Reducing Inoperative Days of Soldiers Under Stress:

A Novel Approach

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ABSTRACT

Stress is proven to be one of the major causes of work absenteeism of professionals working in public safety. The high rate of inoperative days and the related financial costs highlight the need for an effective stress-reaction assessment tool. The here presented psychometric system architecture proposes the evaluation and monitoring of the reliability of individuals in high risk professions, by analyzing the individual's capability to transform an arbitrary state of mind (hereby represented as self- and world-schema) to a stress coping level. This is performed to predict the development of psychological disorders and violent behaviour, useful in military contexts. On the basis of Bond's and Vaillant's hierarchy of coping mechanisms, we developed a novel approach to analyze the extent to which the individual i) shows cognitive bias in perceiving new information, ii) is prone to violent behavior, or iii) performs major reality distortion, by considering relations between the manifestation level and the current schema of the individual. The objective is to detect, during both recruitment and ongoing monitoring phases, which individuals have maladaptive behaviour and/or mental state. The immediate quantifiable benefit we forecast, thanks to the devised instrument, is the reduction of inoperative days brought by stress-related traumas of various nature and intensity, as a result of selecting only individuals with a higher degree of coping mechanisms.

INTRODUCTION

During the past decades, work-related stress and burnout at work have been the central focus of many studies, especially in high-risk professions such as military and police: If we consider that combat deployment has lead to the development of mental disorders in almost 20% of UK soldiers (Fear et al., 2010), that 23% of American soldiers admitted to work less carefully as a result of stress-related emotional problems (Perrewe, Rosen, & Halbesleben, 2013), and that stress has accounted for 13% of all hospitalizations among active duty personnel between 1990 and 1999 (Hoge et al., 2002), we can see that stress has both psychosocial and financial consequences. Psychological difficulties caused by exposure to stressful and traumatic events lead to high turnover rates and a high number of inoperative days. In fact, 42% of active duty soldiers report an intent to leave the U.S. army after their current obligation ends (Perrewe et al., 2013). This does not only impact military-readiness: each soldier who must be trained to replace another lost to emotional health problems is estimated to cost the U.S. army between \$54,000 and \$73,000 (Harms, Krasikova, Vanhove, Herian & Lester, 2013). This problem is also present, even if to a minor extent, in less traumatic contexts such as in the police force: the UK Metropolitan

Police Force officers take on average 44 days off per annum due to stress-related sickness (MET HQ Performance and Assurance, 2014).

These numbers tell us that many individuals in high-risk professions are either a) overly stressed on duty and not treated timely or b) non sufficiently able to cope with stress both inside and outside their workplace. In order to prevent and treat stress-related problems on time and decrease inoperative days brought by burnout as well as its related financial costs, we present a time conscious and clinically oriented predictive model to be applied during selection and monitoring of personnel in sensitive roles.

RELATED WORK

The present paper describes a novel predictive model and the related assessment instrument for detecting inefficient coping strategies and stress-related disorders, by evaluating cognitive schemas and the behaviors produced from these. In the first part of this chapter we will briefly present relevant previous findings in the field, with focus on two groups of related work (i.e. relations between *coping capacities and psychopathology*, and between *cognitive schemas and coping strategies*). In the second part we will present existing assessment tools, available for selection and evaluation of coping capabilities.

One group of past work focused on the relationship between coping capacities and psychopathology: Studies on clinical samples showed correlation between coping mechanisms and psychopathological disorders; immature coping responses were found to accurately predict disorders such as borderline personality disorder, depression and anxiety disorders (Bond, 2004). With regards to mental health of soldiers, the most common primary mental disorder diagnoses were alcohol- and substance-related disorders, adjustment disorders, mood disorders, and personality disorders (Hoge et al., 2002). However, research studies exploring stress and psychopathology of soldiers focused mainly on post traumatic stress disorder. It has been found that emotion-focused coping is associated with more PTSD type symptoms than problem-focused coping (Solomon & Mikulincer, 1989; Blake, Cook and Keane, 1992). Comorbidity of PTSD with other disorders is also known (Elhai, Contractor Palmieri Forbes & Richardson, 2011).

However these past works does not explore the full spectrum of psychopathology in relationship to coping capacity, which is a research question confronted in this scope.

Another group of research work refers to bridging cognitive schemas and coping strategies. Authors in this field mainly focused on effects of locus of control (Solomon, Mikulincer & Avitzur, 1988), self efficacy (Litt, 1988; Heinrichs et al., 2005), cognitive approach in treatment of posttraumatic disorder (Moran, Burker, & Schmidt, 2013; Grey, Young & Holmes, 2002; Vitzthum, Mache, Joachim, Quarcoo & Groneberg, 2009; Chemtob, Novaco, Hamada, Gross & Smith, 1997; Harvey, Bryant & Tarrier, 2003), information processing of stressful stimuli (Chemtob, Roitblat, Hamada, Carlson & Twentyman, 1988), effect of stress on well-being (Karlsen, Dybdahl and Vitters, 2006). Several of these studies however explored mechanisms of resilience, in terms of emotional and cognitive adaptation after stressful experiences; it has been found that

people who have experienced stress trauma perceive themselves as less worthy and the world as less benevolent (Janoff-Bulman, 1989), and same self- and world-perceptions have been found at war veterans (Dekel, Solomon, Elklit & 2004). Other authors proposed the tendency to enhance positive emotions during stress as a predictor of successful coping (Waugh & Koster, 2015). Such mentioned evidence was a first step in the development of the current framework: previous work was lacking a comprehensive mapping between cognitive schemas and coping maturity.

With regards to pre-existing assessment instruments in this field, many psychological tests have been developed in order to detect stress in occupational settings. These focus on coping strategies and stress appraisal (e.g. emotion- vs. problem-focused coping), without considering underlying variables, such as cognitive schemas or emotional stability. Known commercial psychological tests in this field, such as *Coping Inventory for Stressful Situations* and *Occupational Stress Indicator* and other open source scales, such as *COPE*, focus on identifying sources of stress and measuring coping strategies in work or clinical contexts. Another frequently used group of tests focuses on examining mental stability or other factors which underlie development of psychopathological disorders, the most diffused of which are current versions of *MMPI*, *BDI* and *STAI*.

Although previous studies found evidence between stress coping and different psychopathologies, most research done on soldiers focused on PTSD, considering, in most cases, symptoms developed after the trauma. In this scope we propose, in order to decrease the number of psychopathological cases, to select the most mentally stable individuals prior to employment and to monitor their mental health over time. Since the coping maturity has found to be a significant predictor of various psychopathological tendencies (Bond, 2014), it follows that this provides information about fitness of a person for a high-stress position. Coping behavior itself, however, doesn't provide a comprehensive insight on the mental state of an individual. Although the aforementioned studies have found the relationship between cognitive schemas and coping skills, at the moment there are no available psychological instruments which bridge aspects of cognitive schemas and coping mechanisms in one model. We therefore believe that a test which would be able to evaluate and monitor both coping capabilities and underlying mechanisms in terms of cognitive bias, as well as their interconnection, would contribute to early detection and treatment of psychological problems caused by stress.

MODEL

Theory

In order to predict maladaptive behaviour, we cannot just consider historical, past cases of stress-related outbursts as these are often rare. It follows that the optimal approach is a predictive model based on information of the current state of the individual and an estimation of the capability to manifest the current state at a behavioral level. We now present our instrument which models how likely is an individual to convert a given state of mind to a manifestation, and to attribute a qualitative level to such behaviour. The instrument the authors have developed stems from the integration of theories of coping mechanisms and cognitive schemas hereafter described.

Out of the many theories and models of stress coping over the years, Bond's & Vaillant's hierarchy of defense mechanisms (Bond & Vaillant, 1986) stands out because of its strong relation to psychopathology. Vaillant (1994, p. 44) defines defense mechanisms as "*innate, involuntary regulatory processes which enable individuals to reduce cognitive dissonance and to minimize sudden changes from environments by modifying the perceptions of these events*". Together with Bond, the authors divided mechanisms into several categories on the continuum of maturity where usage of more mature mechanisms, such as humour, represents adaptive behavior, while the usage of less mature mechanisms, such as dissociation, underlie different psychological disorders, such as borderline personality disorder (Bond, Paris and Zweig-Frank, 1994) and anxiety disorders (Andrews, Pollock and Stewart, 1989).

One of the major coping tasks is assimilating stressful experiences into existing schemas and/or changing self- and world-view (Janoff-Bulman, 1989). It is therefore important to understand cognitive schemas that a given individual creates over time about the self (self-schema) and about the world (world-schema). One of the most validated instruments which explores self-schema and world-schema, i.e. the *Brief Core Schema Scale* (Fowler et al., 2006), showed how the perception of the self and of others is related to the mental health of an individual. For example, negative evaluations of others were associated with paranoia, while negative evaluations of both self and others related to anxiety and positive self-evaluations were in extreme cases connected to grandiosity (Fowler et al., 2006). On the basis of these results, it is desirable to understand where a person's performance stands in terms of being functional rather than dysfunctional.

Framework

Figure 1: High level description of the two-phase architecture: the *second phase* (PII) represents schema constructs, which relate to the *third phase* (PIII) representing the manifestation level, by means of a (behaviour) *production function*

On the basis of pre-existent literature, we hereby present our model which bridges two aspects of psychological functioning: 1) the *mental state* which provides information about cognitive schemas related to self and to others that an individual developed over time, as a consequence of various experiences; 2) the tendency to apply certain *cognitive and behavioral coping strategies* as a response to stressful stimuli. Together, these create a two-phase model which describes the process of transforming cognitive schemas (hence Phase II) into coping behaviors (hence Phase III) by means of a (behaviour) *production function*. An illustration of such introduction is in Figure 1. It is notable that the presented scope is part of a broader, three-phase system, hence the model nomenclature starting from “Phase II”, and not from “Phase I”. In order to get a better holistic view, please refer also to other literature of the authors (Arbanasić & Kirk, 2017; Kirk & Arbanasić, 2017).

Second Phase (PII): mental state, defined as self-schema and world-schema combined

We define the current mental state as the set of cognitive schemas which represent the knowledge about the self (self-schema) and the world (world-schema), stored in the form of autobiographical memories. Memories can vary on the continuums of importance (important-non important) and positivity (positive-negative), which informs us on the impact certain memories have on the individual’s psychological well-being. The observations of this phase provide an estimate on the importance and positivity the individual attributes to his/her memory recalls, specifically with regards to the beliefs of self and others. In other terms, when positive memories dominate, the person is likely to have a more optimistic view about his/her own capacities and intentions of others; conversely if negative memories dominate, the person is likely have less confidence about the self and less trust toward others.

Third Phase (PIII): Coping strategies

On the basis of the mentioned Bond and Vaillant's hierarchy of coping mechanisms, we introduced a new continuum of a maturity, where immaturity is defined as the extent to which an individual distorts reality using various cognitive and behavioral patterns. In our formulation we consider the extent of image distortion as a spectrum, i.e. the level of bias a person applies to his/her world belief to be coherent with his/her internal view. In the extreme case, this would be considered pathological. Conversely, we regard high levels of adaptation of the self-belief to the external world-belief as maturity, i.e. an adaptation capability. We therefore hypothesize that people who are capable of adjusting self-perception to the world-perception will show more adaptive behavior than individuals who tend to adjust the world-perception to the self-image, as these are more likely to develop maladaptive behavior and psychological disorders.

Production function: Mapping Phase II to Phase III

The aforementioned transformation between the current mental state of an individual (PII) and the manifestation/coping level (PIII) is described as a *production function*: this relates how cognitive schemas about self and world produce cognitive and behavioral responses. We define this function as intrinsically non-linear because any manifestation can be the result of different combinations of the internal state.

Implementation

Figure 2: Implementation details of the model in terms of latent variables

Although the model itself offers a new approach towards understanding of relationship between cognitive schemas and coping behavior, the current scope included its practical implementation through the development of a novel assessment method, which would optimize selection and evaluation of military personnel by detecting immature stress coping of soldiers, preventing related psychopathological outcomes and decreasing related financial costs. We applied the above-presented model for the development of a psychometric questionnaire, hereafter called the PERSONA test, which differs from existing assessment tools by its structure and scoring method. The questionnaire implements the above mentioned architecture; it evaluates current mental state of an individual and his/her capability to manifest it in mature coping responses. We now provide details on the operationalization of the test, as illustrated in Figure 2.

The second phase (PII) consists of two parts, the self-schema and the world-schema. Beliefs about self and others are examined by autobiographical memory retrieval and measured on the continuum of positivity-negativity and importance-unimportance, as illustrated in Table 1. Importance of memories is evaluated by a set of 16 items which assess how often does a person think about certain experiences (i.e. a frequency of recall estimation). Positivity of memories is evaluated by a set of 16 items which assess how positive does a person feel when s/he recalls experiences suggested by the item. By estimating the subjective positivity and importance of memory recalls, we can in turn

estimate what is the importance the individual attributes to new positive or negative experiences.

Non-important positive memories	Important positive memories
Non-important negative memories	Important negative memories

Table 1: Classification of memory recalls related to self and to others

The third phase (PIII) contains a set of 40 items which measure cognitive and behavioral patterns of response to stressful stimuli. The phase is divided in six levels, organized in hierarchy, in which higher levels represent more adaptive and mature patterns which contain less bias in the perception of reality, while lower levels represent maladaptive patterns with higher degree of reality distortion. *Bias is hereby defined as the adjustment of the world-schema in order to protect the self-schema.* A description of every newly introduced level is present in Table 2.

Coping level	Definition
Information bias	refers to the bias in attributing importance to certain kind of information, in order to protect the self-schema
Information reorganization	refers to excessive rationalization instead of emotional reactions, in order to protect the self-schema
Information modification	refers to deliberate modification of reasoning or behavior in order to protect the self-schema
Indirect action	refers to passive expression of negative emotions toward others in order to protect the self-schema
Direct action	refers to active expression of negative emotions toward others in order to protect the self-schema
Reality distortion	refers to intentional modification of perception in order to protect the self-schema

Table 2: Levels of coping mechanisms within the scope

Diagnosis Possibilities

We now present a non-exhaustive theoretical analysis on the capability of psychopathological diagnosis of the model, on the basis of examples of qualitative values of the dimensions. We will thus indicate different types of relationships between Phase II,

production function, Phase III and the expected outcomes in terms of mental health (Table 3). We will then explain how the different constructs are expected to be related to potential psychopathological traits (Table 4).

Cognitive schemas	Production function	Coping mechanisms	Level of psychopathology associated with given coping mechanism
Positive ¹	Destructive ³	Mature ⁵	Low level of psychopathology ⁷
Negative ²	Constructive ⁴	Mature	Low level of psychopathology ⁸
Negative	Destructive	Immature ⁶	High level of psychopathology ⁹
Positive	Destructive	Immature	High level of psychopathology ¹⁰
Negative	Constructive	Immature	High level of psychopathology ¹¹

Table 3: Possible levels of psychopathology, given estimates of the test constructs, i.e. self- and world-schemas, production function and coping mechanisms

¹Positive self-view and world-view; high correlation between positivity of memories and attributed importance

²Negative self-view and world-view; low correlation between positivity of memories and attributed importance

³Low capability of producing mature behavior on the basis of the current cognitive schemas

⁴High capability of producing mature behavior on the basis of the current cognitive schemas

⁵Low level of reality distortion; adaptive coping patterns including benevolent and harmless behavior

⁶High level of reality distortion; maladaptive coping patterns including aggressive and/or autoaggressive behavior

⁷Low likelihood of psychopathological symptoms; mature behavior based on positive self-view and world-view

⁸Low likelihood of psychopathological symptoms; good capability of producing mature behavior despite negative self-view and world-view

⁹High likelihood of psychopathological symptoms; insufficient capability of producing mature behavior also because of negative self-view and world-view

¹⁰High likelihood of psychopathological symptoms; poor capability of producing mature behavior despite positive self-view and world-view, due to extreme psychopathological tendencies

¹¹High likelihood of psychopathological symptoms; insufficient capability to produce mature behavior also because of extremely negative self-view and world-view

Table 3 shows representative cases in the level of psychopathology, produced by different combinations of cognitive schemas, production capability and coping maturity. As one can see, *the production function has an important role in the process*: when it's efficient, individual can translate even negative self- and world- view into mature behavior; in the same way, if the person doesn't have good productive capacities, even positive cognitive schemas can turn into immature and maladaptive behavior. However, in extreme cases, when the cognitive state is sufficiently positive and when individual isn't exposed to high stress, a good production function isn't a necessary condition for coping maturity; on the other hand, in cases of an extremely bad cognitive state (i.e. depression or burnout), not even an efficient production is enough for adaptive behavior. This argument proves the importance and necessity of the production function:

furthermore, multiple considerations can be made regarding the development of the production function parametrization over time, which will be the focus of future research.

Self-schema	World-schema	Coping mechanism	Psychological manifestation
Positive ¹	Neutral ⁶	Information bias	Extreme optimism, possible lack of critical thinking, possible narcissism ¹⁰
Neutral ²	Neutral	Information reorganization	Extreme rationalization, emotional isolation ¹¹
Incoherent ³	Incoherent ⁷	Information modification	Incoherent behavior ¹²
Neutral or negative ⁴	Negative ⁸	Indirect action	Anxiety, depressive or stress-related disorders, suicidal thoughts ¹³
Negative	Negative	Direct action	Depressive or stress-related disorders, violent behavior, suicidal thoughts ¹⁴
Extremely negative ⁵	Extremely negative ⁹	Reality distortion	Personality disorders, psychotic disorders, sociopathic tendencies ¹⁵

Table 4: List of possible psychological manifestations and the novel coping mechanism categorization, given the related self-schema and world-schema

¹Positive self-view; enhancing positive memories about self-related events by attributing them more importance and moderating negative memories about self-related events by attributing them less importance

²Neutral self-view; attributing moderate importance to both positive and negative self-related life events

³Incoherent self-view; attributing extreme importance to positive and negative self-related events at the same time

⁴Negative self-view; enhancing negative memories about self-related events by attributing them more importance and disregarding positive memories about self-related events by attributing them less importance

⁵Extremely negative self-view; enhancing negative memories about self-related events by attributing them more importance and disregarding positive memories about self-related events by attributing them less importance

⁶Neutral world-view; attributing moderate importance to both positive and negative memories about other people

⁷Incoherent world-view; attributing extreme importance to positive and negative memories about other people

⁸Negative world-view; enhancing negative memories about other people by attributing them more importance and disregarding positive memories about others by attributing them less importance

⁹Extremely negative world-view; enhancing negative memories about other people by attributing them more importance and neglecting positive memories about others by attributing them less importance

¹⁰Exaggerating positive self-beliefs and positive aspects of situations in order to protect the self-schema, at the cost of a distorted perception of reality; indications for narcissistic disorder

¹¹Excessive rationalization of events without attributing emotions to these, in order to protect self- and world-schema, at the cost of a distorted perception of reality

¹²Incoherent behavior as a consequence of having incoherent and unclear self-image and world-image; extreme change of behavior in different situations, frequently changing attitudes towards other people

¹³High likelihood of developing anxious, depressive and stress-related disorders with possibility of suicidal thoughts

¹⁴High likelihood of developing depressive or stress-related disorders with possibility of violent behavior and/or suicidal thoughts

¹⁵High likelihood of developing personality, psychotic or dissociative disorders with possible sociopathic tendencies, because of extremely negative self-and world-views

Table 4 shows some the practical implications of the model in the terms of psychopathological development analysis. In this, for all coping mechanisms the world-view is negatively biased in order to maintain a positive or neutral self-view. In cases when also the self-view is negatively biased, followed by neutral or negative world-view, more immature coping mechanisms take place and the likelihood of developing psychopathological symptoms, including aggressive and/or auto-aggressive patterns, increases. It is important to notice that all levels of maturity lead to an extent of reality distortion, which manifests in either excessive optimism and rationalization, or in psychotic symptoms and sociopathic tendencies. However, it is important to emphasize that despite the expected relationships described above, the production function, i.e. the capability to produce constructive and adaptive behavior from cognitive schemas, takes a central role in the process which caters for the non-linearity of the architecture, and represents the most important innovative component of the presented model.

EVALUATION

The present model and the related instrument have been developed with the objective to a) screen existing cognitive schemas and their relation to stress-coping capacities within soldiers during their selection, in order to detect individuals with maladaptive coping patterns and b) monitoring of cognitive state and coping capacities at soldiers over time, in order to timely detect stress-related psychopathologies. In order to demonstrate the capability of the test to recognize psychopathological symptoms and predict maladaptive behavior, scientific validation will be conducted on samples from three different populations.

General population sample will be tested in order to collect general norms of measured variables from individuals of generally low-risk professions, who experience lower stress at work. The *clinical population* sample instead includes patients from the psychiatric wards of Italian hospitals, and serves to collect norm data from individuals with confirmed diagnosis of given psychological disorders, who show maladaptive patterns of feelings, thoughts and behaviors. Results from this validation have to prove that the PERSONA test can detect mentioned maladaptive patterns in individuals in occupational settings. Conversely the *high-risk population* sample refers to individuals employed in high-risk professions, who experience short and/or long periods of intense stress (e.g. soldiers). Norms gathered during clinical validation will be used in order to detect non-resilient individuals on the high-risk sample, in order to prove the criterion validity. Samples will be retested after three weeks, in order to provide information about test-retest reliability and again after three months, in order to provide information about change in time-conscious variables measured in test (i.e. cognitive schemas and production function).

In order to show the financial benefits of the testing, data regarding work efficiency, inoperative days, hospitalization and results from other psychological evaluations of tested soldiers will be gathered during the following months. The objective of the validation process is to prove that the usage of the PERSONA test is able to decrease work-absenteeism by an estimated 30%, which would lead to the reduction of the related economic costs.

CONCLUSIONS

Stress-related traumas cause soldiers to not be present at work (i.e. bringing inoperative days) or leave the army (i.e. bringing turnover). In order to minimize this problem, we developed a two-phase model, estimating the process of production of coping behaviors on the basis of cognitive schemas. Consequent to the creation of the model, we created a screening method to select the individuals who are more likely to have an appropriate behavioural response to any arbitrary stress, by testing both upon recruitment and during monitoring. This is achieved by bridging self- and world-schema concepts and stress coping defense mechanism maturity level analysis.

Consequent to evaluation and validation with very diverse population data, our expectations are that the instrument will be able to provide as output an accurate likelihood distribution over a behaviour spectrum in any arbitrary state of stimulation, given as inputs the estimates of the current state of mind and coping defense mechanisms. This, according to the authors, constitutes a major introduction to the theory and practice of human resource management, aiming to reduce lack of maladaptive behaviour in military personnel, and consequently inoperative days and turnover.

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REFERENCES

- Andrews, G., Pollock, C., & Stewart, G. (1989). The determination of defense style by questionnaire. *Archives of general psychiatry*, 46(5), 455-460.
- Beck, A. T., Steer, R. A., & Brown, G. K. (1996). Beck depression inventory-II. *San Antonio*, 78(2), 490-8.
- Arbanasić, K. & Kirk, N. H. (2017). Understanding Resilience by relating Stimuli Optimality to Schema Constructs. In *Proceedings of the 59th Annual Conference of the International Military Testing Association*.
- Kirk, N. H. & Arbanasić, K. (2017). An assessment method for monitoring reliability of individuals in high risk professions, via stress defense maturity analysis and artificial intelligence. 28th September 2017. Italian Patent Application No: 102017000108892.

Blake, D. D., Cook, J. D., & Keane, T. M. (1992). Post-traumatic stress disorder and coping in veterans who are seeking medical treatment. *Journal of clinical psychology*, 48(6), 695-704.

Bond, M. (2004). Empirical studies of defense style: relationships with psychopathology and change. *Harvard review of psychiatry*, 12(5), 263-278.

Bond, M., Paris, J., & Zweig-Frank, H. (1994). Defense styles and borderline personality disorder. *Journal of Personality Disorders*, 8(1), 28-31.

Butcher, J. N. (2001). Minnesota Multiphasic Personality Inventory (MMPI).

Campbell-Sills, L., Cohan, S. L., & Stein, M. B. (2006). Relationship of resilience to personality, coping, and psychiatric symptoms in young adults. *Behaviour research and therapy*, 44(4), 585-599.

Chemtob, C. M., Novaco, R. W., Hamada, R. S., Gross, D. M., & Smith, G. (1997). Anger regulation deficits in combat-related posttraumatic stress disorder. *Journal of traumatic stress*, 10(1), 17-36.

Chemtob, C., Roitblat, H. L., Hamada, R. S., Carlson, J. G., & Twentyman, C. T. (1988). A cognitive action theory of post-traumatic stress disorder. *Journal of Anxiety Disorders*, 2(3), 253-275.

Dekel, R., Solomon, Z., Elklit, A., & Ginzburg, K. (2004). World assumptions and combat-related posttraumatic stress disorder. *The Journal of social psychology*, 144(4), 407-420.

Elhai, J. D., Contractor, A. A., Palmieri, P. A., Forbes, D., & Richardson, J. D. (2011). Exploring the relationship between underlying dimensions of posttraumatic stress disorder and depression in a national, trauma-exposed military sample. *Journal of affective disorders*, 133(3), 477-480.

Fear, N. T., Jones, M., Murphy, D., Hull, L., Iversen, A. C., Coker, B., ... & Greenberg, N. (2010). What are the consequences of deployment to Iraq and Afghanistan on the mental health of the UK armed forces? A cohort study. *The Lancet*, 375(9728), 1783-1797.

Fowler, D., Freeman, D., Smith, B. E. N., Kuipers, E., Bebbington, P., Bashforth, H., ... & Garety, P. (2006). The Brief Core Schema Scales (BCSS): psychometric properties and associations with paranoia and grandiosity in non-clinical and psychosis samples. *Psychological medicine*, 36(6), 749-759.

Grey, N., Young, K., & Holmes, E. (2002). Cognitive restructuring within reliving: A treatment for peritraumatic emotional “hotspots” in posttraumatic stress disorder. *Behavioural and cognitive psychotherapy*, 30(1), 37-56.

Harms, P. D., Krasikova, D. V., Vanhove, A. J., Herian, M. N., & Lester, P. B. (2013). Stress and emotional well-being in military organizations. In *The Role of Emotion and Emotion Regulation in Job Stress and Well Being* (pp. 103-132). Emerald Group Publishing Limited.

Heinrichs, M., Wagner, D., Schoch, W., Soravia, L. M., Hellhammer, D. H., & Ehlert, U. (2005). Predicting posttraumatic stress symptoms from pretraumatic risk factors: a 2-year prospective follow-up study in firefighters. *American Journal of Psychiatry*, 162(12), 2276-2286.

Heinrichs, M., Wagner, D., Schoch, W., Soravia, L. M., Hellhammer, D. H., & Ehlert, U. (2005). Predicting posttraumatic stress symptoms from pretraumatic risk factors: a 2-year prospective follow-up study in firefighters. *American Journal of Psychiatry*, 162(12), 2276-2286.

Harvey, A. G., Bryant, R. A., & Tarrier, N. (2003). Cognitive behaviour therapy for posttraumatic stress disorder. *Clinical psychology review*, 23(3), 501-522.

Hoge, C. W., Lesikar, S. E., Guevara, R., Lange, J., Brundage, J. F., Engel Jr, C. C., ... & Orman, D. T. (2002). Mental disorders among US military personnel in the 1990s: association with high levels of health care utilization and early military attrition. *American Journal of Psychiatry*, 159(9), 1576-1583.

Janoff-Bulman, R. (1989). Assumptive worlds and the stress of traumatic events: Applications of the schema construct. *Social cognition*, 7(2), 113-136.

Karlsen, E., Dybdahl, R., & VittersØ, J. (2006). The possible benefits of difficulty: How stress can increase and decrease subjective well-being. *Scandinavian Journal of Psychology*, 47(5), 411-417.

Litt, M. D. (1988). Cognitive mediators of stressful experience: Self-efficacy and perceived control. *Cognitive therapy and research*, 12(3), 241-260.

MET HQ Performance and Assurance (2014). *Stress Related Sickness Absence for MPS Police Officers*. Retrieved from https://beta.met.police.uk/globalassets/foi-media/disclosure_2015/january_2015/met-hq--human-resources---stress-related-leave-police-officers-working-for-the-mps-have-taken-in-the-last-5-years

Moran, S., Burkner, E. J., & Schmidt, J. (2013). Posttraumatic growth and posttraumatic stress disorder in veterans. *Journal of Rehabilitation*, 79(2), 34.

Perrewe, P. L., Rosen, C. C., & Halbesleben, J. R. (Eds.). (2013). *The Role of Emotion and Emotion Regulation in Job Stress and Well Being*. Emerald Group Publishing.

Schaubroeck, J. M., Riolli, L. T., Peng, A. C., & Spain, E. S. (2011). Resilience to traumatic exposure among soldiers deployed in combat. *Journal of occupational health psychology*, 16(1), 18.

Solomon, Z., Mikulincer, M., & Avitzur, E. (1988). Coping, locus of control, social support, and combat-related posttraumatic stress disorder: A prospective study. *Journal of personality and social psychology*, 55(2), 279.

Spielberger, C. D., Gorsuch, R. L., Lushene, R. E., & Vagg, P. R. (2010). State-trait anxiety inventory (STAI). *BiB*, 1970, 180.

Vaillant, G. E. (1994). Ego mechanisms of defense and personality psychopathology. *Journal of abnormal psychology*, 103(1), 44.

Vitzthum, K., Mache, S., Joachim, R., Quarcoo, D., & Groneberg, D. A. (2009). Psychotrauma and effective treatment of post-traumatic stress disorder in soldiers and peacekeepers. *Journal of Occupational Medicine and Toxicology*, 4(1), 21.

Waugh, C. E., & Koster, E. H. (2015). A resilience framework for promoting stable remission from depression. *Clinical Psychology Review*, 41, 49-60.