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BURNOUT – A RISK FACTOR FOR DEVELOPING PTSD?

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Abstract

Introduction: Burnout is a pathological syndrome in response to prolonged, chronic, interpersonal and occupational stress. In current literature, burnout is often defined by three core components, namely 1) emotional exhaustion 2) feelings of cynicism and detachment from the job (depersonalization) and 3) a sense of ineffectiveness, reduced efficacy and lack of accomplishment/competence. PTSD is a psychiatric disorder caused by exposure to an acute traumatic event, or by acute and chronic stressors of an extreme nature. In symmetry, burnout is also a response to stressors yet is limited to a professional context. Nevertheless, this does not exclude the possibility of overlapping symptoms with PTSD. Furthermore, in a unique environment as that of the military deployed, stressors which may lead to symptoms of PTSD and/or burnout could possibly be resulting from the same work-related (traumatic) events. The current study examines the question whether burnout symptoms, as a result of work-related stressors, serve as a risk factor in military personnel during deployment towards developing post-traumatic stress disorder (PTSD) at a later stage. First we investigated the occurrence of work-related stressors and whether burnout symptoms increase after deployment. Next, we analyzed whether these symptoms correlate to PTSD and its symptoms. Following which, we examined each subscale of burnout and its predictive nature towards developing PTSD in the future.

Methods: This study was part of a large-scale longitudinal study, the PRISMO study, concerning deployment related illnesses in Dutch soldiers. Symptoms of burnout were measured by the Dutch version of the Maslach Burnout Inventory (MBI) and PTSD was measured by the Self-Rating Inventory for PTSD manual (SRIP). Data for measuring burnout was collected three times, whereas PTSD was repeatedly measured four times. The total time-frame for these measurements span approximately 5 years. The cross-lagged associations between the studied variables were investigated by applying statistical procedures.

Results: The frequency of burnout symptoms increased after deployment amongst Dutch military personnel. We found signification associations for all subscales of burnout with the PTSD measurements. Noteworthy is the strong association found between the burnout symptom exhaustion and the diagnosis of PTSD. We also found a strong overlap between the burnout symptom exhaustion and the PTSD symptom 'Arousal' as well as a moderate correlation score with the PTSD symptom 'Avoidance'.

Conclusion: We found that burnout symptoms can increase the vulnerability towards developing PTSD, and thus supports the important role of adapting interventions after deployment in order to detect and reduce burnout symptoms as well as the monitoring and treating the possible development or existence of PTSD.

Introduction

Military deployment requires the acceptance of an occupational and specific environment that determines a lifestyle stretching beyond the boundaries of work (Alpass, Long, Chamberlain & Macdonald, 1997). During deployment, military personnel can be exposed to several stressors which can have severe consequences on both physical and mental health. Intense work demands, the constant pressure to enhance and maintain performance combined with internationally economic and political changes, challenge the mental well-being of employed individuals in the military as well as other working fields (Vogt et al., 2005). Furthermore, recent political world events are altering the environment of military personnel which can increase the exposure to a larger amount of stressors over an extending period of time. That is, military members are being asked to go overseas more often due to politically obligated missions that the military faces (Dimitriu & de Graaf, 2009).

Military deployment to overseas combat areas is physically and mentally demanding and may lead to increased, persistent and prolonged occupational stress. Furthermore, exposure to these types of excessive or chronic job stressors may lead to burnout. According to Maslach and Leiter (2005) the predictors of these job stressors can be divided into two different groups of factors. The first group, situational predictors, includes six antecedents: 1) workload, 2) the lack of control, 3) the lack of award, 4) the lack of a social network, 5) impaired job fairness and 6) values. The second group includes individual antecedents such as gender, age, marital status and experience. Cordes and colleagues (1993; 1997) categorized burnout-related predictors into three subgroups; 1) *personal level*, such as gender, lack of social support and marital problems, 2) *job-role level*, such as role ambiguity or conflict and 3) *organizational level* where intrinsic and extrinsic rewards don't meet expectations or no promotion opportunities (Cordes et al., 1997; Cordes & Dougherty, 1993). Burnout can develop due to chronic stress overload caused by intense work-related pressure. Recent research studies have proposed that burnout may affect future mental health as it increases the vulnerability to develop mental disorders. The association between burnout and mental disorders are currently being examined by different researchers and it has been already implied that burnout could potentially serve as an influential, or risk factor, to increase people's vulnerability to develop depressive or PTSD symptoms (Ahola & Hakenen, 2007; Hakenen et al, 2008; Hakenen & Schaufeli, 2012; LaFauci Schutt & Marotta, 2011; Mealer et al., 2009).

This study aims to extend the line of research on burnout in the context of serving as a risk factor for increasing people's vulnerability to develop other mental health disorders. There is a scarce amount of longitudinal studies conducted in this domain even though the importance and demand for clarity on this topic is continuously highlighted. Burnout is a modern society syndrome which has been acknowledged worldwide, yet on the contrary it still does not appear in the Diagnostic and Statistical Manual of Mental Disorder (5th ed.; American Psychiatric Association, 2013). According to Iacovides and colleagues (2003), considerations about burnout stem from the large tradition of social and psychological psychiatry. As burnout still remains to be identified as a syndrome and has not been recognized as a mental disorder, they plead for empirical verification, however, they add that this is often very difficult due to the vagueness of the definitions.

This longitudinal research study intends to broaden the knowledge on burnout, as measured by the UBOS, and its influence on mental health in the long run. It also tries to answer several questions that still remain either open or controversial in burnout research, such as the conceptual overlap with PTSD, whether it is distinct and self-contained and if that is the case, if there is a causality effect with PTSD (Ahola & Hakenen, 2007; Hakenen et al, 2008; Hakenen & Schaufeli, 2012; LaFauci Schutt & Marotta, 2011; Mealer et al., 2009).

Furthermore, if there is an indication that burnout may predict the development of further mental health disorders, it is of high relevance that not only military personnel, but also the general population, receive an effective and adapted health program which allows them to be monitored for long term prevention. As a result, we can limit or prevent physical, emotional, interpersonal, attitudinal and behavioral damages (Cordes et al., 1997).

Broadly defined this study seeks to explore the consequences of burnout on future mental health. Narrowing it down, the research question has been formulated as follows:

"Do symptoms of burnout serve as a risk factor for increasing the chance of developing a mental disorder."

Our research questions are as follows:

a. Is burnout, or are symptoms of burnout, likely to occur amongst military personnel after military deployment?

b. Is there a shared association between symptoms of burnout and PTSD?

c. Does an individual's level of burnout (as measured by the UBOS) increase the vulnerability for developing PTSD symptoms?

Burnout

Burnout is a pathological syndrome in response to prolonged, chronic, interpersonal and occupational stress. Maslach et al. (2001) define burnout by three main dimensions, namely 1) overwhelming exhaustion 2) feeling of cynicism and detachment from the job and 3) a sense of ineffectiveness, reduced efficacy and lack of accomplishment. The exhaustion component refers to the measure of the overall stress level of an individual. It answers the question to how much emotional and physical resources an individual perceives to have or have access to. The cynicism component, also referred to as 'depersonalization', represents the interpersonal aspects of burnout, it explains the detachment or lack of commitment to the job. The self-evaluation dimension of burnout is represented by the lack of accomplishment or by the component of reduced efficacy. This dimension refers to indications of insecurities and low self-esteem at work, such as lack of achievements and low productivity at work.

The concept of burnout is one that has been explored over the past 40 years (Maslach et al., 2001). In contrast to many other research studies, which tend to use a top down approach, burnout research has been derived from a bottom-up approach. Instead of breaking down a theory to gain insight into its compositional sub-systems, the concept of burnout was actually formed by different findings from different researches. The history of the conceptualization of burnout can be divided into three different stages in time which are coherent with the development and improvement of research methods.

The first stage (1970-1980) can be described in terms of the "bottom-up approach", as burnout emerged from a phenomenon into a syndrome. Interviews, case-studies and on-site observations were the way to approach the phenomenon in the first stage as the early work was dominated by qualitative descriptions of symptoms and the situational context (Maslach et al. 2001). The first article, which aimed to articulate the phenomena of burnout, appeared in the 1970's in the United States (Freudenberger, 1974). It is considered as the starting point for the broader recognition of burnout as it focused on introducing the phenomenon and proving its normality and common response. During the same period of time, Christina Maslach (1976) independently investigated the phenomenon of burnout. Through interviews with individuals working in the human services she highlighted three important factors; 1) emotional exhaustion, 2) detached concern towards clients and 3) a feeling of reduced personal accomplishment.

The second stage is characterized by its empirical nature as cross-sectional studies were introduced in the research framework of burnout. From 1980 – 1990 the scientific and social interest in the concept of burnout increased leading to the development of several different 'burnout measurements'. The publication of the Maslach Burnout Inventory (MBI) remained to have the strongest psychometric properties and has become the predominant burnout measure on a global level (Maslach & Jackson, 1982; MBI-GS; Schaufeli et al., 1996).

The third stage (1990 – till now) lies coherent with the developmental adjustments made during this time period. Studies on burnout reached out to many different occupations, including the military, and with the expansion of the research field, an increase in improvement of the methodology and statistical tools occurred. This improvement in the methodological rigor of burnout is mainly due to the increasing number of longitudinal studies (schaufeli & Buunk, 2004; Borritz, 2005).

Post-traumatic stress disorder (PTSD) and burnout

PTSD is a psychiatric disorder caused by exposure to an acute traumatic event, or by acute and chronic stressors of an extreme nature. The Diagnostic and Statistical Manual of Mental Disorder (DSM-IV) define PTSD as an anxiety disorder that comprises three symptom clusters: re-experiencing the traumatic event, avoidance of trauma related thoughts as well as numbness towards general responsiveness, and hyperarousal and hypervigilance symptoms. Estimates on the prevalence rate of PTSD in soldiers deployed to operations in Iraq and Afghanistan in the past 10 years vary between 3%-13%. In symmetry, burnout is also a response to stressors yet in an entirely different context which nevertheless does not exclude the possibility of overlapping symptoms with PTSD. Furthermore, in a unique environment as that of the military deployed, stressors which may lead to symptoms of PTSD and/or burnout could possibly be resulting from the same work-related (traumatic) events. Overall, burnout and PTSD overlap on the following symptoms;

1. PTSD can occur after experiencing a traumatic event where the event is experienced as being unpredictable and uncontrollable. As mentioned earlier, individuals with burnout also perceive a work-related lack of control.

2. As defined by Maslach et al. (1996), depersonalization is a symptom of burnout. Depersonalization is also a subdomain of PTSD (Del Vecchio et al., 2011)

3. Individuals with PTSD or burnout tend to avoid triggers that are associated with the 'events'

4. Both have symptoms of apathy, tiredness, cynicism, sleep disturbances, generalized irritability and disinterest in seeking help

5. Both can result from low levels of social support (Brown & O'brien, 1998; Brewin, Andrews & Valentine, 2000)

6. Burnout symptoms can result from experiencing traumatic events on the job (van der Ploeg et al., 2003; Alexandra & Klein, 2001)

7. Brattberg (2006) found a strong association between PTSD and the exhaustion symptom of burnout.

8. The allostatic load (AL) hypothesis claims that over time, not just dramatic events but also events on a daily basis, impact the life-long patterns of behavior and physiological reactivity. In the short run, hormones associated with stress and AL protect the body and promote adaptation, yet in the long rung AL causes changes in the body that lead to diseases (McEwen & Seeman, 1999). Namely, the physiological responses to stress could sustain after a stressful event has occurred, thus becoming pernicious. This continuous and consistent exposure to daily stressors is associated with alterations in an individual's physiological and neurological state, as this remodels and adapts to the external events. Hence AL has been implied to account for a vulnerability towards developing stress-related diseases, such as PTSD (Juster, McEwen & Lupien, 2009; Danese & McEwen, 2012). Glover (2006) found that AL, which is the cumulative physiological 'cost' of prolonged stress, can predict people's vulnerability towards developing symptoms of PTSD. If one is more susceptible for minor stressors, then coping with larger stressors will be much more difficult.

The explanation for developing PTSD symptoms could be related to one's overall resistance for being able to cope with stressors.

The similarities between both disorders require clarification as to how they may be related and have an effect on eachother. It is important that military personnel, who meet the burnout criteria, are closely monitored if it is found that they are more vulnerable towards developing symptoms of PTSD in the long run.

Mealer et al. (2009) conducted a cross-sectional study in a sample of 332 nurses. Results show that 13% were positive for depression, 18-22% positive for PTSD and 86% for at least one symptom of burnout. 98 % of the nurses who fulfilled the diagnostic criteria for PTSD were also positive for at least one of the three types of burnout. However, not all the nurses with symptoms of burnout also met criteria for PTSD diagnosis. This research study concludes that nurses who fulfill the criteria for PTSD almost uniformly will have symptoms of burnout and not vice versa. The design of this study was cross-sectional. This means that this study shows there is a relationship between the two, yet cannot determine the direction of the relationship and as to whether having PTSD results into having burnout symptoms or vice versa. Brattberg (2006) also conducted a cross-sectional study yet suggested a reversed relationship as the intent was to analyze the extent to which traumatic life events, PTSD and ADHD could be contributors associated with developing burnout. Brattberg (2006) used potential background factors involved in burnout which were then analyzed using a multiple regression analysis. The results indicate that PTSD was strongly associated with burnout. LaFauci, Schutt and Marotta (2011) also conducted a cross-sectional study (N=197) and found support for the idea that burnout is positively related to PTSD symptoms. Noteworthy, this study recommends that research should explore alternative pathways in which the variables as burnout may contribute to the level of PTSD symptoms.

Methods

Participants

This study was part of an ongoing large-scale longitudinal study of deployment-related illness in Dutch soldiers deployed to Afghanistan between 2005 and 2008 (the so-called PRISMO study). This larger prospective cohort study has been approved by the institutional review board of the University Medical Centre Utrecht, located in the Netherlands. Eight hundred eleven soldiers completed the burnout questionnaire prior to a four-month deployment. Of these, 451 also completed various self-report questionnaires including demographic and PTSD questionnaires. Six months after deployment, 737 soldiers completed the burnout and demographic questionnaires from which 517 soldiers also completed the PTSD questionnaire at T4. This study will take the first four moments (T1-T4) of data collections into consideration. Note that the UBOS, measuring burnout, was not collected from the military sample at T4.

T1: 1 month before deployment
- Burnout and PTSD
- total sample of n=1032, 100% response rate for PTSD, n=859 response rate for burnout
- 2005 - 2008

T2: 1 month after deployment
- Burnout: n=811; PTSD: n=842, 82% response rate

T3: 6 months after deployment
- Burnout: n=737; PTSD, n=775, 74% response rate

T4: 1 year after deployment
- PTSD, n=572, 55% response rate

T5: 2 years after deployment
- PTSD, n=566, 55% response rate

T6: 5 years after deployment
- Depression and PTSD, data was to be collected in 2014

T7: 10 years after deployment
- Depression and PTSD, data will be collected in 2018
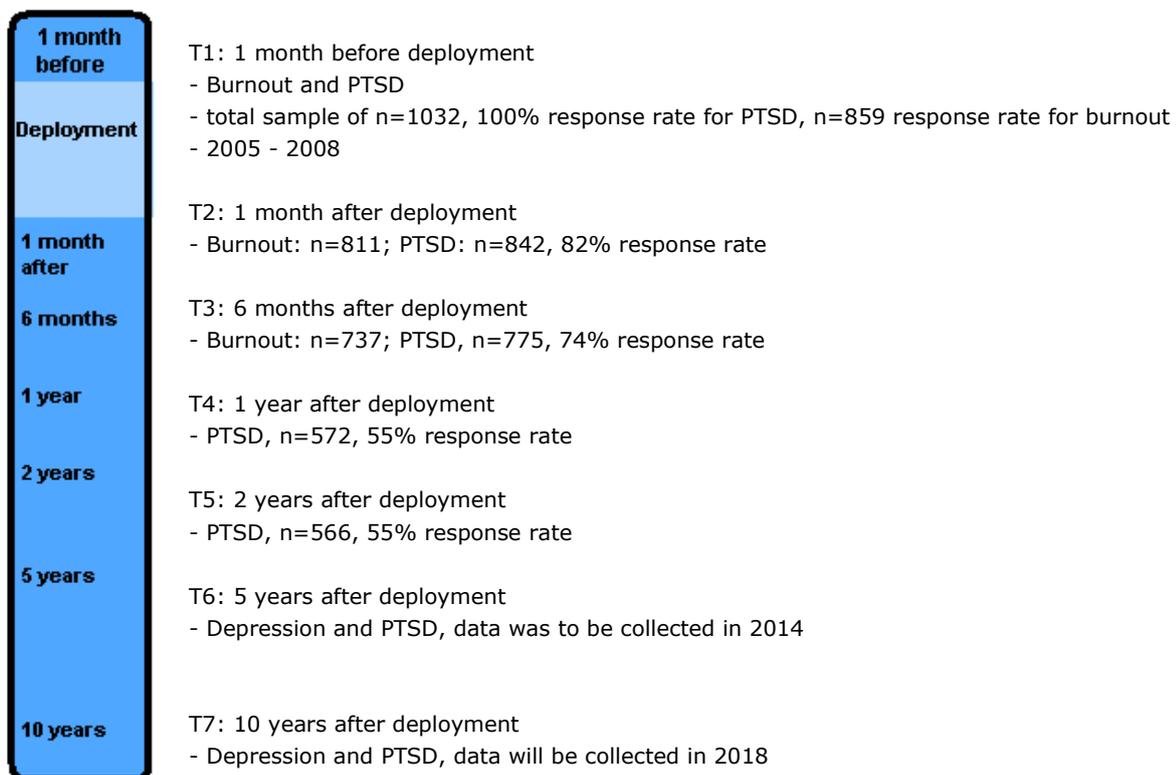
Figure 1. An overview of the repeated moments of data collection throughout a timeframe of 10 years, as part of the PRISMO study.

Data collection

Post-traumatic stress disorder (PTSD). PTSD was assessed by using the Self-Rating Inventory for PTSD manual (SRIP) (Hovens, Van der Ploeg, Bramsen, & Klaarenbeek, 1994). The SRIP measures the possible presence and intensity of PTSD symptoms as defined by the criteria in the Diagnostic and Statistical Manual of Mental Disorder (DSM-IV). The self-report questionnaire consists of 22 items covering the 17 symptoms and the three symptom clusters (i.e., re-experiencing/intrusions, persistent avoidance/numbing and hyperarousal) as formulated by the DSM-IV (hovens, Van der Ploeg, Bramsen, & Klaarenbeek, 1994). Participants are asked to rate their symptoms over the previous four weeks rated on a 4-point likert-scale (from 1 = not at all to 4 = extremely). The total SRIP scores can range from 22 to 88 where a score of 52 or above is the advised threshold for the diagnosis of PTSD. Psychometric properties of the SRIP have been verified in several different clinical samples. (Hovens, Bramsen, & Van der Ploeg, 2002; Hovens et al. 1994). Hovens and colleagues (2002) found that the cronbach's alpha reliabilities are 0.90-0.94 for the total SRIP score, 0.77–0.87 for the subscale intrusion/re-experiencing, 0.80–0.88 for avoidance and 0.76–0.85 hyperarousal. This study replicated similar reliability results, with a cronbach's alpha of 0.85–0.92 for the total SRIP score, 0.75–.84 for the subscale avoidance, 0.69–0.80 for the subscale hyperarousal and 0.77–0.86 for re-experiencing. With a Pearson's r=0.92 for the total SRIP score and correlations of 0.84, 0.91 and 0.85 for the subscales intrusion, avoidance and hyperarousal, this questionnaire has an excellent test-retest reliability.

Burnout. Burnout was measured by using the Utrechtse Burnout Schaal (UBOS) which is a validated Dutch adaptation of the Maslach Burnout Inventory (MBI) developed by Schaufeli and Van Dierendonck (2000). In line with the MBI, the UBOS consists of twenty items that measure the three dimensions; *emotional exhaustion (Cronbach's alpha =,89), depersonalization (Cronbach's alpha =,69)* and a sense of *lack of accomplishment, competence (Cronbach's alpha =,84)*. There are 15 items from which their construction is based on regression, factor and reliability analysis stemming from an original collection of 28 items (Schaufeli, Leiter & Kalimo, 1995). As can be seen in table 4 and 4.1, in this study the Cronbach's α for 'the lack of feeling competent ranged from 0.54 to 0.82 on all time-points for this scale. The Cronbach's α for depersonalization ranged from .74 to .85 and for emotional exhaustion from .61 to .84. These items were measured by a 7-point likert-scale where higher scores on emotional exhaustion and depersonalization and lower scores on a decreased feeling of accomplishment, are indicative for the burnout syndrome. The cutoff criteria used for each subscale derived from a Dutch military study in 1998 (Exhaustion ≥ 2.80, Depersonalization ≥ 3.75 lack of competence ≤ 2.82; Schaufeli & van Dierendonck, 2000). A random sample was selected from the "Human Resource System" which includes all the operational staff from the Dutch Army (N=22), as well as a random sample from those who have been deployed in the past to a foreign country (N=546) There was no significant difference between the groups with regards to the burnout level and so both groups were used together (Schaufeli & van Dierendonck, 2000). Dyrbye, West, and Shanafelt (2009) indicate that results regarding the UBOS can be categorized separately by using dichotomous variables established cutoff scores for each subscale. Hence, in this study, dichotomous variables were created to assess the frequency for each subscale of burnout, based on the established cutoff scores. A high score on emotional exhaustion in combination with a high score

on depersonalization or a low score on the level of competence can be indicative for burnout (Schaufeli & van Dierendonck, 2000).

Events experienced during deployment. One month after deployment participants completed a checklist for exposure to deployment stressors. The Deployment Experiences Checklist (DES) is a 19-item self-report measure where participants respond to the questions by indicating 'true' or 'false' to each given statement. This screening tool was developed for the PRISMO study to assess exposure to deployment stressors, e.g. incoming enemy fire, and witnessing other people get injured or killed. This checklist has not been validated, however, it has been developed by employees of the research Centre of the Military Mental Health Institution, whom derived most questions from validated combat exposure lists such as the Combat Exposure Scale (CES). This scale has an internal consistency of .85 and a test-retest reliability of r=.97 (Keane et al., 1989). The items were analyzed and sectioned by two subscales, namely cognitions (i.e. rejection by locals) and experiences (witnessing death or injury) and was applied as previously published by Reijnen and colleagues (2015).

Demographic and military factors. Data on rank (army troops, corporals, NCO, sub-officer, staff-officer), number of previous deployments (ranging from 0 to 6), year of deployment (between 2005 and 2008).

Statistical analysis

In order to investigate the longitudinal relationships between the study variables, we employed the techniques provided by IBM SPSS statistics 20. The prevalence of burnout was measured by applying the recommended military norm group cutoff criteria (Ex ≥ 2.80, Dep ≥ 3.75 Com ≤ 2.82; Schaufeli & van Dierendonck, 2000). The prevalence of PTSD was measured by applying own cutoff points found in this sample by calculating the mean$_{baseline}$ x 2 SD for each scale. Means and standard deviations for each UBOS subscale at T1 – T3 were compared in order to determine statistical significance, using paired-samples T-test. Psychometric properties of the psychometric properties of UBOS and SRIP were examined by computing Cronbach's α for the subscales and the total score for the SRIP. Bivariate (Pearson) correlations were computed between self-report measures (two-tailed) to examine a positive and/or negative association between the variables. When the assumption of normality was violated, the variables were mathematically transformed to adjust for the skewness and kurtosis. Linear multiple regression analysis was used to test whether the subscales of burnout show a significant effect in predicting PTSD.

Results

Descriptives and psychometrics

Demographic variables are displayed in Table 1. Participants who completed both UBOS T3 and SRIP T4 assessments were older than participants whom failed to complete the follow up assessments at T4 (T3: Mean= 25.06, N=220; T3 & T4:Mean 30,95 N=517). Of the dropouts at T4, 3.2% was female (N=220) whilst 12.2% was female for participants who filled out both assessments (N=517). The dropout group contained more low ranks (56.2% Army troops, 22.4% corporals, 14.6% noncommissioned officer (NCO), 4.6% sub-officer, 2.3% staff-officer) in comparison to participants who completed both assessments (28,3% Army troops, 20,2% corporals, 33,7% NCO, 12,6% sub-officer, 5,2% staff-officer). Furthermore, for 57.4% of the dropouts at T4, being administered in the mission ranging from 2005 to 2008, it was their first military deployment experience (Mean = .77, SD= 1.132). The group that completed both assessments showed a mean average of 1.01 for earlier deployments and a SD of 1.270. No other differences were observed. As shown in table 4 and 4.1, internal consistency (Cronbach's alpha) was acceptable (>.70) for all self-report measures except for two subscales of the UBOS at T3. Internal consistency proved adequate for UBOS subscales at T1 and T2 including the subscale depersonalization at T3 (.85), but not for Exhaustion T3 (.61) and Lack of competence T3 (.54).

Table 1. *Participants who completed burnout 6 months after deployment (T3) (N=737)*

Variable	Count	%
Gender	Total 737	
male	667	90.5
female	70	9,5
Rank (N=735)		
Army Troop	269	36.6
Corporals	153	20.8
NCO	206	28.0
Sub-officer	75	10.2
Staff-officer	32	4.4
Missing	2	

	Mean	SD	Range
# previous deployments	.94	1.236	0 – 6
Age	29.19	9.28	20 – 59

Note. NCO = noncommissioned officer

Symptoms of burnout amongst military personnel due to work-related stressors

The first hypothesis aims to unravel whether symptoms of burnout occur after deployment, as research indicates that burnout symptoms can result from experiencing acute and chronic traumatic events on the job (van der Ploeg et al., 2003; Alexandra & Klein, 2001). In our military sample, results of the DES show that during deployment there have been frequent exposures to various traumatic events. For instance, 62% from N=780 have been engaged in enemy fire, 60% have witnessed people suffering and more than 46% have witnessed overall killing and death or a colleague injured or killed. With regards to cognitions, the results of the DES show that 17% felt they did not possess the sufficient means to intervene and 13% have felt insufficient control over situations. Rejection by locals was perceived by almost 40% of the soldiers, and almost 13 % indicated they experienced the mission as useless.

Table 2 shows the mean scores of the UBOS subscales from our sample group, ranging from T1 – T3, as well as a reference UBOS normative sample of 319 Dutch military constabulary officers (Schaufeli & Van Dierendonck, 2000). Our sample showed a significant increase for both subscales Exhaustion and Depersonalization between T1 and T2, T2 and T3 and T1 and T3 ($p<.001$). No significant differences were found throughout the different moments of data collections for the subscale Competence. However, the increased standard deviation indicates that the individual scores within the sample group deviated more from the average at T3 in comparison to T1. Compared to the norm group ($M = 1.43$), our sample shows relatively low levels of emotional exhaustion prior the deployment. After deployment, the discrepancy between the mean scores of our sample group ($M = 1.24$) and the norm group shows a decrease. It also shows that the proportionally constant levels of competence from T1 – T3, are relatively higher than those of the norm group $M = 4.16$. The mean score of depersonalization before deployment at T1 $M = 1.15$ is similar to those of the norm group $M = 1.10$, whereas the post-deployment score at T3 $M = 1.63$ shows a relatively high increase.

Table 2. *UBOS subscale scores*

Measurement	Exhaustion		Depersonalization		Competence		N
	M	SD	M	SD	M	SD	
T1	0.99	0.77	1.15	0.94	4.44	0.94	859
T2	1.12	0.92	1.52	1.15	4.41	0.95	811
T3	1.24	1.03	1.63	1.29	4.44	1.63	737
Normative sample as reference	1.43	1.08	1.10	0.99	4.16	1.17	319

Normative Sample scores taken from UBOS validation sample.

Table 3 shows the prevalence of burnout symptoms amongst Dutch soldiers as measured by the UBOS from T1 to T3. As hypothesized, the subscales exhaustion and depersonalization showed a moderate increase in frequency from prior to post-deployment measurements. On the contrary, a decrease was found in the frequency of not feeling competent at the job. As can be seen in table 3,

6.2% of our military sample indicated not feeling competent in their occupational working field at T1, yet this perceived lack of competence decreased to 4.6% after deployment at T3. An explanation for the decrease in this particular subscale could lie in the previous deployment experience of the soldiers. Even though 3 soldiers had not specified whether they had been deployed or not before their current mission, a total of 53% of all the soldiers at T1, stated not having been deployed before the current mission. The lack of deployment experience could trigger occupational insecurities leading to higher scores of not feeling competent before deployment (T1). Hence, a gained feeling of being competent at the job could be explained by the actual deployment experience and therefore explains the decrease in frequency from T1-T3.

Schaufeli and van Dierendonck (2000) state that due to technical, theoretical and empirical reasons, the scores of the three subscales of the UBOS cannot be combined to one final score. However, they state that there are practical situations where a diagnosis of being "burned-out" is required. They recommend that an individual could be prone to a positive classification of burnout, if an individual scores above the cutoff criteria on emotional exhaustion, in combination with either high scores on depersonalization or low scores on a perceived level of competence. Before deployment, only 0.8 % of the sample group N = 859, scored above/below the cut-off criteria for two or three of the subscales of the UBOS, indicating that they were prone to a positive diagnose of the burnout syndrome. One month after deployment this increased to 2,3 % and six months after deployment it continued to grow to 2,9 % of the sample group.

Twelve months after deployment at T4, 39 participants (7%; N=565) were positively diagnosed with PTSD. Three of these participants did not fill in the BMI at T3, (N=36 valid cases). Ten participants (27.8%) who were diagnosed with PTSD at T4, also scored above the recommended cutoff criteria on the UBOS component exhaustion at T3, nine participants (25%) scored above threshold for depersonalization and three participants scored above threshold on not feeling competent enough for the job (7.7%).

Table 3. *Frequency of burnout symptoms*

Measurement	Exhaustion	Depersonalization	Competence	N
T1	31 (3.6%)	16 (1.9%)	53 (6.2%)	859
T2	48 (5.9%)	45 (5.5%)	44 (5.4%)	811
T3	67 (9.1%)	60 (8.1%)	34 (4.6%)	737

Note. T1 = 1 month before deployment, T2 = 1 month after deployment, T3 = 6 months after deployment.

Association between variables

The second hypothesis examined in this study, was to determine a shared association between symptoms of burnout and PTSD. A Pearson product-moment correlation coefficient was used to analyze the association between burnout symptoms as measured by the UBOS and PTSD symptoms as measured by the SRIP. All moments of data collection (T1-T4) were taken into consideration as was hypothesized that symptoms of burnout increased after deployment. Table 4 and 4.1 displays the Pearson correlations between all self-report measures. Low correlations were

found for depersonalization and competence with the total SRIP score at T1 (one month before deployment), whilst exhaustion shows a moderate correlation with the total SRIP scores (T1) (exhaustion $r=.35$ $p<.001$; competence $r=-,20$ $p<.001$; depersonalization r= ,28 $p<.001$). One month after deployment, both exhaustion (T2) and depersonalization(T2) show moderate correlations with the total SRIP score (T2), in contrast to competence (T2) which shows a decrease in its correlation scores with the total SRIP score (T2) (exhaustion $r=.43$ $p<.001$; depersonalization r= ,33 $p<.001$; competence $r=-,18$ $p<.001$). Six months after deployment, all the subscales of the UBOS show an increase in correlation with the total SRIP score (T3) compared to scores at T2 (T3; exhaustion $r=.47$ $p<.001$; competence $r=-,28$ $p<.001$; depersonalization r= ,40 $p<.001$). The shared variance between the total SRIP score (T3) and exhaustion (T3) is approximately 22% ($r=.47$, $p<.001$). Shared variance between the total SRIP score (T3) and depersonalization is 15% ($r=.39$, $p<.001$) and competence is 7% ($r=-.28$, $p<.001$)

Noteworthy are the correlations of the UBOS subscale 'exhaustion' and its association with the total SRIP scores, and the SRIP subscales arousal and avoidance. The association between UBOS exhaustion (T1) and SRIP arousal (T1) give a moderate correlation of $r=.36$ $p<.001$. Exhaustion at T2 shows a moderate correlation of .39 $p<.001$ with avoidance (T2) and .49 $p<.001$ with arousal (T2). A strong correlation was observed between UBOS exhaustion T3 and SRIP Arousal T3 (r=.51 $p<.001$), and moderate correlations were found between UBOS exhaustion T3 and SRIP avoidance T3 ($r=.43$, $p<.001$) and SRIP arousal T3($r=.47$, $p<.001$).

Table 4. *Pearson correlations, Mean, Standard Deviations and Cronbach's α of self-report measures*

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. **T1** Feeling competent(UBOS)	-													
2. **T1** Depersonalization (UBOS)	-.26***	-												
3. **T1** Exhaustion (UBOS)	-.15***	.47***	-											
4. **T1** Reexperiencing (SRIP)	-.12***	.14***	.22***	-										
5. **T1** Avoidance / Numb (SRIP)	-.19***	.27***	.28***	.57**	-									
6. **T1** Arousal (SRIP)	-.17***	.26***	.36***	.53***	.55***	-								
7. **T1** Total SRIP score	-.20***	.28***	.35***	.77***	.87***	.84***	-							
8. **T2** Exhaustion (UBOS)	-.15***	.29***	.55***	.21***	.28***	.36***	.36***	-						
9. **T2** Feeling competent(UBOS)	.46***	-.20***	-.13***	-.09***	-.19***	-.09***	-.16***	-.23***	-					
10. **T2**Depersonalization (UBOS)	-.17***	.45***	.32***	.13***	.20***	.19***	.22***	.49***	-.32***	-				
11. **T2** Reexperiencing (SRIP)	-.08***	.09***	.18***	.37***	.29***	.30***	.37***	.27***	-.12***	.20***	-			
12. **T2** Avoidance / Numb (SRIP)	-.19***	.23***	.27***	.32***	.45***	.30***	.44***	.39***	-.19***	.34***	.65***	-		
13. **T2** Arousal (SRIP)	-.11***	.15***	.30***	.37***	.32***	.47***	.46***	.41***	-.15***	.30***	.59***	.61***	-	
14. **T2** Total SRIP score	-.16***	.19***	.31***	.41***	.42***	.43***	.50***	**.43***	**-.18***	**.33***	.80***	.89***	.88.***	-
N	859	859	859	704	704	704	704	811	810	811	765	765	765	765
M	4.44	1.15	.27	6.60	11.11	9.20	26.91	.28	.4.41	1.52	6.72	11.23	9.78	27.72
SD	.94	.93	.16	1.40	2.56	2.37	5.33	.179	.95	1.14	1.55	2.73	2.84	6.23
Cronbach's α	.79	.74	.76	.77	.75	.69	.85	.84	.79	.79	.77	.784	.748	.88

T1 = First measurement (before deployment); T2= Second measurement (1 month after deployment); * p ≤ .05, ** p ≤ 0.01, *** p ≤ .001

Table 4.1 *Pearson correlations, Mean, Standard Deviations and Cronbach's α of self-report measures*

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1. **T2** (UBOS) Exhaustion	-																	
2. **T2** (UBOS) feeling competent	-.23***	-																
3. **T2** (UBOS) Depersonalization	.49***	-.32***	-															
4. **T2** (SRIP) Reexperiencing	.27***	-.12**	.20***	-														
5. **T2** Avoidance / Numb (SRIP)	.39***	-.19***	.34***	.65**	-													
6. **T2** Arousal (SRIP)	.41 ***	-.15***	.30***	.59***	.61***	-												
7. **T2** Total SRIP score	.43 ***	-.18***	.33***	.80***	.89***	.88***	-											
8. **T3** (UBOS) Exhaustion	.63 ***	-.19***	.36***	.28***	.38***	.41***	.42***	-										
9. **T3** (UBOS) feeling competent)	-.23***	.49***	-.26***	-.17***	-.27***	-.22***	-.26***	-.32***	-									
10. **T3** (UBOS) Depersonalization	.34***	-.27***	.59***	.21***	.33***	.31***	.34***	.52***	-.41***	-								
11. **T3** (SRIP) Reexperiencing	.24 ***	-.09**	.19***	.59***	.47***	.47***	.57***	.28***	-.16***	.22***	-							
12. **T3** (SRIP) Avoidance / Numb	.35***	-.14***	.28***	.51***	.59***	.47***	.60***	.43***	-.29***	.38***	.69***	-						
13. **T3** (SRIP) Arousal	.36***	-.12***	.29***	.51***	.51***	.65***	.64***	.51***	-.27***	.39***	.66***	.72***	-					
14. **T3** Total SRIP score	.36***	-.13***	.29***	.59***	.59***	.60***	.68***	.47***	-.28***	.39***	.83***	.92***	.91.***	-				
15. **T4** (SRIP) Reexperiencing	.18***	-0.78	.11**	.50***	.42***	.40***	.49***	.23***	-.24***	.26***	.38***	.37***	.43***	.47.***	-			
16. **T4** (SRIP) Avoidance / Numb	.26***	-.13***	.23***	.43***	.55***	.44***	.55***	.35***	-.30***	.38***	.40***	.52***	.46***	.53***	.71***	-		
17. **T4** (SRIP) Arousal	.29***	-.12**	.26***	.43***	.48***	.56***	.58***	.39***	-.29***	.37***	.47***	.47***	.63***	.60***	.70***	.75***	-	
18. **T4** Total SRIP score	.32***	-.14**	.28***	.50***	.57***	.55***	.62***	.40***	-.32***	.40***	.50***	.59***	.62***	.79***	.91***	.92***	.97***	-
N	811	810	811	765	765	765	765	737	737	737	745	745	745	745	567	567	567	567
M	.2896	4.41	1.52	6.72	11.23	9.78	27.72	.3101	.4.44	1.63	6.82	11.34	9.63	27.78	6.61	11.08	9.36	27.05
SD	.17905	.957	1.149	1.559	2.730	2.848	6.230	.18598	.930	1.290	1.817	3.129	3.017	7.147	1.669	3.067	2.922	6.968
Cronbach's α	.84	.79	.79	.77	.78	.74	.88	.61	.54	.85	.82	.83	.79	.93	.86	.84	.80	.92

T3 = Third measurement (6 months post-deployment), T4 = Fourth measurement (12 months post deployment). * p ≤ .05, ** p ≤ 0.01, *** p ≤ .001

Predicting PTSD symptoms

Consistent with previous findings by Mealer and colleagues (2009), our third hypothesis aims to discover whether an individual's level of burnout symptoms (as measured by the UBOS) increases the vulnerability towards developing PTSD in the future. To capture a predicting relationship between burnout symptoms and PTSD, we used analytic techniques to identify the values between predictors at T3 and at T4. We tested whether each of the individual subscales of burnout at T3, predicted PTSD severity at T4. In addition, rank, deployment experiences (DES scores) and the total SRIP score at T3 were included in the model. Table 5 represents the results of the multiple linear regression analysis on predicting PTSD. We tested three different models in order to compare the contribution of various independent variables to the dependent variable, total SRIP score at T4. The first model included the three subscales of the UBOS at T3 as independent variables, the second model added the DES scores and the third model added the total SRIP score at T3. Next we examined the standardized coefficients (β) to compare the contribution of each independent variable.

The first and second model show that exhaustion is statistically significant and the largest beta coefficient, meaning that it makes the largest contribution to explaining the dependent variable, when the variance explained by all others is controlled for. Our first model showed that all three burnout symptoms at T3 accounted for 24% of the explained variance of the PTSD score at T4. When the DES scores were added to the equation, the explained variance increased to almost 28%. When the PTSD scores at T3 were added on top of the previous independent variables, the third and last model accounted for 44% of the explained variance of PTSD scores at T4. In the third model, the total SRIP score at T3 shows the largest beta coefficient score (β = .484, P≤,001). Exhaustion T3 shows a decrease in its β value compared to the first two models and *p* value greater than .05. This could be due to an overlap with other independent variables, in this case the total SRIP score T3. Namely, as can be seen in table 4.1, a strong correlation was observed between UBOS exhaustion T3 and SRIP Arousal T3 (r=.51 *p*<.001). As can be seen in table 5, the final model accounted for 44% of the explained variance of the PTSD scores at T4. Depersonalization, subjective deployment cognitions and prior PTSD symptoms each showed a separate, statistically significant and predicting contribution.

Table 5. *Summary of linear multiple regression analysis on variables predicting the Total SRIP score at T4 (N=444)*

Variable	B	SE	β	t	p	Adj. R²	ΔR²
Step 1							
constant	1.427	.023		63.027	≤.001	.232	.237.
UBOS Competence T3	-.015	.004	-.155	-3.500	≤.001		
UBOS depersonalization T3	.015	.003	.216	4.409	≤.000		
UBOS exhaustion T3	.117	.023	.244	5.178	≤.000		
Step 2							
constant	1.421	.023		62.631	≤.000	.267	.039
UBOS Competence T3	-.013	.004	-.131	-2.966	≤.005		
UBOS depersonalization T3	.013	.003	.181	3.742	≤.000		
UBOS exhaustion T3	.113	.022	.236	5.048	≤.000		
Rank	-.006	.003	-.082	-2.031	≤.05		
DES experience	.001	.002	.020	.437	.662		
DES cognitions	.016	.004	.167	3.580	≤.000		
Step 3							
constant	1.270	.024		53.537	≤.000	.432	.165
UBOS Competence T3	-.009	.004	-.089	-2.290	≤.05		
UBOS depersonalization T3	.008	.003	.117	2.726	≤.007		
UBOS exhaustion T3	.032	.021	.066	1.521	.129		
Rank	-.004	.003	-.049	-1.363	.174		
DES experience	-005	.001	-.001	-.031	.195		
DES cognitions	.009	.004	.101	2.454	≤.05		
Total SRIP score T3	.006	.001	.484	11.832	≤.001		

Note. Standardized estimates were calculated by multiplying the estimate (*B*) by the standard deviation of the corresponding factor scores (*X*) and dividing by the dependent variable's standard deviation of the factor score (*Y*) βx =*B*x x Stdx)/Stdy. Dependent variable: total SRIP score at T4, 12 months after deployment. Independent variables: Maslach Burnout Inventory subscales competence, depersonalization and exhaustion 6 months after deployment (T3). DES: Dissociative experience scale. R^2=.237; Adjusted R^2 =.232; ΔR^2 .237 for step 1. R^2=.276; Adjusted R^2 =.267; ΔR^2 .038 for step 2. R^2=.441; Adjusted R^2 =.432; ΔR^2 .165 for step 3.

Discussion

This study represents one of the first nuanced investigations of the temporal relationship between symptoms of burnout and PTSD. Several studies have been conducted to measure the relationship between burnout and other mental disorders such as PTSD (Mealer et al., 2009; LaFauci, Schutt & Marotta, 2011; Brattberg, 2006; Van Der Ploeg, 2003). Despite these studies, there is still a lack in our understanding of the relationship between symptoms of burnout and PTSD. This study was conducted to contribute to existing literature in order to increase clarity on the nature of the dynamic interplay between PTSD and burnout symptoms. It is unique in that it includes data from a prospective four-wave design, extracted from an on-going large-scale longitudinal study. Spanning five years, this is so far the longest follow-up period in capturing the dynamic interplay between burnout and PTSD. We applied statistical analytic techniques to identify the predicting influence of burnout symptoms on developing PTSD in the long run. The strength of this study are the large sample size and the longitudinal cross-lagged panel design. Based on the results, this study contributes to the existing literature in three main ways.

First, our results show that burnout symptoms emotional exhaustion and depersonalization as measured by the UBOS, increase after deployment. This speculation was based on the matter that soldiers are often exposed to traumatic and stressful events on the job during deployment. The DES checklist confirmed that our sample group of military soldiers was exposed to traumatic stressors on the job. As hypothesized, the subscales exhaustion and depersonalization showed a moderate increase in frequency from prior to post-deployment measurements. On the contrary, a decrease was found in the frequency of not feeling competent at the job. As stated earlier, an explanation for the decrease in this particular subscale could lie in the lack of deployment experience. A gained feeling of competence at the job at T3 could be explained by the actual deployment experience and therefore explains the decrease in frequency from T1-T3. It is also conspicuous to note that the original definition of burnout by Maslach and her colleagues (1993) merely included emotional exhaustion and depersonalization. Only after a factor analysis, a third separate component was revealed and added to the definition as the perceived level of competence, also referred to as efficacy or lack of accomplishment. Thenceforward, research studies have challenged the validity of this third burnout dimension, and some investigators have even deleted this subscale in their research on burnout (Cordes and Dougherty, 1993; Shirom, 2003; Kalliath et al., 2000; Knudsen et al., 2006; Schaufeli & Salanova, 2007; Hakanen & Schaufeli, 2012; Demerouti et al., 2001). Lee and Ashforth (1996) found that the third subscale shows low scores of correlation with the other components and whilst applying the UBOS in a clinical setting, other studies have shown that patients who received psychological treatment and were positively categorized with the burnout syndrome, reported high levels of emotional exhaustion and depersonalization but no reduced feelings of feeling competent (Schaufeli et al., 2001; Roelofs et al., 2005).

Second, consistent with previous findings, we then expected to find a shared association between symptoms of burnout and PTSD (Mealer et al., 2009; LaFauci, Schutt & Marotta, 2011; Brattberg, 2006; Van der Ploeg, 2003). The burnout component exhaustion shows a strong association with the existence of PTSD, confirming the findings of Brattberg (2006). We also found a strong overlap between burnout symptom exhaustion and the individual PTSD symptoms 'Arousal' as well as moderate correlation scores with 'Avoidance'. We found that burnout symptom depersonalization shows a moderate overlap with the total and individual symptoms of PTSD. The lack of competence shows the lowest, yet still significant, overlap with PTSD and its symptoms. Hence, all the subscales of burnout, showed a significant correlation with individual symptoms of PTSD, as well as the total PTSD score.

Third, our last research question aimed to determine the predictive nature of symptoms of burnout with regards to developing PTSD in the nearby future. We applied multiple linear regression analysis, which is a computerized analysis often used to make a valid projection or prediction of a dependent variable, in our case PTSD, by two or more independent variables. We tested three different models to predict PTSD at T4, by analyzing its relationship with burnout symptoms at T3, the total PTSD scores at T3 and the DES scores. Our first model showed that all three burnout symptoms accounted for 24% of the explained variance of the PTSD score at T4. When the DES scores were added to the equation, the explained variance increased to almost 28%. When the PTSD scores at T3 were added on top of the previous independent variables, the third and last model accounted for 44% of the explained variance of PTSD scores at T4. However, in the last model the exhaustion component of burnout did not appear to be significant anymore, which could be due to a strong overlap with PTSD at T3 as displayed in table 4.1. Nonetheless, the other burnout symptoms, subjective deployment experiences and prior PTSD scores, each showed a separate, statistically significant and predicting contribution. This is in line with our hypothesis that burnout symptoms can increase people's vulnerability towards developing PTSD in the nearby future.

Limitations and implications

This research study has found an increase in burnout symptoms and PTSD after being exposed to work related stressors during deployment. It also confirmed a shared variance between burnout symptoms and PTSD, and multiple linear regression analysis suggests that burnout symptoms could account for a vulnerability towards developing PTSD in the nearby future. Hooper and his colleagues (2010) suggests the negative effects of occupational stress can be undermined and relieved by multiple interventions, such as immediate debriefing and reflecting on traumatic effects. Pre-deployment, trainings and awareness programs should be offered, in order to familiarize the staff with the symptoms of occupational stress, such as burnout and PTSD. These intervention programs should include trainings regarding positive coping strategies, that can be applied during stressful and traumatic occupational situations (Collopy, Kivlehan & Snyder; 2012). Furthermore, health departments should offer confidential counselling programs post-traumatic events, to avoid military personnel from adopting negative coping strategies caused by burnout.

Several limitations of this study should be discussed, accompanied by recommendations for future research. First, our study was based on self-assessment reports which can be prone to the risk of common method variance; the tendency to answer consistent on a questionnaire. On top of

that, a second and related limitation is that the validity of the third component (lack of competence) of the self-rating instrument for measuring burnout (UBOS), has been questioned. As mentioned in the discussion, empirical studies in clinical settings have diagnosed burnout by finding high scores on exhaustion and depersonalization yet low scores on competence. Hence, it would be of relevance for future research to replicate this study by including other sources of input regarding the mental health of participants such as interviews and other objective measures as recommended by Podsakoff, MacKenzie, Lee, and Podsakoff's (2003). Also, Schaufeli and Salanova (2007) have redefined the scale of competence (efficacy) to inefficacy, and found that this scale shows more genuine results on measuring burnout than the currently used reversed scale. It is therefore also recommended that future research should focus on studying this third component, and compare the sensitivity and specificity of different instruments for measuring overall burnout symptoms.

Third, despite the implementations of cross-lagged effects through multiple linear regression with a four-wave design, no UBOS measurements were collected at T4. Hence, strictly speaking our study did not demonstrate causality between the variables as we were not able to compute a reciprocal model at T4 due to lacking data. However, we did study burnout symptoms at three repeated observations, which is considered to be a requirement for defining a true longitudinal study (Singer & Willet, 2003; Ployhart & Vandenberg, 2010)

Fourth, we focused on one professional particular group only, namely military personnel. The solely military sample jeopardizes the generalizability of our results to other sectors. We therefore encourage future research to replicate this study with similar methodologies and sample groups in different professions.

Conclusions

Symptoms of burnout can occur after military deployment as a result of being exposed to stressors on the job. We found support for the notion by Collopy, Kivlehan and Snyder (2012) that burnout is triggered by many of the same stressors that could eventually lead to symptoms of PTSD. Symptoms of burnout show a correlation with symptoms of PTSD, however they do not show a complete overlap, as we found that each contribute independently and uniquely to predict the development of PTSD at a later stage. We found that burnout symptoms can increase people's vulnerability to develop PTSD at a later stage. Thus, this study supports the important role of adapting interventions after deployment, in order to 1) detect symptoms of burnout, 2) reduce burnout symptoms, 3) whilst monitoring and treating the possible development or existence of PTSD.

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