a greater risk of experiencing post-traumatic stress moreover years of service significantly reduced the likelihood of experiencing post-traumatic stress (Richardson et al., 2020). As well as providing a significant contribution to the PTSD literature, the findings of the current study give attention to previously overlooked factors that have implications for policy and practice within occupational-specific trauma exposed populations.

The findings support previous research that suggest prison personnel may be at risk of developing adverse psychological symptomology such as PTSD as well as burnout as a result of exposure to trauma with limited occupational experience (Harizanova & Tarnovska, 2013; Morgan et al., 2002). This is an important overall consideration for the organisational structures of prison systems, where wide scale hiring of younger Prison Officers's to replace experienced ones (Jauvin et al., 2003) initiated by central governments to provide more cost effective public services have led to higher absenteeism rates, turnover, lower staff retention, and stress amongst the workplace, alongside increases in violence, self-harm and suicide rates (Ministry of Justice, 2020) as a result of rapid and erroneous implementations of new policies. The

findings of the current study may help to provide further clarification of these considerations. Adverse symptomology development following trauma exposure amongst inexperienced and female officers mean staff who are affected could leave service because they are unable to potentially harden or develop resilience mechanisms to the trauma exposure or it may be the case they are being exposed to greater magnitudes of potentially traumatic exposures (Ministry of Justice, 2020) that are normally associated with greater years of service. The prison service of England and Wales reported a loss of 596 Prison Officers in 2016 and 1244 in 2018 an increase of 109%, 1 in 16 officers left service in 2018, with 1 in 100 leaving in 2010, 6,000 years of officer experience were lost in 2017, with reports that 1 in 3 officers had less than 3 years' experience in 2018 in comparison to 1 in 8 in 2010 (Ministry of Justice, 2018). Furthermore, 33% of officers who left service in 2018 had less than 12 months experience in comparison to just 7% in 2010. Conversely experienced male staff may also be leaving service due to the adverse effects of other conditions such as burnout and this warrants significant further research attention to explore associations and correlations with the findings of this research as well as identification of other potentially vulnerable sub-groups (James & Todak, 2018). A further important consideration in the finding of violent trauma exposure and PTSD development being moderated by greater years of service in male personnel, is the potential of higher tolerance levels, through habituation and development of resilience overtime as suggested to occur in police officers (Papazoglou, 2013) and military populations (Richardson et al., 2020) which may similarly occur in prison officers. In light of the findings that staff with less years of service may be non-resilient to violent trauma exposure and staff overall non-resilient to self-harm/death and environmental trauma exposure which are a sometimes inherent and non-avoidable aspect of a Prison Officer's role, warrants further investigation as to the potential aspects in their development. It is particularly pertinent when considered alongside findings that suggest that PTSD is most strongly associated with violence and physical danger on the job (Regerhr et al., 2021). In the case of the current study resilience to trauma may develop in male staff overtime or may be a consequence of historical 'cultures of coping' inherent in prison staff who have greater occupational experience. Further studies are needed to elucidate these factors, particularly differentiation in regard to the aspects of the typology of trauma involved, and what may harbour greater resilience development in individuals. The findings also suggest directions for organisational implementations. In more recent times the US military have researched resilience, developed and implemented resilience building programmes based on the theoretical principles of positive psychology (Seligman & Csikszentmihalyi, 2000) to enhance soldier's resilience capabilities in response to exposure to

combat trauma (Cornum et al., 2011). Such programmes could potentially also be developed for other ‘at risk’ occupations such as police and prison officers to develop resilience to trauma amongst personnel, thus adopting a proactive and preventative strategy as opposed to a reactive treatment-based approach to trauma exposure. James and Todak (2018) suggest that “interventions that promote resilience to critical incident induced stress and trauma may help reduce the likelihood of prison employees developing PTSD” (p.730).

The primary limitation of the current study involves the use of cross – sectional examination of the associations between years of service, trauma exposure, and PTSD symptomology and the inability to infer causation behind the relationships. As such it may be the case that the moderating variable of years of service amongst prison personnel is mediated or postulated by other psychological factors such as resilience and hardiness, therefore established measures that record these variables should be used in conjunction also, alongside controlling for these factors during analytical procedures to elucidate these considerations further.

A further potential limitation is the exclusive use of self-report measures. Furthermore, future research efforts should address concerns raised through the use of self-report measures, with the use of clinician-ratings of PTSD to ascertain diagnostic levels of PTSD in participants. Secondly in future studies the use of the PPTM scale although context specific to prison settings, should be utilised in conjunction with a valid and reliable measure of lifetime trauma exposure, such as the Impact of Event Scale – Revised (IES-R; Weiss & Marmar, 1997) which could also be used to evaluate the predictive validity of a weaker or stronger traumatic stress reaction among prison personnel. Thirdly as highlighted the current study was based on data from prison personnel in the United Kingdom only and, as such, the findings may not be generalizable to other countries.

Despite the limitations discussed, the current study provides a significant contribution to the literature surrounding trauma exposure and PTSD development, particularly in prison context specific populations. The current study highlights associations between typology of trauma exposure and PTSD amongst prison personnel and that the association is moderated by years of service. Violent trauma exposure was positively associated with increased PTSD symptomology among male personnel with less years of service and female personnel with ranging years of service. However, violent trauma exposure was negatively associated with PTSD symptomology in male personnel with greater years of service. The findings help to

elucidate the relationships between PTSD symptomology, experience (potentially through the development of resilience and hardiness) and trauma exposure.

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