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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

Catherine Potard <sup>a, b</sup>, Anaïs Madamet <sup>c, d</sup>, Isabelle Huart <sup>c, d</sup>, Wissam El Hage <sup>b</sup>, & Robert  
Courtois <sup>b, c</sup>

<sup>a</sup> Université d'Angers, Département de Psychologie, EA 4638 'Laboratoire de Psychologie  
des Pays de la Loire', Angers, France, [catherine.potard@univ-angers.fr](mailto:catherine.potard@univ-angers.fr)

<sup>b</sup> CHRU de Tours, Clinique Psychiatrique Universitaire, Tours, France, [wissam.elhage@univ-tours.fr](mailto:wissam.elhage@univ-tours.fr)

<sup>c</sup> Université François-Rabelais de Tours, Département de psychologie, EA 2114 'Psychologie  
des âges de la vie, Tours, France, [robert.courtois@univ-tours.fr](mailto:robert.courtois@univ-tours.fr) ; [isabelle.huart@univ-tours.fr](mailto:isabelle.huart@univ-tours.fr)

<sup>d</sup> Centre régional de formation de la Police, Tours, France

Correspondence concerning this article should be addressed to:

Robert Courtois

Université François Rabelais

Département de Psychologie, EA 2114,

3, rue des Tanneurs - BP 4103, F-37041 Tours Cedex 1

Tél. : +33 (0) 2 47 36 66 85

Fax : +33 (0) 2 47 36 64 84

Email : [robert.courtois@univ-tours.fr](mailto:robert.courtois@univ-tours.fr)

**Conflicts of interest:** none

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124 **Abstract**  
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128 Introduction: Exposure to traumatic events is common in police work, and its psychological  
129 impact on officers may take the form of severe PTSD symptomatology. Personality traits such  
130 as hardiness could be protective against mental health outcomes and help withstand stress and  
131 trauma.  
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136 Objective: This study aimed to examine the relationships between hardiness, internalizing  
137 disorders, and PTSD symptoms in a sample of French police officers.  
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140 Method: Participants were French police officers ( $N = 100$ , Mean Age = 32.98 years,  $SD =$   
141 9.85) who completed self-report measures of PTSD and psychiatric morbidity, together with  
142 an index of cumulative exposure to traumatic incidents in an occupational context.  
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147 Results: Correlational analysis and partial correlations showed a specific relationship between  
148 hardiness and the PTSD symptom clusters of Reexperiencing and Avoidance, but not  
149 Hyperarousal. The correlational analysis investigating relationships between hardiness and  
150 mental health outcomes yielded high negative correlations for Control and Commitment, but  
151 no significant finding for Challenge. The results of the regression analysis indicate that only  
152 the Reexperiencing and Avoidance clusters were significantly mediated by Control, and to a  
153 lesser extent, by Commitment.  
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162 Conclusion: Results reveal that Hardiness has a potential buffer and protective effect on  
163 PTSD symptoms among police officers.  
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168 *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.

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



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361 **among French police officers**  
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367 **1. Introduction**  
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370 1 Police stress and burnout have been increasingly recognized as a major public health  
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372 2 issue in recent years. The level of stress induced by police work is higher than that found in  
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374 3 the general population (e.g., Korre, Farioli, Varvarigou, Sato, & Kales, 2014; Webster, 2014).  
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376 4 Examples of stressful events for police officers - called critical incidents - include  
377  
378 5 encountering the body of someone recently dead, a colleague killed or injured accidentally,  
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380 6 responding to children who have been sexually assaulted, and road traffic accidents (Chopko,  
381  
382 7 Palmieri, & Adams, 2015; Weiss et al., 2010). A critical incident is an unexpected and  
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384 8 powerful event causing emotional reactions that overwhelm effective coping skills. Critical  
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386 9 incidents are common and stressful for police officers, but they do not necessarily involve  
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388 10 extreme violence (e.g., shooting, assault). They also include extremely depressing incidents  
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390 11 (Carlier & Gersons, 1994), where the police officer arrives after the event and is not actively  
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392 12 involved (e.g., traumatic injury to a child, suicide).

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395 13 The unique nature of the stress experienced by police officers is linked to burnout and  
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397 14 negative attitudes toward people, life and work. Some police officers develop emotional or  
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399 15 behavioral symptoms, such as suicidal ideation, alcohol abuse, anxiety, or psychosomatic  
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401 16 symptoms (e.g., Chopko, Palmieri, & Adams, 2013; Hartley et al., 2012; Lawson, Rodwell, &  
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403 17 Noblet, 2012; Stanley, Hom, & Joiner, 2016). This is consistent with the findings of a  
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405 18 growing body of research that highly stressful life events may have long-term negative health  
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419 19 consequences (Cleland, Kearns, Tannahill, & Ellaway, 2016; Dohrenwend, 2006). Another  
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421 20 important finding (Chopko et al., 2015) is the strong relationship between cumulative critical  
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423 21 incidents and post-traumatic stress disorder (PTSD), including disturbance of awakening  
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425 22 cortisol activation (Violanti et al., 2017). A recent meta-analysis found that 4.5% of police  
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427 23 officers may suffer from PTSD (Berger et al., 2012) or post-traumatic stress symptoms  
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429 24 (PTSS), compared to about 1-2% of the general population (e.g., Lukaschek et al., 2013).  
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431 25 However, these figures should be treated with caution because they differ across studies.  
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433 26 Frequency (Breslau, Chilcoat, Kessler, & Davis, 1999; Vasterling et al., 2010) and severity of  
434  
435 27 exposure (Jakob, Lamp, Rauch, Smith, & Buchholz, 2017) to critical events seem to play a  
436  
437 28 role in the development of PTSD symptoms and other mental health reactions. However,  
438  
439 29 despite routine exposure to potentially traumatic incidents, the majority of police officers do  
440  
441 30 not develop signs of psychological distress or PTSD. Thus, greater knowledge of protective  
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443 31 (or resilience) factors is a major public health priority. Nevertheless, few studies have  
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445 32 investigated the factors that best protect police officers from developing these symptoms  
446  
447 33 (Ellrich & Baier, 2015; Lee et al., 2016; Yuan et al., 2011).  
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450 34 Research is therefore required to identify resilience factors or general resistance  
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452 35 resources (Antonovsky, 1987; Tusaie & Dyer, 2004). Resilience is defined as the capacity for  
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454 36 successful adaptation despite significant adversity. Hardiness appears to be one of the factors  
455  
456 37 that may contribute to this adaptation (Bartone, Kelly, & Matthews, 2013; Escolas, Pitts,  
457  
458 38 Safer, & Bartone, 2013; Maddi, 2005; Pitts, Safer, Russell, & Castro-Chapman, 2016), and it  
459  
460 39 has been identified as a resistance resource (Kobasa, 1979, 1982; Maddi, 2017). Hardiness is  
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462 40 considered as a healthy personality disposition and shows negative correlations with  
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464 41 neuroticism, and positive correlations with four other Big Five personality traits  
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42 (Conscientiousness, Extraversion, Openness, and Agreeableness; e.g., Bartone, Eid,  
43 Johnsen, Laberg, & Snook, 2009; Zhang, 2011). Hardiness is considered as a personality trait  
44 and hence remains relatively stable over time, even if it is susceptible to change under certain  
45 circumstances (Maddi, 2002).

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

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536 64           Moreover, studies have shown that hardiness is directly related to post-traumatic  
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538 65           adjustment. For example, recent studies with military populations (e.g., combat veterans or  
539 66           prisoners of war) found that PTSD and psychiatric symptomatology (e.g., depression) are  
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541 67           lower among people with high levels of hardiness (Bartone, 1999, 2000; Bartone et al., 2013;  
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543 68           Escolas et al., 2013; King, King, Fairbank, Keane, & Adams, 1998; Waysman, Schwarzwald,  
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545 69           & Solomon, 2001; Zakin, Solomon, & Neria, 2003). A study among police officers (Andrew  
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547 70           et al., 2008) measuring hardiness and post-traumatic symptoms found that Commitment was  
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549 71           associated with fewer PTSS in women and less psychological distress in men. Another study  
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551 72           found that non-hardy police officers had higher levels of absenteeism and illness (Tang &  
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553 73           Hammontree, 1992). These findings support the view that hardiness contributes to the mental  
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555 74           health of police officers. However, other studies have produced divergent results (Marchand,  
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557 75           Nadeau, Beaulieu-Prévost, Boyer, & Martin, 2015). A possible explanation is that most  
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559 76           empirical studies do not take into consideration the symptoms of PTSD (avoidance, intrusion  
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561 77           and hyperarousal). Another possibility is that many studies fail to consider the frequency and  
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563 78           severity of critical incidents. Therefore, the links between hardiness, critical incident history,  
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565 79           PTSD and its symptoms (avoidance, intrusion, hyperarousal, and general mental health) need  
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567 80           to be clarified.

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573 81           The purpose of the present study was to examine how hardiness can act as a buffer  
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575 82           against the cumulative stress of police officers. To this end, we conducted a series of analyses  
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577 83           to evaluate the relationships between hardiness, stressful life events (critical incidents), and  
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579 84           PTSD symptomatology (avoidance, intrusion, and hyperarousal) among police officers.

## 583           **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.

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654 107           *Critical incidents.* The Critical Incident History Questionnaire (CIHQ; Chopko et al.,  
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656 108 2015; Weiss et al., 2010) is a 39-item self-report questionnaire that provides a quantitative  
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658 109 estimate of cumulative exposure to critical incidents. Participants estimated the frequency  
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661 110 (the number of times they have experienced the incident) and severity (how difficult each  
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663 111 incident was to cope with) of 34 work-related critical incidents (e.g., encountering the  
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665 112 body of someone recently dead, being shot at, colleague killed intentionally; see Table 1  
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667 113 for percentages of police officers reporting each item, and their frequency of exposure to the  
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669 114 incident). The total score was the sum of frequency of exposure and a rating score of coping  
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671 115 difficulty for each item. The CIHQ demonstrates good internal consistency.  
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674 116           *PTSD.* The PTSD Checklist-Specific Version (PCL-S; Ventureyra, Yao, Cottraux,  
675  
676 117 Note, & De Mey-Guillard, 2002) is a brief and practical self-report assessment of the severity  
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678 118 of PTSD-related symptoms (DSM-IV criteria) in the past month. Participants rated the level  
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680 119 of distress experienced for 17 items on a 5-point scale (from 1 - not at all to 5 - extremely),  
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682 120 summed to produce a total score (Cronbach's alpha .95). Items can be divided into 3 sub-  
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684 121 scales: Reexperiencing (items 1–5), Avoidance (items 6–12) and Hyperarousal (items 13–17).  
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686 122 Scores range from 17 to 85, with higher scores indicating greater PTSS severity. The PCL-S  
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688 123 (specific) asks about symptoms in relation to an identified stressful experience, a specified  
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690 124 event.

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693 125           *Mental health.* The 28-item General Health Questionnaire (GHQ-28; Goldberg &  
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695 126 Williams, 1988) is a well-validated questionnaire of mental health, measuring emotional  
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697 127 distress and psychiatric morbidity. It is scored on a 4-point Likert scale, with higher scores  
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699 128 indicating a higher level of emotional distress. The GHQ-28 has 4 sub-scales: Somatic  
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701 129 symptoms, Anxiety-insomnia, Social dysfunction and Severe depression.  
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130            *Hardiness*. The 15-item Dispositional Resilience Scale (DRS-15; Bartone, 2007) is a  
131 self-report instrument measuring the three facets of hardiness: Commitment (a feeling of  
132 dedication to tasks and meaning-making, e.g., “Most of my life gets spent doing things that  
133 are meaningful”), Control (a sense of autonomy or influence over one’s life, e.g., “How things  
134 go in my life depends on my own actions”), and Challenge (a perception that obstacles are  
135 opportunities for growth, e.g., “I enjoy the challenge when I have to do more than one thing at  
136 a time”). Participants rate the 15 items on a 4-point Likert scale (0 - not at all true to 3 -  
137 completely true) and scores are summed to give an overall hardiness score.

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Please Insert Table 1 here  
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138            **2.3 Statistical methods**

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

148            **3. Results**

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772 **3.1 Relationships between Hardiness and psychiatric disorders**  
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775 150 All correlations between the total hardiness score and the subcomponents of hardiness  
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777 151 were positive ( $r > .66, p < .001$ ). Additionally, the sub-dimensions of Commitment and  
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779 152 Control, and Commitment and Challenge, were positively correlated (respectively,  $r = .46,$   
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781 153  $p < .001$ , and  $r = .27, p < .01$ ). Table 2 shows the relationships between hardiness scores, PTSD  
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783 154 (PCL-S scores) and psychiatric symptoms (GHQ scores) using Spearman Correlation  
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785 155 analysis. Hardiness had a significant negative correlation with psychological symptoms  
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787 156 (PTSD and GHQ) ( $-.26$  to  $.52, p < .01$ ). However, differences were observed in the hardiness  
788  
789 157 sub-facets; Commitment and Control had significant negative correlations with all variables  
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791 158 (respectively,  $r$   $-.27$  to  $-.42$  and  $r$   $-.24$  to  $-.50$ ), but Challenge showed no significant  
792  
793 159 correlations. There was a high correlation between Hardiness and Somatic symptoms ( $r = -$   
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795 160  $.52, p < .001$ ).

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804 **3.2 Multiple regression analysis**  
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806 162 A multiple regression analysis was conducted to determine which variables were  
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808 163 significant predictors of each of the outcome variables in order to explore whether Hardiness  
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810 164 has an impact on the formation of PTSD symptoms, and if so, which of its components has  
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812 165 the greatest influence. For this analysis, Hardiness scores were the independent variables,  
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814 166 psychiatric morbidity served as mediator, and PTSD symptoms as the dependent variable.  
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816 167 Significant predictors of PTSD symptoms in our sample are presented in Table 3. The result  
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818 168 of this analysis shows that Control and Commitment predicted lower PTSD symptoms. The  
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169 direct effect of Commitment on PTSD symptoms was of much smaller magnitude than  
170 Control. Moreover, the overall effects of hardiness on PTSD symptoms were significant (see  
171 Table 4).

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Please Insert Table 3 here

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### 172 3.3 Partial correlations

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

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Please Insert Table 4 here

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

## 184 4. Discussion

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890 185 This study examined the protective factor of hardiness, which is known to be closely  
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892 186 related to psychological resilience, particularly in certain high-risk occupations. Police  
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894 187 officers experience many potentially life-threatening events, which require adjustment or  
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896 188 coping (Chopko et al., 2015). It is therefore crucial to identify factors that enable them to cope  
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898 189 with stressful experiences. Hardiness is a dispositional factor associated with coping with  
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900 190 adversities (Maddi, 2017). Two previous studies highlighted hardiness as a potential  
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902 191 moderator or buffer against stress symptoms among police officers (Andrew et al., 2008;  
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904 192 Tang & Hammontree, 1992). However, the results produced substantially different results. In  
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906 193 response to this discrepancy, this study examined the relationships between the components  
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908 194 of hardiness and the three specific symptom clusters of PTSD: Reexperiencing – cognitive  
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910 195 dimension, Avoidance – behavioral dimension, and Hyperarousal – physiological dimension.  
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912 196 One hypothesis was that hardiness could have a particular relationship with specific cluster(s).  
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914 197 In the present study, we controlled for the role of critical incidents, age and length of service  
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916 198 in this potential relationship between stress symptoms and hardiness.  
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918 199 The results showed that the hardiness components of Commitment and Control have  
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920 200 significant negative correlations with PTSD symptoms and psychiatric morbidity. This is  
921  
922 201 consistent with previous findings that hardiness has a close relationship with psychological  
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924 202 well-being and the ability to cope with anxiety (Bartone et al., 2013; Escolas et al., 2013;  
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926 203 Maddi, 2005; Pitts et al., 2016), although our results showed no significant association with  
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928 204 Challenge. Each of the three PTSD clusters had a significant negative correlation with both  
929  
930 205 the Control and Commitment components of hardiness. High levels of Control and  
931  
932 206 Commitment were associated with fewer reported PTSD and/or psychiatric symptoms,  
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934 207 including somatic problems. These results are consistent with previous studies reporting a  
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208 relationship between Control and Commitment and physical health (e.g. Shepperd & Kashani,  
209 1991) and extend Andrew's (2008) results that showed similar findings only among women  
210 police officers. A high level of control has been related to an internal locus of control (e.g.,  
211 Kooranian, Khosravi, & Esmaeeli, 2008); in other words, police officers with this disposition  
212 could consider critical events to be under their own control and thus feel less stress. This  
213 appraisal of their ability to cope with the situation could prevent PTSD (secondary appraisal,  
214 Folkman, 2013). Control over life events (dispositional control) is an important predictor of  
215 well-being, but it is possible that relationships between Control and PTSD symptoms are also  
216 influenced by situational control over police work-related stressful events (i.e., response to  
217 meet the demands of specific life stressors).

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

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

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

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

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

261 **5. Limitations**

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

274 **6. Conclusion**

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1126 275 The results of our study reveal the importance of the personality trait of hardiness in  
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1129 276 preserving psychological well-being in stressful occupations. Consistent with previous studies  
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1131 277 of military subjects, we found significant negative correlations between hardiness and mental  
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1133 278 disorder scores, either anxiety disorder symptoms or other internalization symptoms among  
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1135 279 police officers. Psychological hardiness as a direct or “buffering effect” on life stress could be  
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1137 280 an internal resistance resource protecting against the adverse effects of stress and associated  
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1139 281 mental disorders. Furthermore, the present study provides additional evidence that hardiness,  
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1141 282 particularly its Control facet, could protect police officers from PTSD symptoms. Hardiness,  
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1143 283 and particularly the subdimension of control, was significantly and negatively associated with  
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1145 284 the symptoms of reexperiencing and avoidance/numbing. The trait of psychological hardiness  
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1147 285 thus seems to act as a protective factor in relation to PTSD symptoms and might also act as a  
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1149 286 buffer against other negative mental health effects of stress. This finding could prompt  
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1151 287 researchers to investigate the differential impact of the separate facets of hardiness on the  
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1153 288 three PTSD clusters (reexperiencing, avoidance, hyperarousal) as well as the new  
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1155 289 dissociative-PTSD subtype (DSM-5). In particular, peri-traumatic dissociation and  
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1157 290 derealization symptoms in PTSD should receive specific attention in future studies (Dorahy &  
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1159 291 van der Hart, 2015; Nijenhuis, 2017). The apparent benefit of hardiness could be of practical  
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1161 292 interest to clinicians and occupational psychologists as a selection criterion for training police  
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1163 293 officers. If further studies confirm the importance of the hardiness personality construct in the  
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1165 294 long-term adaptation to stressful events in police work (as for former prisoners of wars;  
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1167 295 Zerach, Karstoft, & Solomon, 2017), early identification and screening of ‘dispositional  
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1169 296 resilience’ (Bartone, 2007) among police officers, with particular support for individuals who  
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1171 297 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)			n 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	$\beta$	$t$	$p$ -value	Effect size	$\beta$	$t$	$p$ -value	Effect size	$\beta$	$t$	$p$ -value
<b>Control</b>	.16	-.29	-2.80	***	.12	-.25	-2.36	***	.07	-.20	-1.82	*
<b>Commitment</b>	.05	-.26	-2.47	*	.05	-.24	-2.19	*	.03	-.20	-1.72	*
<b>Total effect</b>	$R^2 = .21; F(2,90) = 12.38, p < .001$				$R^2 = .17; F(2,90) = 6.11, p < .001$				$R^2 = .10; F(2,90) = 5.06, p < .01$			

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

**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.