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**Relationships between hardiness, exposure to traumatic events and PTSD symptoms
among French police officers**

Relations entre endurance, exposition aux événements traumatiques et symptômes de TSPT
chez des policiers français

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Abstract

Introduction: Exposure to traumatic events is common in police work, and its psychological impact on officers may take the form of severe PTSD symptomatology. Personality traits such as hardiness could be protective against mental health outcomes and help withstand stress and trauma.

Objective: This study aimed to examine the relationships between hardiness, internalizing disorders, and PTSD symptoms in a sample of French police officers.

Method: Participants were French police officers ($N = 100$, Mean Age = 32.98 years, $SD = 9.85$) who completed self-report measures of PTSD and psychiatric morbidity, together with an index of cumulative exposure to traumatic incidents in an occupational context.

Results: Correlational analysis and partial correlations showed a specific relationship between hardiness and the PTSD symptom clusters of Reexperiencing and Avoidance, but not Hyperarousal. The correlational analysis investigating relationships between hardiness and mental health outcomes yielded high negative correlations for Control and Commitment, but no significant finding for Challenge. The results of the regression analysis indicate that only the Reexperiencing and Avoidance clusters were significantly mediated by Control, and to a lesser extent, by Commitment.

Conclusion: Results reveal that Hardiness has a potential buffer and protective effect on PTSD symptoms among police officers.

Keywords: Hardiness; Posttraumatic stress symptoms; Resilience; Personality; Vulnerability.

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Résumé

Introduction : L'exposition à des événements traumatiques est fréquente dans le travail de la police et son impact psychologique sur les agents peut prendre la forme d'une symptomatologie sévère de TSPT. Les traits de personnalité tels que l'endurance pourraient être protecteurs en matière de santé mentale et aider à faire face aux stress et aux traumatismes.

Objectif : Cette étude visait à examiner les relations entre endurance, troubles internalisés et symptômes de TSPT dans un échantillon de policiers français.

Méthode : Les participants étaient des policiers français ($N = 100$, Age moyen = 32,98 ans, $SD = 9,85$) qui ont complété des mesures en auto-évaluation du TSPT et de la morbidité psychiatrique, de l'endurance, ainsi qu'un indice d'exposition à des incidents traumatiques dans un contexte professionnel.

Résultats : L'analyse des corrélations a montré une relation spécifique entre l'endurance et les symptômes de répétition (intrusion) et d'évitement du TSPT, mais pas avec l'hyperactivité neurovégétative. L'étude des corrélations entre endurance et mesures de morbidité psychiatrique montre des corrélations négatives élevées pour le contrôle et l'engagement, mais aucune corrélation significative pour la dimension challenge. Les résultats de l'analyse de régression indiquent que seuls les symptômes de répétition et d'évitement ont été significativement médiés par le contrôle et, dans une moindre mesure, par l'engagement.

Conclusion : Les résultats révèlent que l'endurance a un effet protecteur sur les symptômes de TSPT chez les policiers.

Mots-clés : Endurance ; Trouble de stress post-traumatique ; Résilience ; Personnalité ;
Vulnérabilité ; Police.

Relationships between hardiness, exposure to traumatic events and PTSD symptoms among French police officers

1. Introduction

Police stress and burnout have been increasingly recognized as a major public health issue in recent years. The level of stress induced by police work is higher than that found in the general population (e.g., Korre, Farioli, Varvarigou, Sato, & Kales, 2014; Webster, 2014). Examples of stressful events for police officers - called critical incidents - include encountering the body of someone recently dead, a colleague killed or injured accidentally, responding to children who have been sexually assaulted, and road traffic accidents (Chopko, Palmieri, & Adams, 2015; Weiss et al., 2010). A critical incident is an unexpected and powerful event causing emotional reactions that overwhelm effective coping skills. Critical incidents are common and stressful for police officers, but they do not necessarily involve extreme violence (e.g., shooting, assault). They also include extremely depressing incidents (Carlier & Gersons, 1994), where the police officer arrives after the event and is not actively involved (e.g., traumatic injury to a child, suicide).

The unique nature of the stress experienced by police officers is linked to burnout and negative attitudes toward people, life and work. Some police officers develop emotional or behavioral symptoms, such as suicidal ideation, alcohol abuse, anxiety, or psychosomatic symptoms (e.g., Chopko, Palmieri, & Adams, 2013; Hartley et al., 2012; Lawson, Rodwell, & Noblet, 2012; Stanley, Hom, & Joiner, 2016). This is consistent with the findings of a growing body of research that highly stressful life events may have long-term negative health

consequences (Cleland, Kearns, Tannahill, & Ellaway, 2016; Dohrenwend, 2006). Another important finding (Chopko et al., 2015) is the strong relationship between cumulative critical incidents and post-traumatic stress disorder (PTSD), including disturbance of awakening cortisol activation (Violanti et al., 2017). A recent meta-analysis found that 4.5% of police officers may suffer from PTSD (Berger et al., 2012) or post-traumatic stress symptoms (PTSS), compared to about 1-2% of the general population (e.g., Lukaschek et al., 2013). However, these figures should be treated with caution because they differ across studies. Frequency (Breslau, Chilcoat, Kessler, & Davis, 1999; Vasterling et al., 2010) and severity of exposure (Jakob, Lamp, Rauch, Smith, & Buchholz, 2017) to critical events seem to play a role in the development of PTSD symptoms and other mental health reactions. However, despite routine exposure to potentially traumatic incidents, the majority of police officers do not develop signs of psychological distress or PTSD. Thus, greater knowledge of protective (or resilience) factors is a major public health priority. Nevertheless, few studies have investigated the factors that best protect police officers from developing these symptoms (Ellrich & Baier, 2015; Lee et al., 2016; Yuan et al., 2011).

Research is therefore required to identify resilience factors or general resistance resources (Antonovsky, 1987; Tusaie & Dyer, 2004). Resilience is defined as the capacity for successful adaptation despite significant adversity. Hardiness appears to be one of the factors that may contribute to this adaptation (Bartone, Kelly, & Matthews, 2013; Escolas, Pitts, Safer, & Bartone, 2013; Maddi, 2005; Pitts, Safer, Russell, & Castro-Chapman, 2016), and it has been identified as a resistance resource (Kobasa, 1979, 1982; Maddi, 2017). Hardiness is considered as a healthy personality disposition and shows negative correlations with neuroticism, and positive correlations with four other Big Five personality traits

(Conscientiousness, Extraversion, Openness, and Agreeableness; e.g., Bartone, Eid, Johnsen, Laberg, & Snook, 2009; Zhang, 2011). Hardiness is considered as a personality trait and hence remains relatively stable over time, even if it is susceptible to change under certain circumstances (Maddi, 2002).

Hardiness comprises three interrelated attitudes (the “3Cs”): Commitment (versus Alienation), Control (versus Powerlessness), and Challenge (versus Threat). Commitment is the belief that no matter how bad things get, it is crucial to become involved in experiences and remain proactive rather than feel alienated from what happens. Control is the belief that life changes can be anticipated and controlled, even under difficult circumstances; it enables the individual to make appropriate decisions to cope with stressful situations. Challenge refers to the ability to view change as an opportunity, based on evaluation of the personal resources available to cope with the situation (e.g., abilities, skills, knowledge). These three components can thus help the individual remain healthy when faced with stressful events. For example, many studies have shown that hardiness is positively related to a reduction in stress-related health symptoms, negative moods, and alcohol abuse (e.g., Bartone, 1999; Bartone, Hystad, Eid, & Brevik, 2012; Gito, Ihara, & Ogata, 2013). These results suggest that hardy individuals are better able to mobilize adaptive coping strategies than those who are less hardy (Beasley, Thompson, & Davidson, 2003; Delahaij, Gaillard, & van Dam, 2010). In other words, hardiness involves a pattern of attitudes and behaviors that help transform stressors from critical events into opportunities for growth (Almedom, 2005). Khoshaba and Maddi’s studies underlined the importance of early life experiences, parental support on the early development of hardiness (Khoshaba & Maddi, 1999; Maddi, 1999).

Moreover, studies have shown that hardiness is directly related to post-traumatic adjustment. For example, recent studies with military populations (e.g., combat veterans or prisoners of war) found that PTSD and psychiatric symptomatology (e.g., depression) are lower among people with high levels of hardiness (Bartone, 1999, 2000; Bartone et al., 2013; Escolas et al., 2013; King, King, Fairbank, Keane, & Adams, 1998; Waysman, Schwarzwald, & Solomon, 2001; Zakin, Solomon, & Neria, 2003). A study among police officers (Andrew et al., 2008) measuring hardiness and post-traumatic symptoms found that Commitment was associated with fewer PTSS in women and less psychological distress in men. Another study found that non-hardy police officers had higher levels of absenteeism and illness (Tang & Hammontree, 1992). These findings support the view that hardiness contributes to the mental health of police officers. However, other studies have produced divergent results (Marchand, Nadeau, Beaulieu-Prévost, Boyer, & Martin, 2015). A possible explanation is that most empirical studies do not take into consideration the symptoms of PTSD (avoidance, intrusion and hyperarousal). Another possibility is that many studies fail to consider the frequency and severity of critical incidents. Therefore, the links between hardiness, critical incident history, PTSD and its symptoms (avoidance, intrusion, hyperarousal, and general mental health) need to be clarified.

The purpose of the present study was to examine how hardiness can act as a buffer against the cumulative stress of police officers. To this end, we conducted a series of analyses to evaluate the relationships between hardiness, stressful life events (critical incidents), and PTSD symptomatology (avoidance, intrusion, and hyperarousal) among police officers.

2. Methods

2.1 Participants and procedure

Our sample comprised 100 French national police officers: 27.7 % women ($n = 28$) and 72.3 % men ($n = 73$). The participants' ages ranged from 19 to 57 years, with a mean age of 32.98 years ($SD = 9.85$), and a significant gender difference ($t(99) = -2.46, p = .02$). Men were older than women. A majority (58%, $n = 58$) of the participants were patrolmen (*gardiens de la paix*) or judicial police officers (*officiers de police judiciaire*), 41% ($n = 41$) were auxiliary police officers (*adjoints de sécurité*), and 1 participant (1%) was a forensic technician (*technicien de la police scientifique*). All were from the Centre-Val de Loire region of France. Average length of service was 10.96 years ($SD = 9.85$). In our sample, women had worked as police officers for fewer years than men ($t(99) = -2.00, p = .03$).

Participants were recruited in a national police training centre. Participants responded anonymously, and all the data were collected via self-administered paper questionnaires. All the participants gave their informed consent after the purpose of the study and the procedure had been explained, emphasizing the confidentiality and anonymity of the data. Clear and precise instructions were given, and the importance of giving honest answers was stressed. No incentive was provided. Participants with one value or more missing on the measures were excluded ($n = 1$).

2.2 Instruments

Demographic variables. Because previous studies have reported sociodemographic differences in PTSD (e.g. Kun, Tong, Liu, Pei, & Luo, 2013), participants were asked to provide details of their gender, marital status, age, and years of police service.

Critical incidents. The Critical Incident History Questionnaire (CIHQ; Chopko et al., 2015; Weiss et al., 2010) is a 39-item self-report questionnaire that provides a quantitative estimate of cumulative exposure to critical incidents. Participants estimated the frequency (the number of times they have experienced the incident) and severity (how difficult each incident was to cope with) of 34 work-related critical incidents (e.g., encountering the body of someone recently dead, being shot at, colleague killed intentionally; see Table 1 for percentages of police officers reporting each item, and their frequency of exposure to the incident). The total score was the sum of frequency of exposure and a rating score of coping difficulty for each item. The CIHQ demonstrates good internal consistency.

PTSD. The PTSD Checklist-Specific Version (PCL-S; Ventureyra, Yao, Cottraux, Note, & De Mey-Guillard, 2002) is a brief and practical self-report assessment of the severity of PTSD-related symptoms (DSM-IV criteria) in the past month. Participants rated the level of distress experienced for 17 items on a 5-point scale (from 1 - not at all to 5 - extremely), summed to produce a total score (Cronbach's alpha .95). Items can be divided into 3 sub-scales: Reexperiencing (items 1–5), Avoidance (items 6–12) and Hyperarousal (items 13–17). Scores range from 17 to 85, with higher scores indicating greater PTSS severity. The PCL-S (specific) asks about symptoms in relation to an identified stressful experience, a specified event.

Mental health. The 28-item General Health Questionnaire (GHQ-28; Goldberg & Williams, 1988) is a well-validated questionnaire of mental health, measuring emotional distress and psychiatric morbidity. It is scored on a 4-point Likert scale, with higher scores indicating a higher level of emotional distress. The GHQ-28 has 4 sub-scales: Somatic symptoms, Anxiety-insomnia, Social dysfunction and Severe depression.

Hardiness. The 15-item Dispositional Resilience Scale (DRS-15; Bartone, 2007) is a self-report instrument measuring the three facets of hardiness: Commitment (a feeling of dedication to tasks and meaning-making, e.g., “Most of my life gets spent doing things that are meaningful”), Control (a sense of autonomy or influence over one’s life, e.g., “How things go in my life depends on my own actions”), and Challenge (a perception that obstacles are opportunities for growth, e.g., “I enjoy the challenge when I have to do more than one thing at a time”). Participants rate the 15 items on a 4-point Likert scale (0 - not at all true to 3 - completely true) and scores are summed to give an overall hardiness score.

Please Insert Table 1 here

2.3 Statistical methods

All data were analyzed using Statistica® version 13 software. Means and standard deviations were calculated to determine the level of psychological well-being and personality traits. A two-sample t-test was conducted to compare men and women with respect to the main variables of interest. We performed a series of regression analyses in which PTSD features were the dependent variables, with hardiness scores as regressors. Finally, partial correlation coefficients and a multiple regression analysis were conducted to determine the relationship between PTSD symptoms and each outcome variable, controlling for the critical incident score, age and length of service. Differences were considered significant when p values were smaller than .05.

3. Results

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149 **3.1 Relationships between Hardiness and psychiatric disorders**

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150 All correlations between the total hardiness score and the subcomponents of hardiness
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151 were positive ($r > .66, p < .001$). Additionally, the sub-dimensions of Commitment and
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152 Control, and Commitment and Challenge, were positively correlated (respectively, $r = .46,$
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153 $p < .001$, and $r = .27, p < .01$). Table 2 shows the relationships between hardiness scores, PTSD
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154 (PCL-S scores) and psychiatric symptoms (GHQ scores) using Spearman Correlation
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155 analysis. Hardiness had a significant negative correlation with psychological symptoms
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156 (PTSD and GHQ) ($-.26$ to $.52, p < .01$). However, differences were observed in the hardiness
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157 sub-facets; Commitment and Control had significant negative correlations with all variables
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158 (respectively, r $-.27$ to $-.42$ and r $-.24$ to $-.50$), but Challenge showed no significant
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159 correlations. There was a high correlation between Hardiness and Somatic symptoms ($r = -$
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160 $.52, p < .001$).

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804 **3.2 Multiple regression analysis**

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162 A multiple regression analysis was conducted to determine which variables were
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163 significant predictors of each of the outcome variables in order to explore whether Hardiness
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164 has an impact on the formation of PTSD symptoms, and if so, which of its components has
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165 the greatest influence. For this analysis, Hardiness scores were the independent variables,
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166 psychiatric morbidity served as mediator, and PTSD symptoms as the dependent variable.
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167 Significant predictors of PTSD symptoms in our sample are presented in Table 3. The result
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168 of this analysis shows that Control and Commitment predicted lower PTSD symptoms. The
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direct effect of Commitment on PTSD symptoms was of much smaller magnitude than Control. Moreover, the overall effects of hardiness on PTSD symptoms were significant (see Table 4).

Please Insert Table 3 here

3.3 Partial correlations

Finally, partial correlations were calculated to control for the correlations among the independent variables in the regression model. Partial correlations were analyzed to investigate the relationship between hardiness and mental health after controlling for age, length of service and critical incident. Table 4 displays the partial correlation results. In sum, the results show no significant correlations between challenge and GHQ scores or PTSD scores. Commitment showed significant negative correlations with PTSD and psychiatric symptoms, but partial correlation analysis yielded lower correlations (r -.24 to -.38, $p < .05$). The analysis revealed significant negative correlations between Control and psychological symptoms (r -.24 to -.48, $p < .05$).

Please Insert Table 4 here

In sum, as predicted, the control variables did not eliminate all the significant correlations between hardiness and the GHQ and PCL-S.

4. Discussion

This study examined the protective factor of hardiness, which is known to be closely related to psychological resilience, particularly in certain high-risk occupations. Police officers experience many potentially life-threatening events, which require adjustment or coping (Chopko et al., 2015). It is therefore crucial to identify factors that enable them to cope with stressful experiences. Hardiness is a dispositional factor associated with coping with adversities (Maddi, 2017). Two previous studies highlighted hardiness as a potential moderator or buffer against stress symptoms among police officers (Andrew et al., 2008; Tang & Hammontree, 1992). However, the results produced substantially different results. In response to this discrepancy, this study examined the relationships between the components of hardiness and the three specific symptom clusters of PTSD: Reexperiencing – cognitive dimension, Avoidance – behavioral dimension, and Hyperarousal – physiological dimension. One hypothesis was that hardiness could have a particular relationship with specific cluster(s). In the present study, we controlled for the role of critical incidents, age and length of service in this potential relationship between stress symptoms and hardiness. The results showed that the hardiness components of Commitment and Control have significant negative correlations with PTSD symptoms and psychiatric morbidity. This is consistent with previous findings that hardiness has a close relationship with psychological well-being and the ability to cope with anxiety (Bartone et al., 2013; Escolas et al., 2013; Maddi, 2005; Pitts et al., 2016), although our results showed no significant association with Challenge. Each of the three PTSD clusters had a significant negative correlation with both the Control and Commitment components of hardiness. High levels of Control and Commitment were associated with fewer reported PTSD and/or psychiatric symptoms, including somatic problems. These results are consistent with previous studies reporting a

relationship between Control and Commitment and physical health (e.g. Shepperd & Kashani, 1991) and extend Andrew's (2008) results that showed similar findings only among women police officers. A high level of control has been related to an internal locus of control (e.g., Kooranian, Khosravi, & Esmaeeli, 2008); in other words, police officers with this disposition could consider critical events to be under their own control and thus feel less stress. This appraisal of their ability to cope with the situation could prevent PTSD (secondary appraisal, Folkman, 2013). Control over life events (dispositional control) is an important predictor of well-being, but it is possible that relationships between Control and PTSD symptoms are also influenced by situational control over police work-related stressful events (i.e., response to meet the demands of specific life stressors).

In the present study, the Commitment and Control facets of hardiness predicted lower cognitive (Reexperiencing) and behavioral (Avoidance) symptoms of PTSD, but not physiological symptoms (Hyperarousal). The latter could be attributed more to biological than dispositional variables (e.g., stress hormones). In each case, Control had the main influence, accounting for 16% of the explained variance for Reexperiencing and 12% of the explained variance for Avoidance (and 7% for Hyperarousal). The consistent finding in this work is that Control and Commitment are negatively related to post-traumatic stress symptoms and mental health disorders. Our results highlight the importance of examining the different components of hardiness rather than hardiness as a whole. In particular, we observed that Control moderated the experience of cognitive and behavioral stress symptoms, but less than physiological reactivity. Police officers with a high level of control may feel they have control over their lives and their ability to navigate in their world, and are therefore less likely to develop PTSD symptoms. To a lesser extent, Commitment could play a protective role,

because it gives one a sense of purpose and encourages the development of social relationships that can be supportive during (and after) stressful situations (Eschleman, Bowling, & Alarcon, 2010).

Challenge was unrelated to the three PTSD symptom clusters and internalization disorders (severe depression, anxiety or somatic symptoms). This finding is in line with results in the literature on the role of challenge in mental health outcomes (e.g. Kardum, Hudek-Knežević, & Krapić, 2012). Challenge is perceived and experienced as an opportunity for self-growth (with the availability of strategies to cope with stressful events). Emphasizing opportunity and success in a stressful situation could be associated with individual goal performance (Drach-Zahavy & Erez, 2002) more than with mental health outcomes. Furthermore, other studies (e.g., Andrew et al., 2008) documented that the Challenge component was not a significant predictor of mental health in stressful situations and suggested that it should be eliminated from the hardiness concept (Florian, Mikulincer, & Taubman, 1995; Hull, Van Treuren, & Vinelli, 1987).

Assessing the role of each component of hardiness may shed light on the specific relations with each PTSD symptom cluster. Nevertheless, overall, hardiness accounted for approximately 15% of the variance in PTSD symptoms. A full and accurate account of the relationship between personality traits and PTSD symptoms among police officers is likely to involve several additional factors, such as social support, emotional or behavioral expression (e.g., anger or hostility, behavioral inhibition) or cognitive appraisal (e.g., coping style, goal orientation). Another important avenue of investigation involves the relationships between externalization symptoms and hardiness components, especially challenge, based on the hypothesis that personality processes influence the form and expression of psychopathology.

In the light of previous studies (Miller, Kaloupek, Dillon, & Keane, 2004), we can consider that PTSD is influenced by individual differences in tendencies toward the externalization versus the internalization of distress. Lastly, the dissociation symptoms of PTSD should receive specific attention in future studies on stress in police personnel. Indeed, peri-traumatic dissociation and derealization symptoms have been described as being negatively related to the hardiness subdimension of challenge in navy officer cadets, in medium and high stress situations (Eid & Morgan, 2006).

5. Limitations

This study has a number of limitations. Our measurement of hardiness and mental health was self-reported, and use of physiological or medical assessments would be less subjective. Another limitation was that the General Health Questionnaire-28 does not address many dimensions relevant for mental health (e.g., suicidal /obsessive ideation or dissociative symptoms). Secondly, the PTSD measure was not specific, and consequently, the PTSD symptoms we measured could have referred to traumatic events other than those experienced during police work (or experienced co-currently). Similarly, drug use and comorbid disorders should be taken into consideration in future studies. Moreover, our sample was relatively small and the study should be replicated with a larger clinical sample. The cross-sectional nature of the study limits inferences about direction of effect and causality. Therefore, our results should be interpreted with caution and they should be validated and extended in future research (e.g., longitudinal studies).

6. Conclusion

The results of our study reveal the importance of the personality trait of hardiness in preserving psychological well-being in stressful occupations. Consistent with previous studies of military subjects, we found significant negative correlations between hardiness and mental disorder scores, either anxiety disorder symptoms or other internalization symptoms among police officers. Psychological hardiness as a direct or “buffering effect” on life stress could be an internal resistance resource protecting against the adverse effects of stress and associated mental disorders. Furthermore, the present study provides additional evidence that hardiness, particularly its Control facet, could protect police officers from PTSD symptoms. Hardiness, and particularly the subdimension of control, was significantly and negatively associated with the symptoms of reexperiencing and avoidance/numbing. The trait of psychological hardiness thus seems to act as a protective factor in relation to PTSD symptoms and might also act as a buffer against other negative mental health effects of stress. This finding could prompt researchers to investigate the differential impact of the separate facets of hardiness on the three PTSD clusters (reexperiencing, avoidance, hyperarousal) as well as the new dissociative-PTSD subtype (DSM-5). In particular, peri-traumatic dissociation and derealization symptoms in PTSD should receive specific attention in future studies (Dorahy & van der Hart, 2015; Nijenhuis, 2017). The apparent benefit of hardiness could be of practical interest to clinicians and occupational psychologists as a selection criterion for training police officers. If further studies confirm the importance of the hardiness personality construct in the long-term adaptation to stressful events in police work (as for former prisoners of wars; Zerach, Karstoft, & Solomon, 2017), early identification and screening of ‘dispositional resilience’ (Bartone, 2007) among police officers, with particular support for individuals who are at risk, and integration of hardiness training (including commitment and control) in police

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298 education, should be regarded as channels for a PTSD prevention strategy. The hardiness
299 training programs for stress resilience in military contexts described by Bartone, Eid and
300 Hystad (2016) could provide a useful basis for developing such a strategy.

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Table 1*Critical Incident History Questionnaire: frequency and mean severity of events.*

Items	Mean (SD)			<i>n</i> reported
	Severity	Frequency	Index of exposure	
Colleague killed intentionally	2.69 (.54)	.06 (.34)	2.00 (.01)	4
Mistake that injures/kills bystander	2.79 (.43)	.15 (.38)	2.29 (.61)	14
Mistake that injures/kills colleague	2.73 (.49)	.03 (.22)	2.50 (.70)	2
Colleague killed accidentally	2.62 (.54)	.11 (.34)	2.50 (.52)	10
Trapped in life-threatening situation	2.31 (.54)	.01 (.10)	2.00 (.00)	1
Killing or injuring in the line of duty	1.92 (.72)	.50 (.73)	1.79 (.62)	38
Life-threatening man-made disaster	2.36 (.69)	.25 (.48)	2.09 (.90)	23
Loved ones threatened	2.34 (.64)	.13 (.33)	2.08 (.64)	13
Being shot at	2.31 (.58)	.53 (.76)	2.15 (.54)	39
Sexually assaulted child	2.04 (.62)	.20 (.40)	1.85 (.58)	20
Being taken hostage	2.40 (.73)	.14 (.37)	1.92 (.64)	13
Badly beaten child	2.34 (.67)	.69 (.93)	2.22 (.62)	46
Making a death notification	1.97 (.76)	.68 (.81)	1.84 (.73)	51
Threatened with a gun	2.09 (.74)	1.10 (.91)	1.96 (.74)	71
See someone dying	2.49 (.61)	.11 (.31)	2.36 (.50)	11
Seriously injured intentionally	2.21 (.66)	.25 (.43)	2.00 (.70)	25
Life threatened by toxic substance	2.20 (.62)	.06 (.23)	2.17 (.40)	6
Severely neglected child	1.63 (.68)	.64 (.61)	1.58 (.59)	57
Being seriously beaten	1.75 (.69)	.62 (.64)	1.65 (.61)	55
Exposed to AIDS or other diseases	2.38 (.65)	.07 (.25)	2.14 (.90)	7
Being seriously injured accidentally	2.09 (.75)	.07 (.25)	1.86 (.90)	7
Colleague injured intentionally	1.58 (.81)	.10 (.30)	1.70 (.67)	10
Mutilated body or human remains	1.85 (.75)	.03 (.17)	2.00 (.70)	3
Life-threatening natural disaster	2.21 (.69)	.44 (.55)	2.10 (.72)	42
Threatened with knife/other weapon	1.92 (.61)	.12 (.33)	2.08 (.66)	12
Sexually assaulted adult	2.29 (.74)	.69 (.78)	2.13 (.79)	52
Colleague injured accidentally	1.35 (.70)	1.18 (.89)	1.32 (.65)	76
Shooting at suspect without injury	1.86 (.77)	.86 (.84)	1.82 (.80)	61
Decaying corpse	1.70 (.69)	.83 (.89)	1.62 (.69)	58
Life threatened by dangerous animal	1.44 (.67)	1.27 (.96)	1.40 (.63)	78
Body of someone recently dead	1.55 (.70)	.34 (.49)	1.58 (.66)	33
Badly beaten adult	1.57 (.78)	1.08 (.87)	1.53 (.66)	75
Life-threatening high-speed chase	1.28 (.80)	.71 (.65)	1.27 (.77)	60
Animal neglected, tortured, killed	1.55 (.81)	1.38 (.85)	1.56 (.79)	89

Table 2
Pearson's correlations between hardiness and psychological well-being.

	PTSD symptoms						Psychiatric morbidity							
	Reexperiencing		Avoidance		Hyperarousal		Somatic symptoms		Anxiety insomnia		Social dysfunction		Severe depression	
Total Hardiness score	-.39	***	-.30	**	-.26	**	-.52	***	-.45	***	-.29	**	-.35	***
Challenge	-.05	<i>ns</i>	.03	<i>ns</i>	-.01	<i>ns</i>	-.17	<i>ns</i>	-.07	<i>ns</i>	-.07	<i>ns</i>	-.07	<i>ns</i>
Commitment	-.38	***	-.33	***	-.27	**	-.42	***	-.39	***	-.33	***	-.32	**
Control	-.40	***	-.35	***	-.28	**	-.50	***	-.50	***	-.24	*	-.38	***

* $p < .05$; ** $p < .01$; *** $p < .001$; *ns*: non-significant.

Table 3

Hierarchical multiple regression results for the prediction of PTSD symptoms.

Predictor variables	Reexperiencing				Avoidance				Hyperarousal			
	Effect size	β	t	p -value	Effect size	β	t	p -value	Effect size	β	t	p -value
Control	.16	-.29	-2.80	***	.12	-.25	-2.36	***	.07	-.20	-1.82	*
Commitment	.05	-.26	-2.47	*	.05	-.24	-2.19	*	.03	-.20	-1.72	*
Total effect	$R^2 = .21; F(2,90) = 12.38, p < .001$				$R^2 = .17; F(2,90) = 6.11, p < .001$				$R^2 = .10; F(2,90) = 5.06, p < .01$			

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

Table 4

Partial correlation analyses for hardiness and psychological well-being, covarying for age, length of service and critical incident exposure.

Variables		1	2	3	4	5	6	7	8	9	10
Hardiness	1.Challenge	--	.15 <i>ns</i>	-.01 <i>ns</i>	-.08 <i>ns</i>	-.03 <i>ns</i>	-.03 <i>ns</i>	-.04 <i>ns</i>	.07 <i>ns</i>	.14 <i>ns</i>	.05 <i>ns</i>
	2.Commitment		--	.36 ***	-.27 ***	-.32 **	-.38 ***	-.31 **	-.31 **	-.25 *	-.24 *
	3.Control			--	-.43 ***	-.48 ***	-.24 *	-.33 **	-.31 **	-.28 **	-.23 *
Psychiatric morbidity	4.Somatic symptoms				--	.76 ***	.31 **	.55 ***	.37 ***	.31 *	.44 *
	5.Anxiety-insomnia					--	.44 ***	.59 ***	.36 ***	.32 ***	.43 ***
	6.Social dysfunction						--	.40 ***	.29 **	.24 *	.32 ***
	7.Severe depression							--	.35 ***	.32 **	.44 ***
PTSD	8.Reexperiencing								--	.61 ***	.50 ***
	9.Avoidance									--	.57 ***
	10.Hyperarousal										--

** $p < .05$; ** $p < .01$; *** $p < .001$; ns: non-significant.*