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Personality, coping, and PTSD severity among Dutch veterans: a mediation analysis.

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“The most persistent sound which reverberates through man’s history is the beating of war drums.” - Arthur Koestler

Abstract: This study examines how personality and coping influence PTSD severity among 182 Dutch veterans. Neuroticism, Extraversion, and Conscientiousness were associated with different coping strategies, and these were in turn associated with PTSD severity. As expected, Neuroticism predicted higher PTSD severity and Extraversion predicted lower PTSD severity. Conscientiousness was not significantly related to PTSD severity. Passive coping predicted higher PTSD severity, Active coping and Seeking social support were not associated with PTSD severity. It was found that the relationship between Neuroticism and PTSD severity is mediated by Passive coping. This study is the first to examine such a mediation effect and discusses implications for future research and practical implementations.

Introduction

Global processes such as increasing levels of modernization and civilization have not discontinued the occurrence of wars worldwide. Even the most developed Western countries continue to provide military training for their citizens. In Holland, over 45.000 men and women are currently active as military personnel in uniform and there are over 110.000 veterans (Veterans Institute, 2011). A military living environment is very dissimilar to the average Dutch living environment, among other reasons because of the enormous group cohesion one experiences and the strong collective identity one develops, which might even come to overshadow one's own personal identity. Such an environment in itself already has a significant impact on one's sense of identity and psychological wellbeing (Alexander, 2004). What is even more important and of relevance for the current research is that being in the military greatly enhances the risk of being exposed to traumatizing events.

Veterans, (ex-) military personnel who served the country in situations of war or similar circumstances, can be exposed to life-threatening and horrific events, concerning themselves as well as others, which can evoke intense feelings of anxiety, disgust, or helplessness (Hyer, McCranie, Boudewyns & Sperr, 1996). Individuals are diagnosed with PTSD when they have been exposed to a traumatic experience that is continuously being relived, they suffer from an increased arousal level, and they avoid trauma-related stimuli. The disorder must exist for at least a month, and must have a significant negative impact on the individual's normal functioning (American Psychiatric Association, 2000). Considering that veterans experience numerous and intense traumatic events, and that the average prevalence of PTSD in Holland is about 8%, it seems surprising that only about 3-4% of them is diagnosed with PTSD (Engelhard et al., 2007). From this follows a question that interests many and the answer to which has meaningful implications for military selection procedures as well as psychological intervention development (Peng, Riolli, Schaubroek & Spain, 2012). What differentiates those who develop PTSD from those who do not? The current research aims to elucidate this question.

Among well-established factors such as social support, physical and psychological wellbeing (Ozer, Best, Lipsey & Weiss, 2003), personality factors are strongly related to the development of PTSD. Personality has been found to significantly predict the development of PTSD in soldiers (Rademaker, Zuiden, Vermetten & Geuze, 2011). Personality constitutes the distinct and characteristic patterns of thought, emotion, and behavior that form an individual's

personal style of interacting with the physical and social environment. It is generally defined as rather stable over the lifespan, although some adaptations do occur, possibly in reaction to certain life circumstances. Importantly, we often seek environments that suit our personalities well, thereby reinforcing existing traits; elements of personality (Nolen-Hoeksema, Fredrickson, Loftus & Wagenaar, 2009). Despite the still numerous possible frameworks through which personality can be considered, a consensus of five trait dimensions that encompass human diversity and cover most of what we mean when referring to personality has emerged. The ‘Big Five’, as this model is called, have consistently emerged from a wide variety of personality tests (McCrae & Costa, 1999). The Big Five comprises Openness to experience, reflecting levels of curiosity, independent judgment, and conservativeness; Conscientiousness, encompassing dimensions such as careful-careless, reliable-undependable and reflecting one’s level of self-control in planning and organization; Extraversion, reflecting the degree of sociability, positive emotionality, and general activity, and entailing dimensions such as spontaneous-inhibited and sociable-retiring; Agreeableness, reflecting one’s altruistic, sympathetic, and cooperative tendencies; and Neuroticism, the tendency to experience negative emotions and psychological distress in response to stressors, involving dimensions such as worrying-calm, vulnerable-hardy, and insecure-secure (McCrae & Costa, 1987).

Particularly Neuroticism, Extraversion, and Conscientiousness have consistently been linked to certain mental health outcomes. High Neuroticism is related to worse overall mental health outcomes, and to higher PTSD symptoms in Dutch soldiers specifically (Rademaker et al., 2011). Low Extraversion is associated with more PTSD symptoms in veterans (Rademaker et al., 2011). Low Conscientiousness is related to more injury-related PTSD symptoms (Fauerbach, Lawrence, Schmidt, Munster & Costa, 2000) as well as to PTSD among veterans (Peng et al., 2012). Moreover, in both a traumatized refugee population and a disaster-survivors population, resilient individuals were characterized by traits as low Neuroticism, high Extraversion and high Conscientiousness (Ghazinour, Richter & Eisemann, 2003; North, Abbachi & Cloninger, 2012). In an attempt to replicate these findings, 3 hypotheses relating personality to PTSD will be investigated in the current research. *(H1a:) Neuroticism is positively associated with PTSD severity. (H1b:) Extraversion is negatively associated with PTSD severity. (H1c:) Conscientiousness is negatively associated with PTSD severity.*

Most studies investigating the associations between personality and mental health outcome have been correlational, which thwarts drawing conclusions about the mechanisms underlying these relationships. Nevertheless, researchers have posited possible mechanisms,

and suggested these for future research. For example, while combat exposure will likely generate negative feelings in most individuals, those high in Neuroticism may respond more negatively because of their pessimistic tendencies (Grant & Langan-Fox, 2007; Suls & Martin, 2005). Personality may also affect individuals' exposure to different stressors, thereby affecting their mental health status (Bolger & Zuckerman, 1995). Most studies, however, have emphasized the key role of coping in the relationship between personality and mental health, generally as well as combat-related PTSD-specifically (Peng et al., 2012; Bolger & Zuckerman, 1995).

While coping has been related to health, even in traumatic circumstances, its relationship to psychological wellbeing is much less researched and clear-cut (Peng et al., 2012). Coping is defined as “constantly changing cognitive and behavioral efforts to manage specific external and/or internal demands that are appraised as taxing or exceeding the resources of the person” (Lazarus & Folkman, 1984, p.141). Among various approaches to classifying the large number of coping strategies, Active problem-focused coping and Passive avoidant coping are considered encompassing and useful distinguishing dimensions (Folkman & Moskowitz, 2004). Seeking social support is unique in utilizing resources in one's social network, and is therefore understood as a separate, third main category of coping (Connor-Smith & Flachsbart, 2007). Whereas Active coping involves managing the stressor itself, focusing on situational demands, and initiating a plan of action, Passive coping rather involves behaviors and thoughts directed at escaping from the stressor (Peng et al., 2012). Seeking social support involves turning to others to discharge distress, seek out empathy, and seek solutions to one's problems from others (Peng et al., 2012). Whereas in the short term avoiding the stressor may reduce one's anxiety (Suls & Fletcher, 1985), in the long term it does not serve to overcome the trauma and even promotes distress (Begley, 1998). Active coping and Seeking social support have consistently been associated with better (mental) health outcomes, in the general population (Brewin, 2003) and in a population of traumatized veterans (Nezu & Carnevale, 1987). In a study of personality and coping among Gulf war veterans, both these factors differentiated between those with chronic fatigue syndrome and healthy individuals (Fiedler et al., 2000). In order to investigate whether the current sample replicates the links between coping and PTSD, the following 3 hypotheses will be researched. *(H2a:) Active coping is negatively related to PTSD severity. (H2b:) Passive coping is positively associated with PTSD severity. (H2c:) Seeking social support is negatively associated with PTSD severity.*

Now that a framework is set from which it appears that both personality and coping influence whether or not a traumatized individual will develop PTSD, the question arises how personality and coping relate to each other and how they work together to affect PTSD severity. Individuals' personality configurations are believed to predispose them to choosing certain coping strategies. In a sample of athletes, Allen and colleagues (2011) found a positive relationship between Extraversion and Conscientiousness and Active coping as well as a negative relationship between Neuroticism and Active coping. Even more so, several meta-analyses have found fairly consistent links between Neuroticism and Passive coping (Murberg, 2009), between Extraversion and Seeking social support and Active coping (Connor-Smith & Flachsbart, 2007), and between Conscientiousness and Active coping (Peng et al., 2012). The well-established link between Neuroticism and ineffective coping might result from the negative and pessimistic responses to stressors, leading persons high in Neuroticism to cope more passively and ruminate about their negative feelings, maintaining a vicious circle. Moreover, perceiving that a situation is unlikely to improve may prevent such individuals from taking actions directed to solving their problem (Peng et al., 2012). The tendency of persons high in Extraversion to relate to and communicate with others renders them more likely to seek out social support, which may help them to overcome experienced stress (Zellars & Perrewe, 2001). Moreover, their more energetic nature facilitates Active coping (Holahan & Moos, 1991). Conscientious individuals facing a potentially stressful situation are more likely to perceive that they have control over the situation, and will therefore be more motivated to make specific plans and effectively pool available resources to solve the problem (Bamberger & Bacharach, 2006). The theoretical match, also observed in reality, between the three personality dimensions Neuroticism, Extraversion, and Conscientiousness with the three main coping strategies (McCrae & Costa, 1986; Peng et al., 2012) led to the hypotheses relating personality to coping. *(H3a:) Neuroticism is positively associated with Passive coping and negatively associated with Active coping. (H3b:) Extraversion is positively associated with Seeking social support and Active coping. (H3c:) Conscientiousness is positively associated with Active coping and negatively associated with Passive coping.*

It follows from the before-mentioned theory and findings that individuals' coping strategies may affect how their personality influences their PTSD symptoms. The transactional model developed by Lazarus and Folkman (1987) theoretically underpins this mediation relationship. This model emphasizes that 'causal antecedents' affect psychological wellbeing in short- and long-term through 'mediating processes'. In the current research,

personality is the causal antecedent, coping the mediating process, and PTSD severity the psychological outcome. The transactional nature of the relationship means that in the relationship, the independent identities of the separate processes are lost in favor of a new state or process. In this research this means that coping should not only be regarded as a property of the environment or the person exerting its own influence upon PTSD severity, but also as a process influenced by an individual's personality and thereby affecting PTSD severity, after experiencing traumatic events (Lazarus & Folkman, 1987). If indeed the impact of personality on PTSD severity is mediated by coping, this would have significant implications for training and treating soldiers and veterans. Since coping is more amenable to change than personality, soldiers-to-be could be taught coping strategies that are found to be effective in order to minimize the risk of PTSD. In order to investigate this mediating relationship, the following hypothesis will be researched. (*H4:*) *The relationship between personality and PTSD severity is mediated by coping.*

Methods

Participants

The data were collected from veterans, forwarded for diagnostic and treatment purposes to Centrum '45, a specialized center for psychological trauma, with psychological problems resulting from traumatic experiences during their military service. The data were collected between August 2005 and October 2012. In this period, 334 veterans enrolled in Centrum '45. Due to partial digitalization, data are only available from some veterans. The total sample (N = 182) includes 179 males and 3 females.

Measures

The degree of PTSD severity was assessed with two measures: the Zelf Inventarisatie Lijst (ZIL-22, Bramsen, Hovens & van der Ploeg, 2000) and the Harvard Trauma Questionnaire (HTQ, Mollica et al., 1996). The ZIL-22 is a self-report instrument whereby participants are asked to score 22 4-point scale items. The instrument has strong reliability and validity, with a sensitivity of .86 and a specificity of .71 (Bramsen et al., 1994). The HTQ is a self-report instrument consisting of 16 4-point scale items. Since this questionnaire is also available in Dutch, participants were able to answer the questions independently. The HTQ is

rated as a reliable and valid instrument (Kleijn, Hovens, & Rodenburg, 2001) with a sensitivity of .78 and a specificity of .65 (Mollica et al., 1992).

An individual's preferred coping style was measured with the COPE-EASY (Kleijn, van Heck & Van Waning, 2000). This self-report questionnaire consists of 32 items to be scored on a 4-point scale. The complete questionnaire has a reliability of .80. The internal consistency of the subscales is relatively good ($\alpha = .70$ to $.92$). Only 'seeking distraction' has a relatively low internal consistency: .58 (Kleijn et al., 2000). The current research employs 3 main dimensions of coping that can be derived from adding scores from 22 items. Active coping is derived from 10 items, passive coping from 6, and seeking social support from 6. This is a well-established method for interpreting the COPE-EASY in a clinically and empirically valid and meaningful manner (Kleijn et al., 2000).

Personality, specifically the traits Neuroticism, Extraversion, and Conscientiousness, was assessed with the NEO-Five Factor Inventory (NEO-FFI, Costa & McCrae, 1992). This is a self-report questionnaire with 60 items that are scored on a 5-point Likert scale. It is one of the most widely used instruments to measure personality and each of the five domains (Neuroticism, Extraversion, Conscientiousness, Openness, and Agreeableness) possesses adequate internal consistency ($\alpha = .68$ to $.86$) and temporal stability ($r = .86$ to $.90$). Scores for each domain are obtained by summing the 12 item responses belonging to each of the subscales (Rosellini & Brown, 2011).

Procedure

As the data were initially not collected for research purposes, no fixed procedure was used to obtain the data. The veterans completed the questionnaires during their intake for diagnostic and treatment purposes. The questionnaires used in this research are only a few of the larger test battery that was completed by the veterans during the intake. Informed consent was obtained from all clients before they completed the questionnaires.

Data analysis

Some of the veterans had completed the ZIL-22, whereas others had completed the HTQ. After comparing the content and statistical specifics of both instruments it was concluded that they could be combined as a measure of PTSD to provide a larger number of participants, thereby increasing the reliability of the research. To investigate the relationship between dependent variable (dv) 'PTSD severity' and independent variable (iv) 'personality', as well as between 'PTSD severity' (dv) and 'coping' (iv), a multiple regression analysis was

conducted. Post-hoc power analyses revealed that the power of these analyses was very high (>99%) (Soper, 2013). Moreover, multiple regression analyses were conducted to investigate the relationship between (iv) 'personality' and (dv) 'coping'. Post-hoc power analyses revealed that power was less than desirable for some of the models, ranging from 54 to 95% (A(Active coping)(N+E)=79%; A(C+E)=90%; B(Passive coping)(N+E)=73%; B(C+E)=54%; C(Seeking social support)(N+E)=95%; C(C+E)=80%) (Soper, 2013).

To draw conclusions about a population based on a regression analysis conducted on a sample, several assumptions must be met (Field, 2009). All predictor variables were quantitative and the outcome variable was quantitative, continuous, and unbounded. There was no non-zero variance in any of the predictors. By checking the plot of the standardized predicted values of the dependent variable based on the model (*ZPRED) plotted against the standardized residuals, or errors (*ZRESID), it was concluded that the assumptions of homoscedasticity and normally distributed errors were met. The assumptions of independent errors and of independence were also met, meaning that for any two observations the residual terms were uncorrelated and that all values of the outcome variable were independent. The mean values of the outcome variable for each increment of the predictors lie along a straight line, thereby meeting the assumption of linearity.

Regarding the assumption of no multicollinearity some complications arose. Looking at the tolerance statistics it would be concluded that the assumption has been met, since these values were between .530 and .997, whereas only values below 0.1 (Bowerman & O'Connell, 1990) or 0.2 (Menard, 1995) are reason for concern. Following the variance inflation factors (VIF), however, it would be concluded that multicollinearity may in fact be biasing the regression model, since all VIF values were between 1.003 and 1.887, and if the average VIF is greater than 1 multicollinearity may be biasing the model (Bowerman & O'Connell, 1990). Also, rules of thumb indicate that correlations of .5 or higher might be alarming and, as can be seen in the correlation table below (Table 2), especially Neuroticism and Conscientiousness correlate highly ($r = -.648$, $p = .000$). Moreover, the sample size is relatively small, which exacerbates the possible bias caused by multicollinearity. Finally, these concerns were confirmed when a regression analysis with Neuroticism, Extraversion, and Conscientiousness in one predicting model was conducted, and it was found that many highly significant relationships (as was found in the correlational analysis), for example with PTSD or with Active coping, disappeared. It was thus concluded that multicollinearity is indeed biasing the regression model. Hence, in each analysis whereby Personality is used as the iv, 2 separate

regression models will be used, in order for Neuroticism and Conscientiousness to not be in a model together. In this way, the problem of multicollinearity was bypassed.

To investigate the third hypothesis of the current research, a mediation analysis following Preacher and Hayes' method (2004) was conducted. To enable such an analysis, a significant three-way relationship between the variables must exist. Hence, the relationships between Personality and Coping, between Personality and PTSD severity, and between Coping and PTSD severity must be significant.

Results

Descriptive statistics

Table 1 displays the relevant descriptive statistics. The total sample (N = 182) consists of 179 males and 3 females. At the time of data collection the average age of the respondents was 40.49 years (SD = 9.13, range 23 – 68). We obtained PTSD severity measures from 100% of the participants, whereby the average score was 54.03 (SD = 21.86, range 0 – 96.97). Personality measures were obtained from 35.71% of the participants (N = 65). The mean of the average Neuroticism score was 3.30 (SD = .76, range 1.50 – 4.83). The mean of average Extraversion was 2.92 (SD = .66, range 1.50 – 4.33). The mean of average Conscientiousness was 3.42 (SD = .54, range 2.33 – 4.58). Coping measures were obtained from 62.64% of the participants (N = 114). The mean of the average Active coping score was 2.61 (SD = .58, range 1.30 – 4.00). The mean of average Seeking social support was 2.23 (SD = .61, range 1.17 – 4.00). The mean of average Passive coping was 1.96 (SD = .44, range 1.17 – 3.50). Personality and coping measures were obtained from only 35.71% and 62.64% of the participants because throughout the years of data collection, different sets of tests were administered to new clients. Hence, personality and coping measures were only part of this set in a number of years.

Table 1. *Descriptive statistics*

Variable	N (%)	M	SD	Range
Age	182 (100%)	40.49	9.13	23.00 – 68.00
<i>Gender</i>				
Male	179 (98.35%)			
Female	3 (1.65%)			
PTSD severity	182 (100%)	54.03	21.86	0 - 96.97
<i>Personality</i>				
Neuroticism	65 (35.71%)	3.30	.76	1.50 - 4.83
Extraversion	65 (35.71%)	2.92	.66	1.50 - 4.33
Conscientiousness	65 (35.71%)	3.42	.54	2.33 - 4.58
<i>Coping</i>				
Active coping	114 (62.64%)	2.61	.58	1.30 – 4.00
Passive coping	114 (62.64%)	1.96	.44	1.17 - 3.50
Seeking social support	114 (62.64%)	2.23	.61	1.17 – 4.00

Correlational analysis

Table 2 presents Pearson’s correlation coefficients and their significance for all the variables.

Table 2. *Correlations among the variables*

Variable	Neuroticism	Extraversion	Conscientious- ness	Active coping	Seeking social support	Passive coping
Extraversion	-.47**					
Conscientious	-.65**	.50**				
Active coping	-.35**	.25*	.41**			
Seeking social support	.07	.35**	.10	.52**		
Passive coping	.32**	-.24	-.25*	-.01	.05	
PTSD severity	.47**	-.55	-.44**	-.18	-.18	.48**

* indicates significance above the .05 level

** indicates significance above the .01 level

Personality and PTSD severity

With respect to the hypotheses that Neuroticism is positively associated with PTSD severity, and both Extraversion and Conscientiousness are negatively associated with PTSD severity, two multiple regression analyses were conducted (one in which Neuroticism and Extraversion are predictors, and one in which Conscientiousness and Extraversion are predictors). The results of these analyses are shown in Table 3.

Table 3. *Personality and PTSD severity*

Personality	PTSD severity		
	B	β	<i>p</i>
Neuroticism	8.15	.27	.021*
Extraversion (N + E model)	-14.94	-.43	.000*
Extraversion (C + E model)	-15.62	-.45	.000*
Conscientiousness	-9.04	-.21	.079

(N+E) $R^2 = .36$, $F(2, 62) = 17.78$, $p = .000^*$

(C+E) $R^2 = .34$, $F(2, 62) = 16.05$, $p = .000^*$

*indicates significance above the .05 level

More than 36 or 34% of the variance in PTSD severity can be explained by the models consisting of these 3 independent variables. A higher Neuroticism score significantly predicted higher PTSD severity; the standardized regression coefficient (β) was .27, and the unstandardized regression coefficient (B) was 8.15, meaning that an increase of 1 on the average Neuroticism score (on a 5-point scale) was associated with a 8.15 increase on PTSD severity (on a scale from 0-100) ($p \leq .05$). A higher Extraversion score was associated with lower PTSD severity ((N+E) B = -14.94, $\beta = -.43$, $p \leq .001$; (C+E) B = -15.62, $\beta = -.45$, $p \leq .001$). An increase of 1 on the average Extraversion score (on a 5-point scale) was associated with a 14.94 or 15.62 decrease on PTSD severity. This variable explained the most variance in the dependent variable. Conscientiousness ($\beta = -.21$) did not significantly predict PTSD severity.

Coping and PTSD severity

The associations between coping and PTSD were investigated by means of a multiple regression analysis. The results are displayed in Table 4.

Table 4. *Coping and PTSD severity*

Coping style	PTSD severity		
	B	β	<i>p</i>
Active coping	-3.73	-.10	.301
Seeking social support	-5.28	-.15	.125
Passive coping	23.90	.48	.000*

$R^2 = .27, F(3, 110) = 13.76, p = .000^*$

* indicates significance above the .05 level

Over 27% of the variance in PTSD severity could be explained by this model ($p \leq .001$). An increase of 1 on the average Passive Coping scale (on a 4-point scale) was associated with an increase of 23.90 on PTSD severity (on a scale from 0-100). Moreover, this iv was the most important in explaining the variance in PTSD severity. Active Coping ($\beta = -.10$) and Seeking Social Support ($\beta = -.15$) did not significantly predict PTSD severity.

Personality and coping

Regarding the hypotheses relating the three different coping styles to the three personality traits, three distinct multiple regression analyses were conducted. Each one of these analyses had a different coping style as the dv, and the three personality variables as the three iv's. Again, each analysis was conducted twice, once with N and E as predictors, and once with C and E as predictors.

Table 5. *Personality and Coping*

Personality	A: Active coping			B: Passive coping			C: Seeking social support		
	B	β	<i>p</i>	B	β	<i>p</i>	B	β	<i>p</i>
Neuroticism	-.22	-.29	.034*	.16	.27	.051	.25	.30	.023*
Extraversion (N+E)	.10	.12	.390	-.08	-.12	.389	.47	.12	.000*
Extraversion (C+E)	.06	.07	.629	-.11	-.16	.267	.39	.41	.004*
Conscientiousness	.40	.37	.007*	-.14	-.17	.236	-.13	-.11	.424

A (N+E) $R^2 = .13, F(2, 62) = 4.60, p = .014$

A (C+E) $R^2 = .17, F(2, 62) = 6.22, p = .003$

B (N+E) $R^2 = .12, F(2, 62) = 4.03, p = .023$

B (C+E) $R^2 = .08, F(2, 62) = 2.69, p = .076$

C (N+E) $R^2 = .20, F(2, 62) = 7.54, p = .001$

C (C+E) $R^2 = .13, F(2, 62) = 4.81, p = .011$

* indicates significance above the .05 level

As is displayed in Table 5, the 2 models can explain almost 13 or 17% of the variance in Active Coping (A). Neuroticism was uniquely negatively related to Active Coping, whereby an increase of 1 of the average Neuroticism scale was associated with a .22 decrease on the average Active coping score (on a 4-point scale) ($B = -.22, \beta = -.29, p \leq .05$). Conscientiousness was uniquely positively associated with Active Coping, whereby an increase of 1 on the average Conscientiousness scale was associated with a .40 increase on Active coping ($B = .40, \beta = .37, p \leq .05$). Extraversion was not uniquely related to the dv Active coping.

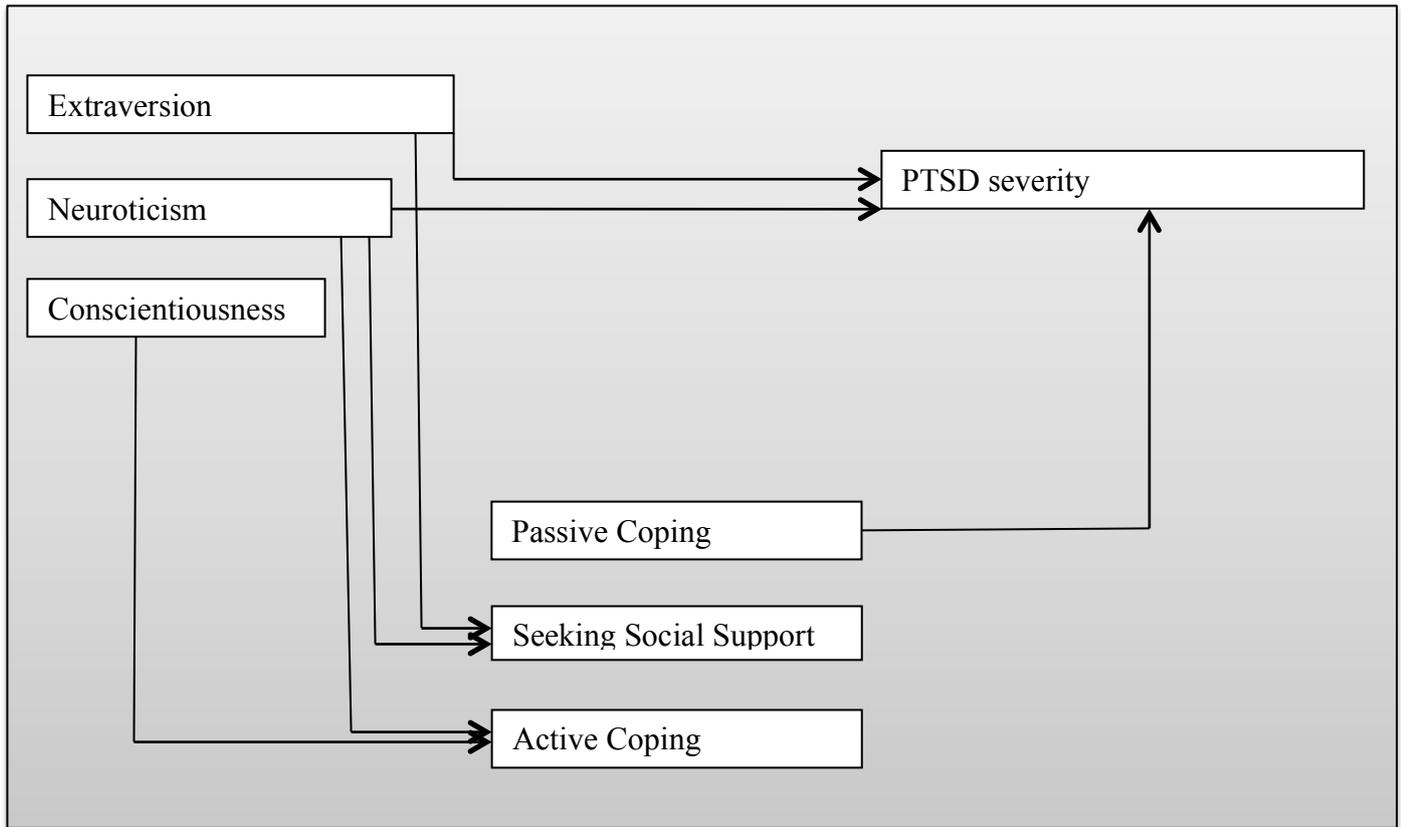
The model consisting of Neuroticism and Extraversion explained almost 12% of the variance in Passive coping (B) ($p \leq .05$). None of the predictors was significantly uniquely associated to Passive coping. However, there was a strong trend in which Neuroticism is positively related to Passive coping ($B = .16, \beta = .27, p = .051$). The model consisting of Conscientiousness and Extraversion did not significantly predict Passive Coping ($p = .076$).

The model consisting of Neuroticism and Extraversion explained almost 20% of the variance in Seeking social support (C) ($p \leq .001$). An increase of 1 on the average Neuroticism score was associated with a .25 increase on Seeking social support ($B = .25, \beta = .30, p \leq .05$). An increase of 1 on Extraversion was associated with a .47 increase on Seeking social support ($B = .47, \beta = .12, p \leq .001$). The model consisting of Conscientiousness and Extraversion explained 13.4% of the variance in Seeking social support ($p \leq .05$). Extraversion was uniquely positively related to the dependent variable ($B = .39, \beta = .41, p \leq .05$), but Conscientiousness was not ($p = .424$).

Personality – Coping –PTSD severity, mediation analysis

Despite the significant findings from the regression analyses, no significant three-way relationship was found between aspects of personality, aspects of coping, and PTSD severity. The arrows displayed in Figure 1 indicate the significant relationships.

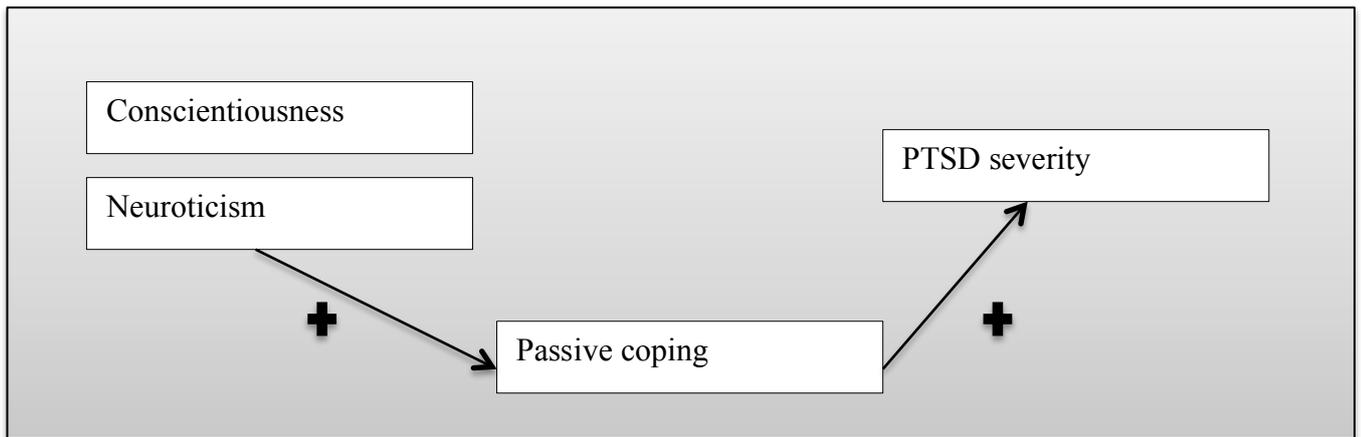
Figure 1. Relations among the variables resulting from regression analyses



If, however, the relationships among the variables are investigated with correlational analyses, so that the issue of multicollinearity is circumvented, a significant three-way relationship is found. As is displayed in Table 2, Neuroticism is significantly positively correlated with Passive coping ($r = .32, p < .05$), as is Conscientiousness ($r = -.25, p < .05$). This significant three-way relationship enables a mediation analysis, which was hence conducted following Preacher and Hayes's method (2004).

A mediation analysis with (iv's) Neuroticism and Conscientiousness, Passive coping as mediating variable, and (dv) PTSD severity was conducted following the bootstrap resampling method ($N=5000$). Regarding Conscientiousness, it was found that zero was within the 95% confidence-interval ($LLCI = -5.37; ULCI = 1.82$), which indicates that the negative relationship between Conscientiousness and PTSD severity is not mediated by Passive coping. Regarding Neuroticism, it was found that zero was not within the 95% confidence-interval ($LLCI = .24; ULCI = 5.29$). From these results it can be concluded that the positive relationship between Neuroticism and PTSD severity is mediated by Passive Coping. Figure 2 displays the mediation analysis that was eventually conducted. The arrows represent the significant mediation effect.

Figure 2. *Mediation analysis*



Discussion

This study, besides investigating whether previous findings linking personality to PTSD severity, coping to PTSD severity, and personality to coping could be replicated, tested a mediation model of personality, coping and PTSD severity on a sample of veterans in the Netherlands who were in treatment for their PTSD symptoms. The findings were largely consistent with the literature describing the associations between personality, coping, and mental health, and more specifically with the article by Peng and colleagues (2012). The current research is largely based on their format, but our focus is on PTSD as opposed to health more generally. Our findings suggest that Passive coping mediates the effect of Neuroticism on PTSD severity.

The hypotheses relating Neuroticism and Extraversion to PTSD severity (H1a and H1b) were confirmed. Since Neuroticism has consistently been found to be the most significant personality trait predicting different mental health outcomes (Lawrence & Fauerbach, 2003) such as PTSD severity (Kelly et al., 1998), it is not surprising that we replicated this strong association. Mechanisms of this association may be negative appraisals of the situation and one's ability to cope (Van den Hout & Engelhard, 2004) and, mainly, coping, which has been examined in this study.

The consistent link between Extraversion and PTSD severity has also been replicated. Lower levels of Extraversion hinder individuals to experience interpersonal intimacy, to enjoy the company and support of other people, and to experience feelings like happiness, joy, and excitement, which are all potential protective factors from mental disorders (Alejandro, 2004). The nature of the intensive group cohesion in the military might further exacerbate the

importance of Extraversion in the effect on PTSD severity in veterans specifically, as the ability to share experiences and feelings is even more important in such a close-knit environment.

High Conscientiousness did not predict less PTSD severity. The large construct overlap with Neuroticism, as is reported in the literature (Rosellini & Brown, 2012) and found in the current research, might conceal a possible effect of Conscientiousness. Moreover, the effective mechanism through which Conscientiousness mainly impacts PTSD severity is probably Active coping, which, however, did not predict PTSD severity. It must be noted that the regression analyses investigating the relationships between personality and coping suffered from low statistical power. Hence, the partial confirmations and partial disconfirmations of these hypotheses should be regarded very cautiously. Interestingly, Horen (1999) hypothesized that people high in Conscientiousness might be more likely and better able to feign PTSD, perhaps to ensure that they receive proper treatment or financial compensation. If this was the case in the current research, it might help explain the lack of negative relationship between Conscientiousness and PTSD severity.

The results confirm hypothesis H2b about the negative effects of Passive coping on PTSD severity. Passive coping has previously been related to long-term negative wellbeing among distressed veterans (Begley, 1998). The avoidance so characteristic of Passive coping is one of the core symptoms of PTSD (American Psychiatric Association, 2000). Indeed, avoidance PTSD symptoms are related to Passive coping (Waldrop & Resick, 2004). Hence, an artificial overlap in what is measured as PTSD and as Passive coping might exist, which would delegitimize the significant relationship. Future research should investigate this.

Active coping is generally associated with decreased mental health problems (Greenglass & Burke, 2000; Parkes, 1990) and low levels of Active coping have been related to the development of PTSD specifically (Gil, 2005). Our results disconfirm these findings. Since researchers have posited that Active coping is merely effective in low-stress situations (Sharkansky, King, King & Wolfe, 2000), the stressful nature of the veterans' experiences might explain our somewhat surprising results. The association between Active coping and PTSD severity has not been investigated much with veterans. The findings might not be generalizable to this group. Also, coping can be classified in multiple ways and alternative approaches might have offered different results.

The lack of significant relationship between Seeking social support and PTSD severity contrasts previous research which indicates that coping by Seeking social support may alleviate experienced stress regarding stress-related problems (Peng et al., 2012), particularly

in situations that are perceived as uncontrollable (Terry & Hynes, 1998). Other research however, indicates that Seeking social support is not very effective since it does little to alleviate or manage the stressor itself (Folkman & Moskowitz, 2004), which might explain the lack of relationship found in the current study.

The mediation analysis was eventually conducted based on correlational results because no significant three-way relationship was found with regression analysis. Most likely, this was due to multicollinearity biasing the model. It is important that future research investigates this, so that this hypothesis can be (dis-)confirmed and that mediation analyses can be conducted based on stronger statistical techniques. The positive effect of Neuroticism on PTSD severity was mediated by passive coping. This is consistent with research that has decisively found a positive relationship between Neuroticism and ineffective coping (Murberg, 2009), and with the claim that the nature of individuals high in Neuroticism leads them to engage in a passive coping style, thereby rendering the amelioration of problems or stressors unlikely (Peng et al., 2012). Following the transactional model by Lazarus and Folkman (1987), Neuroticism is found to be a causal antecedent exerting a long-term influence on PTSD severity through the mediating process of Passive coping. This advocates the usefulness of training workers in jobs that entail high risk of exposure to traumatic and stressful experiences to utilize more effective coping strategies. Psycho-education about coping and PTSD might increase awareness and the ability of contemplating and adjusting it. Passive avoidant coping can be discouraged by providing more effective alternatives, such as finding some aspects of life over which one can have personal control and employ an active coping style in these aspects (Peng et al., 2012). Moreover, there are some relevant implications for issues of personnel selection. This study suggests that individuals low in Neuroticism and high in Extraversion are less likely to be severely negatively affected by traumatic experiences. Hence, adding these components to selection batteries might be very useful; especially considering that personality factors appear to be valuable predictors of job performance as well (Hurtz & Donovan, 2000).

To our knowledge, this study is the first to test the mediating effect of coping on the effect of personality, specifically Neuroticism, Extraversion, and Conscientiousness, on PTSD severity among veterans. This research is based on empirically sound theory and research regarding PTSD, personality, and coping, and employs well-defined and frequently used instruments for measuring the constructs. It addresses a socially relevant theme, and offers valuable practical implications.

Some limitations should also be taken into account. The sample size rendered the power of the regression analyses regarding personality and coping less than desirable. Future research should aim for a larger sample in order to be able to draw conclusions in this realm. The reliability and validity of this research would improve with the mediation analysis based on regression analyses, instead of the correlational analyses currently used. Moreover, the cross-sectional design of this study renders it impossible to draw firm causal conclusions. A longitudinal design in future research is desirable so that causal conclusions may be drawn. Although the NEO-FFI is widely used and considered a reliable instrument for measuring personality, the construct overlap among the traits, especially Neuroticism and Conscientiousness, complicated the research, forcing the researchers to employ two different predictive models of personality, so that this problem would not interfere with the statistical usefulness of the results. Possibly, future research could employ a different measure of personality or even attempt to improve the NEO-FFI. All data used in the current research are based upon self-reports. Participants may have intensified their complaints in order to ensure a proper treatment (Lindman-Port, Engdahl, Frazier & Eberly, 2002), which would lower the reliability of the PTSD measure. Future research could employ multiple measures of PTSD severity, combining self-report data with more objective measures. The data did not provide information about the time elapsed between the traumatic experience and the administration of the self-report measures. This might affect the obtained results, for example, individuals' coping styles might have changed over time in reaction to the traumatic experiences and their impact. Future research should aim to control for the variable of time. Finally, investigating an even more complete transactional model of factors influencing the severity of PTSD would be interesting. For example, besides coping as a mediator between personality and PTSD severity, one's appraisal of the situation might also be important.

In conclusion, this research has replicated previous findings regarding the positive association between Neuroticism and PTSD severity, the negative association between Conscientiousness and PTSD severity, and the positive association between Passive coping and PTSD severity in a sample of Dutch veterans. It has added to the empirical literature the finding that the intensifying impact of Neuroticism on PTSD severity is mediated by Passive coping. These findings have important implications for personnel selection procedures, specialized training for high-risk workers, and psychological treatment for those suffering from PTSD.

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