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Resilience Among Police Officers: a Critical Systematic Review of Used Concepts, Measures, and Predictive Values of Resilience

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Abstract
Resilience, hardiness, and psychological capital are considered to be important capacities for police officers to cope with and adapt to challenging stressful and potentially traumatic situations. Despite their growing popularity, a systematic review assessing used concepts and instruments for these capacities and synthesizing the results of studies on the predictive values of resilience, hardiness, and psychological capital among police officers is absent. The aim of the present study is to fill this gap of scientific knowledge, and for this purpose, a systematic literature search was conducted using PsycInfo, Pubmed, and Web of Science. We identified 17 cross-sectional and 5 longitudinal studies. Results showed that resilience, hardiness, and psychological capital were studied mostly in relation to physical and mental health variables. No study focused on officers' professional functioning. In both cross-sectional and longitudinal studies, associations with health variables were very weak to moderate, while cross-sectional studies mostly yielded stronger associations than longitudinal associations. In sum, we found no empirical support for the growing popularity.

Keywords PTSD · Resilience · Hardiness · Psychological capital · Police officers

Introduction

In the past decades resilience, hardiness, and psychological capital have gained growing attention and popularity (Aburn et al. 2016; Britt et al. 2016; Fletcher and Sarkar 2013; Garcia-Dia et al. 2013; Herrman et al. 2011; Windle 2011). They are considered to be important capacities for high-risk professions and especially police officers to cope with and adapt to challenging situations caused by operational or potentially traumatic stressors (McCanlies et al. 2014), organizational stressors (van der Velden et al. 2010), and work-private life conflicts (Paton et al. 2008). These stressors may put police officers at risk for mental health problems such as anxiety and depression, sleep problems, PTSD, sickness leave, suicidal thoughts and suicide, and substance abuse (Berger et al. 2012; Lindsay 2008; Stanley et al. 2016; Slaven et al. 2011; Taloyan et al. 2016) that may negatively impact their functioning as officers, such as reduced performance and productivity (Fox et al. 2012; Levy-Gigi et al. 2016).

Importantly, the three concepts resilience, hardiness, and psychological do share several characteristics. Central themes that occur in various definitions of resilience are coping with adversity and trauma (Fletcher and Sarkar 2013; Johnston et al. 2015; Pangallo et al. 2015), positive adaptation (Aburn et al. 2016; Fletcher and Sarkar 2013; Johnston et al. 2015; Pangallo et al. 2015), and resilience being a dynamic process (Aburn et al. 2016; Johnston et al. 2015): resilience is defined as both a predictor and process variable (Cf. Britt et al. 2016; Hu et al. 2015; Olsson et al. 2003; Windle 2011). Others consider resilience as an outcome, such as the absence of PTSD symptoms (e.g., Bowler et al. 2012). More in general, it is viewed as the capacity to "bounce back" after adversity, but also to develop their capacity to deal with future events (Paton et al. 2008).

Like resilience, hardiness is considered to influence an individuals' interaction with others and coping with problems (Atella 1999) as described by the three facets of hardiness, e.g., commitment (approaching situations as meaningful and

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interesting), control (seeing stressors as changeable), and challenge (seeing change as an opportunity for growth and as a normal aspect of life rather than as threat; Kobasa 1979; Maddi and Kobasa 1984). Like resilience, hardiness is seen as a psychological skill for police officers that gives positive outcomes after experiencing stress and trauma (Andrew et al. 2008; Andrew et al. 2013; James et al. 2006).

Psychological capital (Luthans and Youssef-Morgan 2017; Luthans et al. 2007) consists of four facets: self-efficacy, optimism, hope, and finally resilience (i.e., when beset by problems and adversity, sustaining and bouncing back and even beyond to attain success; Luthans et al. 2007). The meta-analysis of Avey et al. (2011) showed that psychological capital predicted job satisfaction, organizational commitment, and psychological well-being (Cf. Farr-Wharton et al. 2016; Farr-Wharton et al. 2016; Ojedokun and Balogun 2015; Siu et al. 2015).

Despite the growing attention and popularity, to date, no systematic review has been conducted to assess and compare used concepts of resilience, hardiness, and psychological capital, used measures of and to synthesize the results of empirical studies among police officers.

Aim of the Present Study

The aim of the present systematic review is to fill this gap of scientific knowledge. In sum, the two main research questions of the present study are the following:

1. What concepts and measures of resilience are used in studies among police officers that focus the relationships between resilience, hardiness, and psychological capital on the one hand and officers' functioning or problems in functioning on the other?
2. To what extent does resilience predict officers' functioning or problems in functioning?

Method

A broad literature search was conducted using the electronic databases of PsycInfo, Pubmed, and Web of Science, with the following keywords and algorithm: for resilience (resilien* or hardiness or psychological capital) and for police officers (police or officer* or law enfor*). The asterisk (*) broadens a keyword by finding words that start with the same letters. We focused on journal articles in peer-reviewed academic journals published in English. Dissertations and "gray literature" were excluded. In advance, no exclusion keywords and algorithms were used to be able to identify as many relevant papers as possible. The search was not restricted to a particular publication date in the past. The search and coding of identified studies was conducted by the first author in collaboration with the second author. This systematic review was conducted and reported according to the PRISMA guideline (Cf. Moher et al. 2009), except that it was not registered in advance.

Results

Identified and Selected Studies

The primary search resulted in 828 hits (PsycInfo = 302, Pubmed = 242, Web of Science = 284). Next, relevant articles were selected according to their titles and abstracts. After this selection, 162 articles remained (PsycInfo = 68, Pubmed = 52, Web of Science = 42). A further selection was made based on the content of the full text. This gave a total of 51 potentially relevant articles published until February 2017. Of 51 studies, we finally only selected empirical cross-sectional and longitudinal studies, and selected studies that treated resilience (or described related terms) as a predictor in these analyses, resulting a final set of 22 articles. At this stage, we excluded literature reviews (e.g., Honig and Sultan 2006; Shochet et al. 2011), studies evaluating interventions aimed at enhancing resilience (e.g., Andersen et al. 2016; Ramey et al. 2016), and studies assuming that not having PTSD symptoms is being resilient (e.g., Bowler et al. 2012; Galatzer-Levy et al. 2011) because these studies do not focus on investigating the relationships between resilience and officers' functioning or problems in functioning (see Fig. 1).

General Study Characteristics

Table 1 provides a description of each study included in this review, e.g., authors; year of publication; sampling and design including response, demographics of respondents, the independent, and dependent measures; and the main results and conclusions. The main results and conclusions discuss the significant bivariate and multivariate associations.

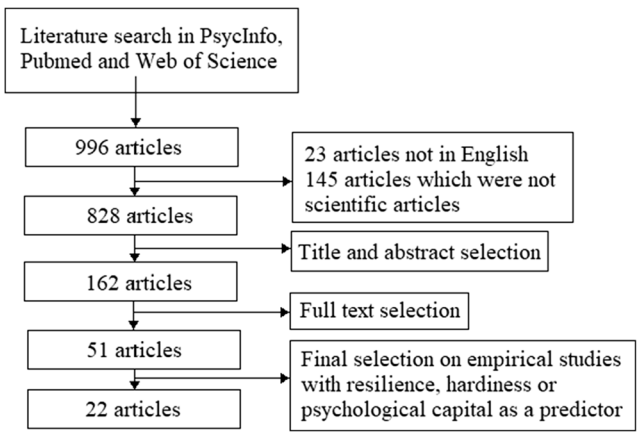

Fig. 1 Systematic literature search and selection process

Table 1 Overview of main characteristics, results, and conclusions of included studies

Author (year, country)	Design (*N*), age, gender, rank, years of service (YOS); M (SD)/%	Measures		Analysis	Main results	Main conclusions
		Predictors	Outcomes			
Andrew et al. (2008, US)	*Design*. Cross-sectional (*N* = 105). *Age*. < 40 y = 55.2%, 40–49 y = 35.2%, > 50 y = 9.5%. *Gender*. Men = 62.0%, W = 38.0%. *Rank*. PO = 64.8%, det = 17.1%, ser/lie = 13.3%, cap = 2.9%, other = 1.9%. *YOS*. 1–5 y = 21.0%, 6–10 y = 15.2%, 11–15 y = 27.6%, > 15 y = 36.2%.	*Resilience*. Hardiness (SHS). *Other*. Age, education, gender, marital status, years of service, rank.	Depressive symptoms (CES-D, BSI), PTSD symptoms (IES), psychological symptoms and distress (BSI).	ANC CHI FIS MRA	*Multivariate*. Control (men: $\beta = -0.36$, women: $\beta = -0.37$) and commitment (men: ns, women: $\beta = -0.69$) were associated with depressive symptoms, controlled for age, education, and marital status. Commitment was associated with PTSD symptoms for women ($\beta = -0.47$) and with psychological symptoms for men ($\beta = -0.26$), controlled for age, education, and marital status.	The hardiness dimension control and commitment were negatively associated with depressive symptoms. Commitment was negatively associated with psychological and PTSD symptoms. These cross-sectional associations were weak to strong and different for men and women.
Andrew et al. (2013, US)	*Design*. Cross-sectional (*N* = 412). *Age*. < 40 y = 39.4%, 40–49 y = 43.8%, > 50 y = 16.8%. *Gender*. Men = 74.5%, W = 25.5%. *Rank*. PO = 66.2%, ser/lie = 12.7%, cap/det = 11.7%, other = 9.4%. *YOS*. 1–5y = 8.1%, 6-10 y = 24.6%, 11–15 y = 16.8%, > 15 y = 50.5%.	*Resilience*. Hardiness (DRS). *Other*. Gender, age, education, marital status, years of service, rank, dispositional coping (BCOPE), personality (NEO-FFI), hostility (CMHS).	Depressive symptoms (CES-D), PTSD symptoms (IES-R), anxiety symptoms (BAI).	ANC MRA	*Multivariate*. Challenge was associated with depressive symptoms ($\beta = -0.16$), PTSD symptoms ($\beta = -0.14$), and anxiety symptoms ($\beta = -0.17$) for men, controlled for age, education, and marital status. Control and commitment were associated with depressive symptoms (men: $\beta = -0.33$ and $\beta = -0.42$, women: $\beta = -0.32$ and $\beta = -0.57$), PTSD symptoms (men: $\beta = -0.12$ and $\beta = -0.22$, women: $\beta = -0.30$ and $\beta = -0.44$), and anxiety symptoms (men: $\beta = -0.33$ and $\beta = -0.34$, women: ns and $\beta = -0.36$), controlled for age, education, and marital status.	The hardiness dimensions were negatively associated with depressive symptoms, PTSD symptoms and anxiety symptoms, controlled for demographics. These cross-sectional associations were very weak to moderate and different for men and women.
de Terte et al. (2014, NZ)	*Design*. Cross-sectional (*N* = 176). *Age*. M = 39.2 (5.5). *Gender*. Men = 73.0%, W = 27.0%. *Rank*. nr. *YOS*. nr.	*Resilience*. Optimism (LOT-R), adaptive coping (BRCS), emotional competence (MSCEIT: UE, ME), adaptive health practices (HPI), social support (SS). *Other*. Traumatic event exposure (TSS), age, gender, ethnicity, work status.	Posttraumatic stress (IES-R), psychological distress (HSCL-21), physical health (Idler and Benyamini 1997).	COR MRA	*Multivariate*. Controlled for traumatic event exposure (ns), only the resilience facets adaptive health practices ($\beta = -0.25$), social support from colleagues ($\beta = -0.26$), and emotional competence (UE: $\beta = -0.20$ and ME: $\beta = 0.19$) accounted for 23% of the variance of posttraumatic stress ($F(10, 133) = 4.69$). The resilience facets optimism ($\beta = -0.41$) and social support from colleagues ($\beta = -0.23$) accounted for 29% of the variance of psychological distress ($F(10, 133) = 6.81$), controlled for traumatic event exposure (ns). The resilience facets adaptive health practices ($\beta = 0.42$) and adaptive coping ($\beta = 0.23$) accounted for 24% of the variance of physical health ($F(10, 131) = 5.55$), controlled for traumatic event exposure (ns).	Resilience facets were cross-sectional moderate associated with posttraumatic stress, psychological distress, and better physical health.
Farr-Wharton et al. (2016, US and MT)	*Design*. Cross-sectional (*N* = 842; US = 69.4%, MT = 30.6%) *Age*. nr. *Gender*. Men = 72.9%, W = 27.1%. *Rank*. Lowest rank = 90.9%, second rank or higher = 9.1%. *YOS*. nr.	*Resilience*. Psychological capital (PCQ). *Other*. Leader-member exchange relationship (LMX-7), age, gender.	Stressors (McCreary and Thompson 2006), psychological well-being (Brunetto et al. 2011).	COR SEM	*Bivariate*. Psychological capital was associated with country (Malta/USA; $r = 0.23$), leader-member exchange relationship ($r = 0.34$), stress ($r = -0.23$) and well-being ($r = 0.54$). Psychological capital was associated with psychological well-being ($\beta = 0.59$) and stress ($\beta = -0.21$). The structural model showed an acceptable model fit (2/df = 2.859, CFI = 0.928, TLI = 0.921, RMSEA = 0.47, GFI = 0.897).	There was cross-sectional a weak negative association between psychological capital and stress and a moderate positive association between psychological capital and psychological well-being.
Fyhn et al. (2015, NO)	*Design*. Cross-sectional (*N* = 156). *Age*. M = 41.4 (7.8).		Burnout (MBI), subjective health complaints (SHC),	COR MRA	*Bivariate*. Hardiness was associated with work engagement ($r = 0.55$), social support	There was a very weak negative cross-sectional association

Table 1 (continued)

Author (year, country)	Design (*N*), age, gender, rank, years of service (YOS); M (SD)/%	Measures		Analysis	Main results	Main conclusions
		Predictors	Outcomes			
	Gender. Men = 59.0%, W = 41.0%. *Rank*. PI = 100.0%. *YOS*. nr.	*Resilience*. Psychological hardiness (DRS-15-R). *Other*. Social support (marital status and job support; JCQ), work engagement (UWES), meaningfulness, job specialty, age, gender, years experience in the police, years experience in current position.	self-reported sickness absence.	TTE	(*r* = 0.53), meaningfulness (*r* = 0.44), and burnout (*r* = − 0.53). *Multivariate*. Besides social support (marital status (β = 0.168) and job support (β = − 0.561)), meaningfulness (β = − 0.083) and work engagement (β = − 0.498), hardiness-commitment (β = − 0.282) accounted for 3.6% of the variance of burnout (*F* change (1, 123) = 9.72), controlled for age, experience in the police, experience in current position and gender. The total model accounted for 54.4% of the variance of burnout.	between hardiness commitment and burnout.
Greene and Nowack (Greene and Nowack 1995, US)	*Design*. T1 = begin of function, T2 = 3 y (*N* = 229). *Age*. M = 25.3 (3.5). *Gender*. Men = 69.0%, W = 31.0%. *Rank*. nr. *YOS*. nr.	*Resilience*.$^{T1,\ T2}$ Hardiness (CHS, RHS). *Other*.$^{T1,\ T2}$ Hassles (HSc), age, ethnicity.	Absenteeism (cumulative sick time over 3 y)^{T2}, hospitalization (self-report over 3 y)^{T2}, psychological well-being (12-item scale)^{T2}.	COR MRA	Bivariate. Hardiness was associated with hassles (RHS: *r* = 0.29, CHS: *r* = − 0.34) and psychological well-being (RHS: *r* = − 0.24, CHS: *r* = 0.42). *Multivariate*. A regression analysis showed that hardiness measured with CHS (β = − 0.174), but not with RHS, was a predictor of hospitalization, controlled for psychological well-being, age, and ethnicity (*F* = 7.07, R^2 = 0.03). Hardiness was not a predictor for absenteeism.	Hardiness was a very weak predictor of self-reported hospitalization, controlled for psychological well-being and demographics.
Gupta et al. (2012, IN)	*Design*. Cross-sectional (*N* = 70). *Age*. M = 38.1. *Gender*. nr. *Rank*. PO = 63.0%, inspector = 27.0%. *YOS*. nr.	*Resilience*. Resilience (RS).	Burnout (OBI), personality (BFFI).	COR TTE	*Bivariate*. Resilience was associated with the personality factors conscientiousness (*r* = 0.316) and agreeableness (*r* = 0.439). Resilience was associated with burnout (*r* = − 0.413) and both of the dimensions of burnout (exhaustion: *r* = − 0.431, disengagement: *r* = − 0.315).	Resilience was weakly to moderate cross-sectional associated with personality factors conscientiousness and agreeableness and both of the dimensions of burnout (exhaustion and disengagement).
Hills and Norvell (Hills and Norvell 1991, US)	Design. Cross-sectional (*N* = 234). *Age*. M = 33.6 (8.2). *Gender*. Men = 100.0%. *Rank*. Highway patrol trooper = 100.0% *YOS*. M = 8.0 (6.7).	*Resilience*. Hardiness (HS) *Other*. Stressors (PSS, PSI), hassles (HSc), neuroticism (EPI).	Burnout (MBI), physical symptoms (CHIPS), job satisfaction (JDI).	MRA	*Multivariate*. Hardiness (β = 0.168) was very weak positively associated with physical symptoms (adjusted R^2 = 0.025) and weak negatively associated with job satisfaction (β = − 0.336; adjusted R^2 = 0.134). Hardiness was not associated with burnout.	Hardiness was very weak positively associated with physical symptoms and weak negatively associated with job satisfaction.
James et al. (2006, US)	Design. Cross-sectional (*N* = 52). *Age*. M = 27 (5.6) *Gender*. Men = 81.0%, W = 19.0%. *Rank*. nr. *YOS*. nr.	*Resilience*. Hardiness (PVS III-R). *Other*. Stress symptoms (MAACL-R), gender, relationship status, years of education, income level, age, number of children, ethnicity, certification status as a peace officer.	Anger (STAXI-2)	COR MRA TTE	*Bivariate*. Hardiness was weak negatively associated with anger (*r* = − 0.387). *Multivariate*. Hardiness was associated with anger (β = − 0.376) but hardiness did not significantly moderate the relationship between dysphoria and anger (dysphoria × hardiness: β = 0.06).	Hardiness was weakly associated with anger expression, but did not moderate the relationship between dysphoria and anger.
Johnsen et al. (2017, NO)	*Design*. Cross-sectional (*N* = 163).	*Resilience*. Hardiness (DRS-15-R).	Performance satisfaction, perceived strain.	COR OLS	*Bivariate*. Hardiness was positively very weak associated with self-efficacy (*r* = 0.18) and	Hardiness was positively (very) weak associated with self-efficacy and

Table 1 (continued)

Author (year, country)	Design (*N*), age, gender, rank, years of service (YOS); M (SD)/%	Measures		Analysis	Main results	Main conclusions
		Predictors	Outcomes			
	Age. < 25 y = 4.9%, 25–29 y = 23.5%, 30–39 y = 41.5%, 40–57 y = 30.1%. *Gender.* Men = 90.1%, W = 20.9%. *Rank.* nr. *YOS.* < 1 y = 4.9%, 2–5 y = 22.8%, 6–10 y = 42.6%, 11–20 y = 29.6%.	*Other.* Self-efficacy (MSA), motivation for operational duties.			weak associated with motivation ($r = 0.25$). There was an interaction effect between self-efficacy and hardiness ($\beta = 0.01$) for performance satisfaction. There was no interaction effect between self-efficacy and hardiness for perceived strain.	motivation. There was an interaction effect between self-efficacy and hardiness for performance satisfaction, but not for perceived strain.
Lee et al. (2016, CN)	*Design.* Cross-sectional (*N* = 112). *Age.* M = 54.4 (3.3). *Gender.* nr. *Rank.* City patroller = 58%, rural patroller = 41.9%. *YOS.* 10–20 y = 23.2%, > 20 y = 35.7%.	*Resilience.* Self-resilience (CD-RISC-K). *Other.* Critical incident exposure, occupational stress (KOSS-SF), depressive symptoms (K-CES-D), age, education, marital status, smoking state, alcohol use, service area, years of service.	Current PTSD symptoms (IES-R-K).	CHI LOR TTE	*Multivariate.* Participants with low self-resilience had higher prevalence of PTSD symptoms, controlled for age, level of education, marital status, smoking, drinking, service area, duration of patrol service, job stress and depression (OR = 3.51, 95% CI = 1.06–19.23).	Lower self-resilience was cross-sectionally associated with a higher prevalence rate of PTSD symptoms, controlled for demographic variables.
Lu et al. (2015, CN)	*Design.* Cross-sectional (*N* = 2226). *Age.* < 34 y = 34.5%, 35–44 y = 42.1%, > 45 y = 23.4%. *Gender.* Men = 84.5%, W = 15.5%. *Rank.* nr. *YOS.* < 10 y = 33.1%, 11–20 y = 39.0%, > 21 y = 27.9%.	*Resilience.* Psychological capital (PCQ-24). *Other.* Job stress (ERI), organizational identification (Mael and Ashforth 1992), age, gender, marital status, education, years of service.	Job satisfaction (MSQ).	ANO COR SEM TTE	*Bivariate.* Psychological capital is very weak negatively associated with age ($r = -0.068$) and effort/reward ($r = -0.096$), and very weak positively associated with overcommitment ($r = 0.103$). Psychological capital is moderate positively associated with organizational identification ($r = 0.555$), intrinsic ($r = 0.545$), extrinsic ($r = 0.449$) ,and overall ($r = 0.514$) job satisfaction. *Multivariate.* Job stress is negatively associated with job satisfaction through psychological capital ($\beta = -0.181$). Organizational identification showed a positive association with job satisfaction through psychological capital ($\beta = 0.196$). Job stress, organizational identification, and psychological capital accounted for 33% of the variance in job satisfaction. The structural model showed an acceptable model fit (CFI = 0.95, NFI = 0.95, RMSEA = 0.08, GFI = 0.93).	Job stress and organizational identification were very weakly associated with job satisfaction through psychological capital.
Marchand et al. (2015, CA)	*Design.* T1 = 5–15 d after traumatic event, T2 = 1 m, T3 = 3 m, T4 = 1 y (*N* = 76). *Age.* M = 32.6 (7.7). *Gender.* Men = 76.0%, W = 24.0%. *Rank.* nr. *YOS.* M = 8.6 (7.3).	*Resilience.*^{T1} Hardiness (SHS). *Other.*^{T1} Age, gender, education, marital status, number of children, ethnicity, job position, years of service, day/night shifts, weekly hours worked, trauma history (LEC), mental	PTSD (SCID-I)$^{T2, T3, T4}$, intensity of PTSD symptoms (MPSS-SR)$^{T2, T3, T4}$.	COR MRA	*Bivariate.* Hardiness was not associated with PTSD diagnose and the intensity of PTSD symptoms.	Hardiness did not predict PTSD symptoms.

Table 1 (continued)

Author (year, country)	Design (*N*), age, gender, rank, years of service (YOS); M (SD)/%	Measures		Analysis	Main results	Main conclusions
		Predictors	Outcomes			
		health (SCID-I), coping (CISS), self-efficacy (SES), trauma severity (TSQ), dissociative experiences (PDEQ), emotional and physical reactions (ISR-E/-P), job-related consequences, perceived social support (PSI), ASD symptoms (SCID-I), depressive symptoms (BDI-II).				
McCanlies et al. (2014, US)	*Design*. Cross-sectional (*N* = 114). *Age*. M = 43.0 (8.8). *Gender*. Men = 73.7%, W = 26.3%. *Rank*. nr. *YOS*. < 9 y = 25.6%, 10–14 y = 18.6%, 15–19 y = 17.4%, > 20 y = 38.4%.	*Resilience*. Resilience (CD-RISC10). *Other*. Age, gender, ethnicity, education, marital status, years of service, alcohol use, posttraumatic growth (PTGI), assessment of hurricane Katrina, life satisfaction (SLS), gratitude (GQ-6).	PTSD symptoms (PCL-C).	ANC ANO COR	*Bivariate*. Resilience was associated with PTSD symptoms ($\beta = -0.84$). *Multivariate*. Controlled for age, gender, ethnicity, education, and alcohol use, PTSD symptoms were associated with resilience ($\beta = -0.65$).	Resilience was strongly cross-sectional associated with PTSD symptoms.
Ojedokun and Balogun (Ojedokun and Balogun 2015, NG)	*Design*. Cross-sectional (*N* = 340). *Age*. M = 38.9 (7.1). *Gender*. Men = 81.2%, W = 18.8%. *Rank*. nr. *YOS*. M = 4.7 (5.1).	*Resilience*. Psychological capital (PCQ). *Other*. Age, gender, marital status, education, years of work experience, years of service, rank, workplace social capital (SCS).	Mental health (GHQ-28).	COR SEM	*Bivariate*. The model produced an acceptable fit ($\chi^2(18) = 849.023$, GFI = 0.968, AGFI = 0.771, RMSEA = 0.369). Resilience was associated with somatization ($\beta = -0.19$) and anxiety ($\beta = -0.21$). Optimism was associated with somatization ($\beta = -0.32$), anxiety ($\beta = -0.31$), depression ($\beta = -0.45$) and social dysfunction ($\beta = 0.15$). Self-efficacy was associated with somatization ($\beta = -0.31$). Hope was associated with social dysfunction ($\beta = 0.21$).	The facets of psychological capital were cross-sectional very weakly to moderate associated with somatization, anxiety, depression, and social dysfunction.
Prati and Pietrantoni (Prati and Pietrantoni 2010, IT)	*Design*. Cross-sectional (*N* = 509). *Age*. M = 38.8 (7.8). *Gender*. Men = 50.2%, W = 49.8%. *Rank*. nr. *YOS*. M = 10.4 (8.1).	*Resilience*. Self-esteem, social support. *Other*. Critical incident exposure, perceived threat, peritraumatic distress (PDI).	PTSD symptoms, age, gender, years of service, smoking, alcohol use, use of sleeping pills.	LOR MRA TTE	Through cluster analysis the clusters "non-resilient officers" and "resilient officers" were formed by identifying different patterns of risk and protective factors (kappa = 0.96). *Bivariate*. 7% of the variance in PTSD symptoms was explained by being resilient/non-resilient ($F(1, 496) = 36.18$). Being resilient/non-resilient was not associated with everyday alcohol intake and smoking habits. Being resilient/non-resilient was associated with the use of sleeping pills ($\beta = 0.79$) and a shorter length of service ($\beta = -0.03$).	Being a resilient officer is cross-sectionally (very) weak to strongly associated with less PTSD symptoms, less sleeping pills use, and a shorter length of service.
Siu et al. (2015, CN)	*Design*. Cross-sectional (*N* = 311).			COR		

Table 1 (continued)

Author (year, country)	Design (*N*), age, gender, rank, years of service (YOS); M (SD)/%	Measures		Analysis	Main results	Main conclusions
		Predictors	Outcomes			
	Age. 20–24 y = 37.6%, 25–29 y = 42.8%, 30–39 y = 9.3%, > 40 y = 10.3%. *Gender*. Men = 80.4%, W = 19.3%. *Rank*. nr. *YOS*. M = 4.7 (7.1).	*Resilience*. Psychological capital (PCQ). *Other*. Age, gender, education, positive emotions (Siu et al. 2006).	Job satisfaction (MOAQ), stress symptoms (ASSET), turnover intention (Brough and Frame 2004).	SEM	*Bivariate*. Psychological capital was associated with positive emotions ($\beta = 0.57$), job satisfaction ($\beta = 0.61$), and stress symptoms ($\beta = -0.26$). *Multivariate*. Psychological capital had an indirect effect on turnover intention through job satisfaction (bootstrap estimate = −0.23, SE = 0.07, lower CI = −0.37, higher CI = −0.10) and stress symptoms (bootstrap estimate = −0.09, SE = 0.04, lower CI = −0.20, higher CI = −0.03).	In a cross-sectional design, psychological capital was indirect associated with turnover intention through job satisfaction and stress symptoms.
Tang and Hammontree (Tang and Hammontree 1992, US)	*Design*. T1 = baseline, T2 = 6 m (*N* = 60). *Age*. M = 32.4. *Gender*. Men = 97.0%, W = 3.0%. *Rank*. nr. *YOS*. nr.	*Resilience*. Hardiness (AT, CLGES, EILCS). *Other*. Life stressors (SRE), police stressors (PS-S).	Illness (SIRS), absenteeism.	COR MRA	*Bivariate*. Hardiness was moderate positively associated with illness measured at T1 ($r = 0.48$) and weak positively associated with illness ($r = 0.33$) and life stressors ($r = 0.25$) measured at T2. *Multivariate*. There was an interaction effect between hardiness and police stress on absenteeism (R^2 change = 0.085, F change (4, 55) = 6.41).	There was a weak interaction effect between hardiness and police stress on absenteeism.
Velichkovsky (2009, RU)	Design. Cross-sectional (*N* = 542). *Age*. M = 31.3 (6.6). *Gender*. Men = 81.5%, W = 18.5%. *Rank*. nr. *YOS*. M = 11.3 (6.7).	*Resilience*. Anxiety (STAXI), anger (STAI), depression (STDI), level of functional resources (CFS, SC-S).	Somatic outcomes (chronic illness, acute illness), behavioral outcomes (alcohol use, smoking), type A personality (type A scale), burnout (RBI), stress (BMSII), professional and life stressors.	CHI COR LOR	*Bivariate*. Resilience was negatively associated with serious illness during the last half year ($\beta = -2.74$; Nagelkerkes-$R^2 = 0.503$), visiting a doctor during the last half a year ($\beta = -1.68$; Nagelkerkes-$R^2 = 0.285$) and having at least one chronic illness ($\beta = -2.41$); Nagelkerkes $R^2 = 0.443$. Resilience was associated with smoking (rho = −0.11), drinking (rho = −0.34), type A personality ($r = -0.34$), burnout (emotional exhaustion: $r = -0.81$, depersonalization: $r = -0.45$, reduction of achievements: $r = -0.55$) and stress ($r = -0.63$).	There were very weak to strong cross-sectional associations between resilience and somatic, behavioral and psychological stress outcomes.
Violanti et al. (2014, US)	*Design*. Cross-sectional (*N* = 337). *Age*. M = 41.0 (6.4). *Gender*. Men = 72.0%, W = 28.0%. *Rank*. PO = 74.7%, ser/lie = 12.2%, cap/det = 13.1%. *YOS*. M = 14.3 (6.6).	*Resilience*. Hardiness (DRS-15). *Other*. Stressors (SPSS).	Absenteeism.	MRA COR TTE	*Multivariate*. There was an interaction between hardiness commitment and the total score of stressors for 1-day work absence, controlled for age, ethnicity, smoking, rank, alcohol use, and sleep hours (RR = 1.16 (0.94–1.42)).	There was an interaction effect between hardiness commitment and the total score of stressors for 1-day work absence.
Walumbwa et al. (2010, US)	*Design*. T1 = baseline, T2 = 6 w, T3 = 8 w (*N* = 343). *Leaders*: *Age*. M = 44.0. *Gender*. Men = 90.0%, W = 10.0%. *Rank*. nr. *YOS*. M = 10.2. *Followers*: *Age*. M = 31.3 (9.2). *Gender*. Men = 81.0%, W = 19.0%. *Rank*. nr. *YOS*. M = 6.0.	*Resilience*. Psychological capital (PCQ)[T1]. *Other*. Service climate (Schneider, White and Paul 1998)[T2].	Leader-rated job performance (Walumbwa, Avilio and Zhu 2008)[T3].	COR HLM OLS	*Bivariate*. Leader psychological capital was associated with follower psychological capital ($\hat{y} = 0.52$) and the performance of followers ($\hat{y} = 0.29$). Follower psychological capital was associated with their supervisory-rated performance ($\hat{y} = 0.31$). *Multivariate*. Leader psychological capital ($\hat{y} = 0.14$), follower psychological capital ($\hat{y} = 0.28$), service climate ($\hat{y} = 0.37$) and the interaction between follower psychological capital and service climate ($\hat{y} = 0.33$) accounted	There was a moderate association between leader psychological capital, follower psychological capital, service climate, and supervisory-rated performance.

Table 1 (continued)

Author (year, country)	Design (*N*), age, gender, rank, years of service (YOS); M (SD)/%	Measures		Analysis	Main results	Main conclusions
		Predictors	Outcomes			
					for 35% of the variance in supervisory-rated performance.	
Yuan et al. (2011, US)	*Design.* T1 = baseline, T2 = 2 y (*N* = 233). *Age.* M = 27.2 (4.6). *Gender.* Men = 85.4%, W = 14.6%. *Rank.* nr. *YOS.* nr.	*Resilience.*^{T1} Personality (NEO-FFI), world assumptions (WAS), social support (SOS), social functioning (SAS-SR). *Other.* Age, gender, ethnic status, education, marital status, axis I disorders (SCID)^{T1}, previous trauma (LSC-R)^{T1}, critical incident exposure (CIHQ)^{T2}.	Current PTSD symptoms (CMS)^{T2}.	COR MRA	*Bivariate.* Neuroticism ($r = 0.24$), self-worth ($r = -0.15$), belief in the benevolence of the world ($r = -0.22$), social support ($r = -0.13$) and social adjustment ($r = 0.23$) were very weak to weakly associated with PTSD symptoms. *Multivariate.* Belief in the benevolence of the world ($\beta = -0.15$) accounted for an additional 4% of the variance and social adjustment ($\beta = 0.18$) for an additional 3% of the variance of current PTSD symptoms, controlled for ethnicity and traumatic event exposure.	The resilience factors world assumptions and social adjustment prior to police service were very weak to weakly related to the development of PTSD symptoms.

All associations and effects mentioned in this table were significant ($p < 0.05$). *US* United States of America; *NZ* New Zealand; *MT* Malta; *NO* Norwegian; *CA* Canada; *NG* Nigeria; *CN* China; *RU* Russia; *IT* Italy; *m* month; *y* year; *w* week; *d* day; *W* women; *PO* police officer; *PI* police investigator; *nr* not reported; *SD* standard deviation; *T* time; *N* sample size; *det* detective; *ser* sergeant; *lie* lieutenant; *cap* captain; *PTSD* Posttraumatic Stress Disorder; *ASD* Acute Stress Disorder; *ANC* analysis of covariance; *CHI* chi-squared test; *FIS* Fisher's exact test; *MRA* multiple regression analysis; *TTE T* test; *ANO* analysis of variance; *COR* correlational analysis; *SEM* SEM analysis; *OLS* OLS regression analysis; *LOR* logistic regression analysis; *HLM* hierarchical linear modeling; *ns* not significant; *(K-)CES-D* (Korean version of) Center for Epidemiological Studies-Depression Scale; *ASSET* An Organizational Stress Screening Tool; *AT* Alienation Test; *BAI* Beck Anxiety Inventory; *BCOPE* Brief COPE instrument; *BDI(-II)* Beck Depression Inventory (-II); *BFFI* Big Five Factor Inventory; *BMSII* not reported (in Velichkovsky 2009); *BRCS* Brief Resilient Coping Scale; *BSI* Brief Symptoms Inventory (a shortened version of the Symptoms Checklist-90-Revised); *CD-RISC(-10/-K)* Connor-Davidson Resilience Scale (-Korean Version); *CFS* Chronic Fatigue Scale; *CHIPS* Cohen-Hoberman Inventory of Physical Symptoms; *CHS* Cognitive Hardiness Scale; *CIHQ* Critical Incident History Questionnaire; *CISS* Coping Inventory for Stressful Situations; *CLGES* California Life Goals Evaluation Schedule; *CMHS* Cook-Medley Hostility Scale, a scale from the Minnesota Multiphasic Personality Inventory; *CMS* Civilian Mississippi Scale; *DRS(-15-R)* Dispositional Resilience Scale (-15-R); *EILCS* External versus Internal Locus of Control Scale; *EPI* Eysenck Personality Inventory; *ERI* Effort-Reward-Imbalance at work model; *GHQ(-28)* General Health Questionnaire (-28); *GQ-6* Gratitude Questionnaire; *HPI* Health Practices Index; *HS* Hardiness Scale; *HSc* Hassles Scale; *HSCL-21* Hopkins Symptom Checklist-21; *IES(-R/-K)* Impact of Event Scale (-R/-K); ISR(-E/-P) Initial Subjective Reaction Scale (-Emotional Subscale / -Physical Subscale) of the Potential Stressful Events Interview; *JCQ* Job Content Questionnaire; *JDI* Job Descriptives Index; *KOSS-SF* Korean Occupational Stress Scale - Short Form; *LEC* Life Events Checklist (part of the Clinician-Administered PTSD Scale); *LMX-7* Leader-membership Exhange Relationship - 7 item unidimensional scale; *LOT-R* Life Orientation Test; *LSC-R* Life Stressor Checklist-Revised; *MAACL-R* Multiple Affective Adjective Checklist-Revised; *MBI* Maslach Burnout Inventory; *MOAQ* Michigan Organizational Assessment Questionnaire; *MPSS-SR* Modified PTSD Symptom Scale; *MSA* Military Skills and Abilities; *MSCEIT* Mayer-Salovey-Caruso Emotional Intelligence Test (UE: understanding emotions; ME: managing emotions); *MSQ* Minnesota Satisfaction Questionnaire; *NEO-FFI* NEO Five Factor Inventory; *OBI* Oldenburg Burnout Inventory; *PCL(-C)* PTSD Checklist (-Civilian Version); *PCQ* Psychological Capital Questionnaire; *PDEQ* Peritraumatic Dissociative Experiences Questionnaire; *PDI* Peritraumatic Distress Inventory; *PSI* Perceived Support Inventory; *PSS* Perceived Stress Scale; *PS-S* Police Stress Survey; *PTGI* Posttraumatic Growth Inventory; *PVS III-R* Personal Views Survey III-Revised; *RBI* Russian Burnout Inventory (based on Maslach Burnout Inventory); *RHS* Revised Hardiness Scale; *RS* Resilience Scale; *RSA* Resilience Scale for Adults; *SAS-SR* Social Adjustment Scale-Self report; *SCID(-I)* Structured Clinical Interview for DSM-IV Axis I Disorders; *SCS* Social Capital Scale; *SC-S* Subjective Comfort Scale; *SES* Self-Efficacy Scale; *SHC* Scale Subjective Health Complaints; *SHS* Short Hardiness Scale; *SIRS* Seriousness of Illness Rating Scale; *SLS* Satisfaction with Life Scale; *SOS* Sources of Social Support Scale; *SPSS* Spielberger Police Stress Survey; *SRE* Schedule of Recent Events; *SS* Social Support Scale; *STAI* State-Trait Anxiety Inventory; *STAXI-2* State Trait Anger Expression Inventory(-2); *STDI* State-Trait Depression Inventory; *TSQ* Trauma Severity Questionnaire; *TSS* Traumatic Stress Schedule; *UWES* Utrecht Work Engagement Scale; *WAS* World Assumptions Scale

Most of the included studies were published since 2006, with a small majority of the studies published in recent years (2013–2017: $N = 12$, 55%). The large majority ($N = 17$, 77%) had a cross-sectional design. Five studies (Greene and Nowack 1995; Marchand et al. 2015; Tang and Hammontree 1992; Walumbwa et al. 2010; Yuan et al. 2011) had a longitudinal design with a minimum of 8 weeks and a maximum of 3 years between the baseline and final follow-up. The cross-sectional studies had larger sample sizes (between $N = 52$ and $N = 2226$) than the longitudinal studies (between $N = 60$ and $N = 343$). Most of the studies ($N = 18$) relied only on self-report measurements. The studies of Marchand et al. (2015) and Yuan et al. (2011) conducted clinical interviews (SCID), combined with self-reported measures. Greene and Nowack (1995) and Violanti et al. (2014) used absenteeism data out of electronic databases. About 50% ($N = 11$) was conducted in the USA. In all studies, more men than women participated, which corresponds with the male-female ratio among police officers. The mean age of the samples varied between 25.3 and 54.4 years. The mean years of service varied between 4.7 and 20.1 years. All studies focused on (general) police officers in patrol assignment besides the study of Fyhn et al. (2015), which focused on police investigators.

Concepts and Instruments Capturing Resilience

Table 2 provides an overview of the definitions used for resilience, hardiness, and psychological capital in each of the included studies. It includes some more or less standard definitions available in the wider literature, as well as some definitions created by the authors itself and conceptualizations of the definitions. Of the identified papers, eight studies (36%) used the term resilience, nine studies (41%) used the term hardiness, and five studies (23%) used the term psychological capital.

The term resilience was considered as a uniform, unidimensional concept ($N = 4$) and as a combined multidimensional concept, consisting of several partial facets ($N = 4$). Although studies using the term resilience do differ in wordings of definitions, they all refer to resilience as an ability to deal with stressful situations.

Furthermore, Table 1 shows that resilience was measured in quite different ways, e.g., resilience was assessed by different instruments covering different topics. For example, de Terte et al. (2014) mentioned resilience as a combination of optimism, adaptive coping, emotional competence, adaptive health practices, and social support, and measured these concepts respectively with the Life Orientation Test, Brief Resilient Coping Scale, Mayer-Salovey-Caruso Emotional Intelligence Test, Health Practices Index, and Social Support Scale.

Hardiness, consisting of the facets of challenge, control, and commitment, was considered to be a personality state, trait, or style in the identified studies. Hardiness was most often measured with scales designed by Bartone: for example, the Short Hardiness Scale (SHS; Bartone 1995) or the Dispositional Resilience Scale-15 (DRS-15; Bartone 2007). These measures are both based on the longer Dispositional Resilience Scale (Bartone 2007).

Five studies measured psychological capital, e.g., a combination of resilience, self-efficacy, optimism, and hope (Farr-Wharton et al. 2016; Lu et al. 2015; Ojedokun and Balogun 2015; Siu et al. 2015; Walumbwa et al. 2010). All of these studies used the Psychological Capital Questionnaire to measure psychological capital, indicating that psychological capital was defined and assessed in a (much) more uniform way than resilience and hardiness.

All definitions in some way refer to abilities, strengths, styles, or traits enabling police officers to cope successfully with difficult, stressful, or adverse events (either as a moderator or mediator), thus enabling police officers to (keep) carry(ing) out their duties. However, none of the instruments assessed concrete behaviors showing that resilient police officers were indeed able to cope with adversity and stressful situations more successfully, e.g., to perform better in their law enforcement and related policing tasks.

Measurements of Other Variables

In the included studies, (mental) health problems were treated mostly as dependent variables, such as PTSD symptoms (e.g., Andrew et al. 2008; Andrew et al. 2013)), psychological distress (e.g., Andrew et al. 2008; de Terte et al. 2014), physical health (e.g., de Terte et al. 2014; Fyhn et al. 2015; Greene and Nowack 1995), and burnout (e.g., Fyhn et al. 2015; Gupta et al. 2012). There was much less attention for the relationship between resilience and non-health variables, like stressors (Farr-Wharton et al. 2016; Velichkovsky 2009), personality (Gupta et al. 2012; Velichkovsky 2009), and job-related variables (e.g., Hills and Norvell 1991; see Table 1).

Table 1 furthermore shows that the identified studies vary widely in terms of the measures used. For example, PTSD symptoms were measured with the Impact of Event Scale(-R, -K), Structured Clinical Interview for DSM-IV Axis I Disorders, Modified PTSD Symptom Scale, PTSD checklist, and Civilian Mississippi Scale.

Results Predictive Value of Resilience

As shown in Table 1, dependent variables studied in relationship to resilience were predominantly (mental) health related.

For Physical Health

Five studies examined the predictive value of resilience for physical health of police officers. Greene and Nowack (1995) found in a longitudinal study of 3 years that hardiness was very weakly and negatively associated with

Table 2 Overview of definitions and conceptualizations of resilience, hardiness, and psychological capital

Author (year, page number)	Definition
Andrew et al. (2008, p. 138)	"Resiliency is often used to imply an ability to 'bounce back.' Being able to bounce back is an important capability in situations that are difficult and stressful. (...) Hardiness refers to a personality trait that indicates the manner in which a person might interpret a critical incident, life stress, or traumatic event. Hardiness is thought to consist of three sets of cognitive style (Maddi, 1990)."
Andrew et al. (2013)	Not presented/clarified.
de Terte et al. (2014, p. 416)	"Psychological resilience has been defined as the ability of an individual to rebound or recover from adversity (Leipold & Greve, 2009) or as the ability to maintain psychological and physical health despite exposure to a traumatic event (Bonanno, 2004). Bonanno (2004) has further argued that psychological resilience is multidimensional because various factors have been found to protect individuals when faced with traumatic events."
Farr-Wharton et al. (2016, p. 334)	"[Psychological capital] is a psychological emotional resource that humans have in varying quantities, and those with high [psychological capital] have a natural defence against stress and an internal mechanism for promoting positive employee outcomes, such as high psychological wellbeing and work engagement (Avey et al. 2011)."
Fyhn et al. (2015, p. 2)	"Hardiness is a personality style that influences the individual to cope with challenges in a constructive and proactive manner (Kobasa et al. 1982)." and "The hardiness measure consists of three factors: Commitment, control, and challenge (Kobasa 1979). Individuals high in these three domains generally seem to function and perform under difficult or even extreme conditions, by believing they can influence their situation, and positively reframe challenges they face (Kobasa et al. 1982)."
Greene and Nowack (Greene and Nowack 1995, p. 448)	"Personality hardiness is typically conceptualized as a multidimensional construct consisting of internal locus of control (versus powerlessness), commitment to work and life activities (versus alienation), and perception of life changes and demands as a challenge (versus threat). Results from a growing body of studies suggest that personality hardiness may exert a protective effect against physical illness and psychological distress in the face of work and life stressors (Ganellen and Blaney 1984, Kobasa et al. 1982b, Kobasa et al. 1983, Kobasa and Puccetti 1983, Pierce and Molloy 1990, Hills and Norvell 1991, Wiebe and McCallum 1986)."
Gupta et al. (2012, p. 2)	"Resilient employees 'bounce back' from circumstances that involve risk (Tusaie & Dyer, 2004; Youssef & Luthans, 2007). According to Wagnild and Young (1993) resilience moderates the negative effects of stress, and promotes adjustment to circumstances. Higher levels of resilience make the individual less vulnerable to burnout."
Hills and Norvell (Hills and Norvell 1991, p. 31)	"Hardiness, a composite of the experience of control, challenge, and commitment, has been found to have a buffering effect on physical illness.[4–6]"
James et al. (2006, p. 38)	"Kobasa (1979) originally defined hardiness in her work with Illinois Bell Telephone executives in the late 1970s. Kobasa found that executives undergoing major organizational stress could be characterized in two opposing ways. One group was vulnerable to health problems, performance problems, and attrition while another group tended to thrive in spite of the stressful circumstances experienced at work. Kobasa (1979) hypothesized that there were three inter-related personality characteristics (control, commitment, challenge) that predicted the differences between the two groups. Kobasa coined the term stress hardiness to describe the characteristics of the group that seemed to thrive under stress."
Johnsen et al. (2017, p. 2)	"Hardiness is a personality or cognitive style marked by increased levels of control, commitment, and challenge (Kobasa 1979; Maddi and Kobasa 1984)."
Lee et al. (2016, p. 1)	"The term self-resiliency was first used by Rutter in 1985 after he discovered that some people easily adapt to environmental difficulties and stressful situations, and has been used since. While resilient people can easily adapt to stressful situations, non-resilient people become impulsive and threatening; they overly control their demands and impulses, feel anxiety, and show signs of non-adaptability."
Lu et al. (2015, p. 15089)	"Psychological capital (PsyCap) is positive state-like psychological capacities, and focuses on people's strength and how they grow and thrive. With the development of positive psychology, PsyCap has become an important internal resource for

Table 2 (continued)

Author (year, page number)	Definition
	positive work behaviors, job attitudes (e.g., job satisfaction) and employee performance [23,24]."
Marchand et al. (2015)	Not presented/clarified.
McCanlies et al. (2014, p. 406)	"Resilience has a number of different definitions, including the absence of psychopathology in children raised in abusive and neglectful environments, recovery of physical health following an injury or serious illness, and the ability to overcome stress and adversity while maintaining normal physical and psychological function (Agaibi and Wilson 2005; Wu et al., 2013)."
Ojedokun and Balogun (Ojedokun and Balogun 2015, p. 2)	"According to Luthans et al. (2007), [psychological capital] is considered a positive psychological state characterized by confidence to take on and put in the needed effort to succeed at challenging tasks; making a positive attribution about succeeding now and in the future; persevering towards goals and, when required, redirecting paths to goals in order to succeed, and when beset by problems with adversity, sustaining and bouncing back and even beyond to attain success."
Prati and Pietrantoni (Prati and Pietrantoni 2010, p. 28)	"Thus, the absence of negative change in behavioral outcomes could be considered an indicator of resilience, among many others."
Siu et al. (2015, p. 368)	"[Psychological capital] is positive state-like psychological capacities, its focus is on people's strength and how they grow and thrive. It has been defined as an individual's characteristics by (1) having confidence (self-efficacy) to take on and put in the necessary effort to succeed at challenging tasks; (2) making a positive attribution (optimism) about succeeding now and in the future; (3) persevering towards goals, and when necessary, redirecting paths to goals (hope) in order to succeed; and (4) when beset by problems and adversity, sustaining and bouncing back and even beyond (resiliency) to attain success (Luthans et al. 2007, p. 3)."
Tang and Hammontree (Tang and Hammontree 1992, p. 494)	"Kobasa (1979) proposed hardiness as a resistance resource. The three crucial dimensions for hardiness are commitment, control, and challenge. For hardy individuals, the stresses or life events are interpreted in such a way that the events are placed in a meaningful context and seen as controllable, challenging, and less alienating."
Velichkovsky (2009, p. 540)	"Resiliency is also studied in the midlife (Bonanno, 2004). Here, again, it is the successful adaptation to traumatic experiences (for instance, a terrorist attack), which is being investigated in the first line. Finally, the term is used with adults meaning the ability to overcome "the stress of life" without developing psychiatric symptoms (Hjemdal, et al., 2006). Common to all these approaches to resilience is "a sense of recovery and rebounding despite adversity and change" (Earvolino-Ramirez, 2007, p. 74)." and "Taking these considerations into account, resilience can be conceptualized as the ability to overcome short-term or chronic stress without deleterious effects of distress. This means that the resilience processes prevent stressors from having negative somatic, behavioral and psychological consequences, which the stressors would have if the resiliency processes were not active. Resilience is inversely related to stress vulnerability. In fact, these are two sides of exactly the same coin."
Violanti et al. (2014, p. 2)	"Hardiness is an indicator of resiliency and has been identified as a protective factor that reduces the probability of pathogenic psychological reactions (Frederickson, Tugade, Waugh, & Larkin, 2003; Paton, 1994; Paton, Violanti, & Smith, 2003). Hardiness is thought to consist of three sets of cognitive styles (Maddi, 1990). Commitment reflects the tendency to find meaning and purpose in potentially stressful events; control refers to the tendency to believe that one is capable of managing the stressful event; and challenge is the tendency to see stressful events as an opportunity for personal growth."
Walumbwa et al. (2010, p. 938)	"Psychological capital is defined as "one's positive appraisal of circumstances and probability for success based on motivated effort and perseverance" (Luthans et al. 2007, p. 550)."and "Psychological capital represents an individual's positive psychological state of development that is characterized by four psychological resources: efficacy (confidence to take on and put in the necessary effort to succeed at challenging tasks), hope (one's ability to persevere towards a goal), optimism (a positive expectation about succeeding now and in the future), and resilience (being able to sustain and bounce back to attain success when beset by problems and adversity; Luthans et al. 2007)." and "Thus, based on theory and past research, individuals who score higher in psychological capital can be expected to put forth

Table 2 (continued)

Author (year, page number)	Definition
	extra effort and perseverance based on greater confidence (efficacy), more willpower, and energy to generate multiple solutions to problems or goal blockages (hope); will be more likely to voice positive expectations about results (optimism); and will respond more positively to adversity and setbacks (resilience)."
Yuan et al. (2011, p. 45)	"Resilience has been characterized by the ability to "bounce back from negative emotional experiences and by flexible adaptation to the changing demands of stressful experiences" (Tugade and Fredrickson, 2004). Luthar et al. presented an excellent overview of this construct and suggested using the term "protective factors" when describing processes that alter the effects of adversity (Luthar et al. 2000)." and "(...) the terms "resilience" and "protective factors" have been used interchangeably to describe attributes of trauma survivors which mitigate the development of PTSD symptoms and are associated with the preservation of functioning following traumatic events."

hospitalization and not associated with absenteeism, based on the adjusted *R*-squared of hardiness and controlled for psychological well-being, age, and ethnicity. Cross-sectional studies examined various aspects of physical health. De Terte et al. (2014) found weak to moderate positive associations between resilience and physical health, based on the *R*-squared of resilience and controlled for traumatic event exposure. Velichkovsky (2009) found very weak to moderate negative associations between resilience and chronic illness, smoking, and alcohol use, using correlations and logistic regression analyses. Hills and Norvell (1991) found a very weak positive association between hardiness and physical symptoms, based on the adjusted *R*-squared. Violanti et al. (2014) found with rate ratios a relationship between hardiness commitment and the total score of stressors for 1-day work absences in a binomial regression analysis.

For General Mental Health

With respect to mental health, cross-sectional studies found a moderate positive association between psychological capital and psychological well-being (Farr-Wharton et al. 2016) and weak to moderate negative associations between psychological capital, anxiety, and depressive symptoms (Ojedokun and Balogun 2015), using SEM analyses. In another SEM analysis, Siu et al. (2015) found a weak negative association between psychological capital and stress symptoms. In contrast, Velichkovsky (2009) found in a correlational analysis a strong negative association between resilience and stress symptoms. Resilience was moderate negatively associated with psychological distress, based on the adjusted *R*-squared of resilience and controlled for traumatic event exposure (de Terte et al. 2014). Andrew et al. (2008) and Andrew et al. (2013) conducted multiple regression analyses and controlled for age, education, and marital status. Based on the standardized regression coefficients, Andrew et al. (2008) and Andrew et al. (2013) found weak to moderate negative associations between hardiness (2008: men: control, women: control and commitment; 2013: men: challenge, control, and commitment, women: control and commitment) and depressive symptoms. Besides that, in men, hardiness was weakly and negatively associated with psychological symptoms (Andrew et al. 2008) and there were weak negative associations between hardiness (men: challenge, control, and commitment; women: commitment) and anxiety symptoms (Andrew et al. 2013).

For PTSD Symptomatology

In total, eight studies assessed the independent predictive value of resilience for PTSD symptomatology. Longitudinal studies found both no independent effect of hardiness on PTSD symptoms in a multiple regression analysis (Marchand et al. 2015) and very weak independent effects of the resilience facets of "belief in the benevolence of the world" (positive effect) and "social adjustment" (negative effect) on PTSD symptoms, based the adjusted *R*-squared and controlled for ethnicity and traumatic event exposure (Yuan et al. 2011). Cross-sectional studies (Andrew et al. 2008; Andrew et al. 2013; de Terte et al. 2014; Lee et al. 2016; McCanlies et al. 2014; Prati and Pietrantoni 2010) found varying associations between resilience, hardiness, and PTSD symptoms. In linear regression analyses, Andrew et al. (2008) and Andrew et al. (2013) controlled for age, education, and marital status and based on the standardized regression coefficients, they found weak to moderate negative associations between hardiness and PTSD symptoms. Andrew et al. (2008) found that, for women, the hardiness facet commitment was negatively associated with PTSD symptoms. Andrew et al. (2013) found that for men, all hardiness facets were associated with PTSD symptoms; for women, there was an association with the hardiness facets control and commitment. De Terte et al. (2014) found a moderate negative association between resilience and PTSD symptoms, based on the *R*-squared of resilience, while controlling for

traumatic event exposure. McCanlies et al. (2014) conducted ANCOVAs to examine the relationship between resilience and PTSD symptoms and controlled for age, gender, ethnicity, education, and alcohol use. Based on the standardized regression coefficients, McCanlies et al. (2014) found a strong negative association between resilience and PTSD symptoms. Following Prati and Pietrantoni (2010), resilience was weakly negatively associated with PTSD symptoms, based on the *R*-squared of resilience. In a logistic regression analysis, Lee et al. (2016) found a negative association between resilience and PTSD symptoms, controlling for age, education, marital status, smoking, alcohol use, service area, duration of patrol service, job stress, and depression.

For Burnout

Four cross-sectional studies examined the relationship between resilience and burnout. Fyhn et al. (2015) found a very weak negative association between hardiness and burnout, based on the adjusted *R*-squared of hardiness and controlled for age, gender, police experience, and position experience. Gupta et al. (2012) found in a correlational analysis a weak to moderate negative association between resilience and burnout, whereas Velichkovsky (2009) found a moderate to strong negative association between resilience and burnout, based on correlations. Hills and Norvell (1991) did not find an association between hardiness and burnout in a stepwise regression analysis.

For Personality

The two cross-sectional studies on the predictive value of resilience for personality showed in correlational analyses weak to moderate positive associations between resilience and the personality characteristics of conscientiousness and agreeableness (Gupta et al. 2012) and a weak negative association between resilience and type A personality (Velichkovsky 2009).

For Psychological Capital

Walumbwa et al. (2010) found in a hierarchical linear model that leaders' psychological capital, followers' psychological capital, and service climate were moderately associated with the supervisory-rated performance of followers, based on the *R*-squared. In a cross-sectional design and using SEM analyses, studies found that psychological capital was moderate positively associated with job satisfaction (Siu et al. 2015) and stressors (Farr-Wharton et al. 2016). Hills and Norvell (1991) found a weak negative association between hardiness and job satisfaction in a stepwise regression analysis.

For Interaction and Mediation Effects of Resilience

Five studies examined the interaction effect of resilience. Tang and Hammontree (1992) found in a longitudinal design a weak interaction effect between hardiness and police stress on absenteeism, based on the adjusted *R*-squared of the interaction effect. In two cross-sectional studies, James et al. (2006) found in a multiple regression analysis no interaction effect between hardiness and dysphoria on anger. Johnsen et al. (2017) found an interaction effect between self-efficacy and hardiness for performance satisfaction, but not for perceived strain, based on an OLS regression analysis.

Lu et al. (2015) and Siu et al. (2015) conducted SEM-analyses in cross-sectional designs. Lu et al. (2015) found that job stress and identification with the police organization were very weakly associated with job satisfaction through psychological capital. Siu et al. (2015) found an indirect effect of psychological capital via stress symptoms and job satisfaction to the turnover intention of a police officer.

Discussion

The first aim of the present systematic review was to assess the predictive values of resilience, hardiness, and psychological capital for (problems in) functioning of police officers. We identified 22 empirical studies, of which the large majority was conducted relatively recently, published between 2013 and 2016 and included police officers working in Western countries. Only five of the identified studies used a longitudinal design.

Results of the studies showed that the identified empirical police studies on resilience, hardiness, and psychological capital were predominantly focused on the predictive value of resilience for physical and mental health variables, such as PTSD symptoms and burnout. Earlier reviews on the general literature about resilience also reported a similar dominance of health-related variables (Almedom and Glandon 2007; Britt et al. 2016). Importantly, the large majority of studies had cross-sectional designs despite the importance and call for longitudinal studies (Britt et al. 2016; Davydov et al. 2010; Luthar et al. 2000) to obtain knowledge about the effect of time on the predictive values of resilience (Britt et al. 2016).

The second aim of the present study was to examine the concepts and measures of resilience, hardiness, and psychological capital are used in studies among police officers. Remarkably, despite the description and definitions of resilience invariably referring to being able to cope successfully with difficult, stressful, or adverse events and thus also leaving space for the assessment of actual behavior of police officers, none of the studies that we identified assessed to what extent police officers who are considered to be resilient actually perform better as a police officer than those who are considered

not or less resilient. Besides that, no study assessed how resilience actually enables police officers to (keep) carry(ing) out their duties and responsibilities well during their work. In other words, studies on the predictive value of resilience seem to limit resilience in terms of (mental) health implicitly suggesting that as long as officers do not suffer from (mental) health problems, they have the ability to deal with more or less stressful situations effectively in terms of law enforcement. In fact, there is a remarkable group of studies that actually consider resilience as not developing PTSD (Almedom and Glandon 2010; Galatzer-Levy et al. 2011; Galatzer-Levy et al. 2013; Galatzer-Levy et al. 2014; Hennig-Fast et al. 2009; Marmar et al. 2006; Peres et al. 2011; Pietrzak et al. 2014). Within these studies, resilience is defined as a pattern of minimal to none PTSD symptom levels (Galatzer-Levy et al. 2011; Galatzer-Levy et al. 2013; Galatzer-Levy et al. 2014; Pietrzak et al. 2014). The emphasis would seem to be entirely on being healthy "fit for duty" rather than how well that duty is performed under stressful circumstances.

In this review, we see that, despite the fact that resilience and related terms are studied mostly in relation to physical and mental health variables, the associations found were only very weak to moderate. Also, studies that examined the relationship between resilience and non-health variables, such as personality, stress and job performance, found very diverse and weak associations. Again, we have to realize that 80% of the identified studies were cross-sectional in nature and that these studies used a wide variety of measurements, which makes it complicated to interpret and synthesize any findings. In other words, the described characteristics of the included studies such as the focus on (only) mental health as dependent variable and that studies mostly were conducted in Western countries do introduce bias to some extent.

Resilience and hardiness were studied most frequently in the included studies. We see that the terms hardiness and psychological capital are more uniform in their definitions and concepts than resilience. Resilience is defined in various ways, ranging from single, unidimensional approaches (e.g., Gupta et al. 2012) to heterogeneous, multidimensional approaches (e.g., Britt et al. 2016; de Terte et al. 2014; Prati and Pietrantoni 2010).

Besides that, the included studies used a lot of different measures to investigate resilience, which corresponds well with the conclusions of Windle et al. (2011) and Pangallo et al. (2015). In their methodological reviews, they identified multiple measurement approaches for resilience, although measurements of hardiness and psychological capital varied less than those of resilience. The variety in definitions, conceptualizations, and measurements (Britt et al. 2016; Davydov et al. 2010) may hinder conclusion about potential predictors and outcomes of resilience because it is unclear to which extent different results are caused by, for example, different instruments or study samples.

Limitations

There are some limitations to this review that have to be mentioned. Concepts that may be related to resilience (for example coping or self-efficacy) were not studied in this literature review: we included studies that focused on resilience according to the text of the published papers. We tried to develop a search strategy that was specific enough to include relevant studies and exclude irrelevant studies. However, it is possible that, despite the search strategies in three big databases, some relevant studies were missed. The majority of included studies were conducted in Western countries. These studies do not give us insight into the predictive value and predictors of resilience among officers in non-Western countries.

Due to limited number of longitudinal studies available, we did not perform a meta-analysis. In addition, we may expect that research in this area is sensitive, like other research areas, to publication bias, e.g., that studies with significant findings are more likely to be published by journals (or submitted to journals) than studies presenting non-significant findings. Thus, although we found little evidence that resilience is a strong and important predictor across studies for especially mental health problems, it is conceivable that, for this reason, our findings still overestimate the predictive value of resilience among police officers (Fanelli 2012; Van Assen et al. 2014; Young et al. 2008). Finally, identified studies had their own limitations and weaknesses. All included studies used self-report data, which can cause potential response biases and less objectivity of findings. The large majority of studies had cross-sectional designs and relatively small sample sizes, which has its limitations in order to draw strong conclusions.

Final Conclusions

Finally, the risk of implicitly suggesting that resilience, hardiness, and psychological capital are associated only with (mental) health can be demonstrated if we generalize it to other occupations: are healthy teachers good teachers, healthy doctors good doctors, or healthy scientists good scientists? Earlier, Britt et al. (2016, p. 396) discussed this topic in a similar way for the resilience literature in general: "will the same individuals be identified as resilient in the aftermath of adversity when looking at job performance as the criterion versus mental health?". This statement would appear to be true for policing as well, and as such constitutes a major gap in our knowledge on the role of resilience, hardiness, and psychological capital in policing. In either way, this review shows that results of current studies do not provide strong and consistent evidence that resilience, hardiness, and psychological capital are important predictors for the functioning of police officers. Longitudinal studies assessing, besides mental health, the actual performance of police officers are warranted.

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Compliance with Ethical Standards

Conflict of Interest Authors Kim Janssens, Peter van der Velden, and Marc van Veldhoven declare that they have no conflict of interests. Authors Kim Janssens and Peter van der Velden conducted this study partly at INTERVICT, Tilburg University. Author Ruben Taris is employed at the Police Academy.

Ethical Approval This article does not contain any studies with human participants or animals performed by any of the authors.

Informed Consent Because this study does not contain human participation, informed consent was not necessary to obtain.

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