

# Relationship between Personality Traits and Postural Stability among Czech Military Combat Troops

K. Rusnakova, D. Gerych, M. Stehlik

**Abstract**—Postural stability is a complex process involving actions of biomechanical, motor, sensory and central nervous system components. Numerous joint systems, muscles involved, the complexity of sporting movements and situations require perfect coordination of the body's movement patterns. To adapt to a constantly changing situation in such a dynamic environment as physical performance, optimal input of information from visual, vestibular and somatosensory sensors are needed. Combat soldiers are required to perform physically and mentally demanding tasks in adverse conditions, and poor postural stability has been identified as a risk factor for lower extremity musculoskeletal injury. The aim of this study is to investigate whether some personality traits are related to the performance of static postural stability among soldiers of combat troops. NEO personality inventory (NEO-PI-R) was used to identify personality traits and the Nintendo Wii Balance Board was used to assess static postural stability of soldiers. Postural stability performance was assessed by changes in center of pressure (CoP) and center of gravity (CoG). A posturographic test was performed for 60 s with eyes opened during quiet upright standing. The results showed that facets of neuroticism and conscientiousness personality traits were significantly correlated with measured parameters of CoP and CoG. This study can help for better understanding the relationship between personality traits and static postural stability. The results can be used to optimize the training process at the individual level.

**Keywords**—Neuroticism, conscientiousness, postural stability, combat troops.

## I. INTRODUCTION

COMBAT soldiers are in a group with an increased risk of injury due to incorrect posture and loss of balance. Postural stability has been identified as a risk factor for lower extremity musculoskeletal injury in the military. Soldiers are often required to carry heavy loads during deployment and tactical operations over long distances and difficult terrain [1]. One of the most important issues is to determine all the aspects affecting soldiers body balance system, increase performance and reduce risk of injury.

Personality is a set of psychological characteristics and behavioral mode (inclinations, interests and passions) that defines individual differences. The "Big Five" is a theory of personality traits which is based on five factors or dimensions: extraversion, agreeableness, conscientiousness, neuroticism,

and openness to experience (or intellect) [2]. In this study, we have concentrated on neuroticism and conscientiousness for the reason that conscientiousness and emotional stability are the most valid predictors of performance outcomes across different areas [3].

### A. Conscientiousness

Conscientiousness is a type of self-control related to the active process of planning, organizing and execution of tasks. People achieving a high score on this scale can be described as purposeful, ambitious, diligent, persistent, systematic, firm, disciplined, reliable, accurate and proper [2]. Conscientiousness has been associated with countless of positive outcomes across educational and personnel psychology, and appears to be the personality trait with the most predictive utility [4]-[6]. Facets of conscientiousness are associated with biomedical markers of health status including adiposity, blood markers and physical performance as well [7].

### B. Neuroticism

Emotional instability is defined by the depressed, nervous, anxious characteristics, with feelings of inferiority, low self-esteem, experiencing tension, moodiness, hostility and irritability [8]. Neuroticism can be also characterized as a difficulty to cope with the problems of everyday life. Authors define emotional instability, among other things, by impulsiveness, conceived as an inability to control desires and compulsions [9]. The scale of neuroticism determines how negative emotions such as fear, anxiety or dejection are experienced. People who achieve a high score of neuroticism are described as mentally unstable and their mental balance is easily disturbed. Unlike emotionally stable individuals, they report negative experiences and difficulties in overcoming them more often. They tend to be anxious, easily embarrassed, they feel ashamed, insecure, nervous, and they intensely experience fear, anxiety or sadness [2]. Both neuroticism and conscientiousness are related to sleep continuity (fewer interruptions) and better subjective sleep quality [10].

### C. Personality Traits and Sport Performance

Many studies [11]-[14] accomplished to monitor personality traits (extraversion, introversion) in relation to sports performance based on the Eysenck questionnaire. To understand the personalities of the athletes, researchers asked if they differed in personality from non-athletes, and whether there is a difference between athletes with different sport focus. In terms of the big five personality characteristics (neuroticism, extraversion, openness to experience,

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agreeableness and conscientiousness) previous research has shown significant difference between athletes and non-athlete students [11]. One of the few consistent findings is that athletes are usually more extraverted, emotionally stable [12], [13] and express stronger need for productivity and stimulation than non-athletes [14]. However, there is less agreement on how personality varies from sport to sport.

Sport may expose athletes to repeated emotional highs and lows, allowing their autonomic nervous system to adapt, which is leading to higher emotional stability. This implies that neuroticism may not differ too much between athletes and non-athletes at the beginning of the sport, but it may decline over time with athletes but remain constant with non-athletes (the developmental hypothesis). Another possibility is that there are both pre-existing differences in neuroticism and changes in it as a result of performing the activity. If this is the case, athletes would initially be less neurotic than non-athletes and this difference would be greater over time [12].

The athlete's personality characteristics based on the big five dimensions of personality relate to his preferred coping strategies in sport. While extrovert athletes, who were both emotionally stable and open to new experiences, reported greater use of problem-focused coping strategies, athletes scoring high in conscientiousness and athletes with high levels of extraversion, openness, and agreement report greater use of emotion-focused coping strategies. Athletes with low levels of openness or high levels of neuroticism report greater use of avoidance coping strategies. Sport-related coping strategies are important for sport performance and individual differences may contribute to the coping strategies adopted by athletes [15].

#### *D. Personality Traits and Posture*

Although research about sport performance and personality in the field of sports science has been studied, little is known about the relationship between the personality traits and postural stability. It is prerequisite for improving of the control movements in sport.

The body and mind are intimately connected and interact with each other. In accordance with the literature [16], [17] the posture may be an adaptation to emotional, psychological, and relational conditions. Previous research has shown that posture can affect the state of mind. Upright posture in sitting tends to increase access to positive thoughts and emotions while slouched sitting posture tends to increase access to negative thoughts and emotions [18], or psychological stress [19], body posture can affect anticipatory anxiety [20]. It is confirmed that changes in a person's affective state are reflected by changes in body posture. During episodes of depression, individuals with major depressive disorder experience changes in posture and mild dissatisfaction with body image. Feelings of excitement, self-confidence and contentment manifest themselves as an alert attitude and erect posture, whereas depression usually manifests as a slouching posture [21].

There is also an evidence of a relationship between posture and personality. According to [22] a direct relationship between posture and personality exists. As well, there is a

correlation between personality, posture and pain. Authors proved a relationship between ideal and kyphosis-lordosis postures and extraverted personalities. In turn, the study established a correlative relationship between flat back and sway-back postures with introverted personalities [22]. The possible evidence association between emotional stability and posture is based on the fact that musculoskeletal system and nervous system reciprocally are connected by the presence of proprioceptors and interoceptors. Emotional stability was associated with postural adjustment affecting, in particular, the cervical spine and legs. It could be assumed that symmetrical posture is not necessarily related to psychological balance, while asymmetrical posture may be a sign of good control of emotions and impulses [23]. Posture, stability, and mobility provide the model of the movement which is interconnected and interdependent. The basis of all movements begins with posture and is applicable to both static and dynamic conditions [24].

#### *E. Personality Traits and Postural Stability*

Efforts to measure balance performance may be confounded by the influence of psychological factors as well. There have been a lot of studies [25], [26] investigated the relationship between anxiety (as one of the main manifestations of neuroticism), mood states and postural stability. Significant negative correlations were found between moods (including anxiety), and the subject's sensory and motor systems of balance control. It suggests that low moods may alter balance performance [27].

Previous studies investigated interaction between anticipatory anxiety or state anxiety and postural control conditions [20]. Increased postural threat significantly affects postural control measures for simple and dynamic balancing tests. Physiological and state anxiety increases due to increased postural threat, while assessments of perceived stability and equilibrium efficacy decrease as a function of increased postural threat [26]. The level of stress was capable of influencing static postural stability. This influence was particularly evident when no visual information was available [28]. Fall anxiety caused by manipulation of the environment increased threat to postural control by introducing the possibility of harmful consequences in the event of a fall. Regardless of age, postural control is more conservative as anxiety increases, but age does not affect how anxiety affects the regulation of postural control [29]. Another study [30] explored whether specific personality traits and individual differences can predict changes in postural control when presented with a height-induced postural threat. Results showed that personality traits and individual differences significantly predicted height-induced changes in static, but not anticipatory postural control while.

It was found that anxiety disorders share common clinical features with balance disorders [32]. This comorbidity is probably mediated by shared neural circuits, especially the network of parabrachial nuclei. It also interconnects with the central nucleus of amygdaloid and is often cited as a substrate for anxiety and panic disorders [31].

As mentioned above, increased levels of anxiety have a

negative effect on postural control. Unfortunately, most studies [27], [29], [30] to date have examined only the postural stability performance in relation to the current degree of anxiety, with little attention to how attitude is influenced by the constant characteristics of neuroticism.

As analyzed in previous study the personality is related to postural stability of healthy young adults, and personality should be considered in prediction for individuals at risk of falling or in the treatment of individuals with balance difficulties. Higher neuroticism was related to increased dual task sway during the 2-back task and lower extraversion was related to increased dual task sway during the weather prediction task [33].

Recent work has explored the relationships between the body balance control and the big five personality traits in the sample of football players. While a high conscientiousness score was associated with more unstable body balance in the anteroposterior direction in the closed-eye conditions, a low conscientiousness score was associated with variability in COP in the anteroposterior direction in the open-eye trial [34].

The relation between personality and postural stability has received little attention. This study addressed whether neuroticism and extraversion are related to changes in postural stability and cognitive functioning during a standing balance task.

## II. METHODS

### A. Participants

Altogether, 98 soldiers (aged 23-41) of combat troops of Czech army participated in this study. All participants were men.

### B. Methodology

This study addressed whether facets of personality traits neuroticism and conscientiousness are related to changes in postural stability during upright stance. Some studies [31], [35], [42] have dealt only with the main personality characteristics of the Big Five Personality Traits but no one has examined the specific facets of personality traits. The aim of this study is to examine the association between six facets of Conscientiousness (C1: Competence, C2: Order, C3: Dutifulness, C4: Achievement Striving, C5: Self-Discipline, C6: Deliberation) and 6 facets of Neuroticism (N1: Anxiety, N2: Angry Hostility, N3: Depression, N4: Self-Consciousness, N5: Impulsiveness, N6: Vulnerability) and objective markers of postural stability (ellipse area of CoP and CoG). The second aim of this research is to investigate the relationship between neuroticism and conscientiousness and other facets of these personality traits.

### C. Statistical Procedure

Correlation analyses were used to examine the associations between the variables of postural stability and personality traits by Pearson correlation test ( $r$ ) values. The Pearson correlation coefficient efficiently characterizes the linear correlation between the attributes of the normal distribution. Data were analyzed using statistical software Statistica 13.

### D. Static Postural Stability

Postural stability was measured by movement of the CoG and CoP. CoP is the area of action of the vector reaction force, which can be calculated as the weighted average of all pressures sensed from the base of support. COG can be defined as the vertical projection of the CoG of the body into the pad [35]. Postural stability was assessed using a force platform Nintendo Wii Balance Board which was found to be a reliable assessment device [36]. The Nintendo Wii Balance Board is a two-plate force platform each equipped with four sensors located in every corner to assess the force distribution and the resulting movements in the CoP. The force platform detects the medial-lateral and the anterior-posterior displacement of the CoP and CoG.

The participants were asked to stand on the force platform without shoes, quietly, gazing straight ahead at the point on the wall, with feet spaced in the middle of the platforms, and arms by sides. The participant performed 60 seconds double-leg stance test with eyes opened.

The CoP and CoG parameters analysis included 95% Confidence Ellipse Area (EA), that is the ellipse that contains at least the 95 % of the CoP trajectory (in  $\text{mm}^2$ ), where the smaller the surface is, the better the performance is. CoP is calculated separately for left (LCoP) and right leg (RCoP).

### E. Personality Traits

Personality traits neuroticism and conscientiousness were measured using the Revised NEO Personality Inventory (NEO-PI-R) [9], consisting of 240-item statements to which participants indicate their level of agreement with regard to how well the statement describes their beliefs, attitudes and behaviors, using a 5-point scale ranging from strongly disagree to strongly agree. The NEO-PI-R was developed to measure the five-factor model of personality which includes specific facets of personality within each domain (neuroticism, extraversion, openness to experience, agreeableness, and conscientiousness) [9]. It is a useful tool in the employment selection context and for predicting future job and academic performance. Recent research has also supported its use in prediction of sports performance [37].

## III. RESULTS

The aim of this research was to find out the relationships between the postural stability and subscales of personality traits Neuroticism and Conscientiousness among military troops.

Descriptive statistics for measures of personality traits are presented in Tables I and - II. The mean scores of subscales of Neuroticism of NEO-PI-R in the sample of soldiers of combat troops differ from the average outcomes of the general population ( $MA = 15.05 \pm 5.73$ ;  $MAH = 13.95 \pm 5.49$ ;  $MD = 13.45 \pm 5.69$ ;  $MSC = 13.65 \pm 5.19$ ;  $MI = 16.91 \pm 5.38$ ;  $MV = 11.14 \pm 5.36$ ). Soldiers of combat units score higher on average in the individual subscales of neuroticism.

Average scores in subscales of Conscientiousness of NEO-PI-R in the sample soldiers combat units also differ from the normal population mean results ( $MC = 18.81 \pm 4.42$ ;  $MO =$

17.29 ± 5.15; MD = 22.31 ± 5.05; MAS = 19.70 ± 5.20; MSD = 18.33 ± 5.50; MD = 11.14 ± 5.36). Soldiers of combat troops have higher average scores in the subscales of conscientiousness.

TABLE I  
DESCRIPTIVE STATISTICS FOR MEASURES OF FACETS OF NEUROTICISM

	N1	N2	N3	N4	N5	N6
Min	1.00	1.00	1.00	2.00	1.00	1.00
Max	89.00	91.00	82.00	96.00	93.00	82.00
M	27.34	32.02	25.61	31.24	37.57	26.05
Mdn	21.00	23.00	19.00	24.00	34.00	22.00
SD	22.37	26.59	21.57	23.08	22.41	20.88
V	505.67	714.35	470.14	538.29	507.51	440.67

N1 = Anxiety, N2 = Angry Hostility, N3 = Depression, N4 = Self-Consciousness, N5 = Impulsiveness, N6 = Vulnerability.

TABLE II  
DESCRIPTIVE STATISTICS FOR MEASURES OF FACETS OF CONSCIENTIOUSNESS

	C1	C2	C3	C4	C5	C6
Min	12.00	2.00	16.00	4.00	7.00	4.00
Max	98.00	99.00	98.00	99.00	99.00	99.00
M	76.32	68.57	73.85	62.60	77.67	71.18
Mdn	82.00	73.00	79.50	67.00	81.00	79.00
SD	20.40	22.00	22.20	25.38	20.29	25.35
V	420.51	488.95	497.78	650.86	415.81	649.02

C1 = Competence, C2 = Order, C3 = Dutifulness, C4 = Achievement Striving, C5 = Self-Discipline, C6 = Deliberation.

The statistically significant positive and negative correlations among the parameters of postural stability and personality facets among combat troops are presented in Tables III and IV. One of the six facets of Neuroticism was associated with a marker of postural stability, while Anxiety, Angry Hostility, Depression and Vulnerability had fewer associations with these objective markers of postural control. Among combat troops Self-Consciousness significantly and positively correlated with RCoPEA ( $r = 0.23, p < 0.05$ ). Self-consciousness refers to a state of shyness or social anxiety. People with high scores on the Self-Consciousness subscale feel ashamed, embarrassed and are often embarrassed when performing in public. They are afraid of ridiculing others. Other positive correlations in the facets of neuroticism indicated that the better emotional stability the better the postural stability.

Five of the six facets of conscientiousness were associated with parameters of postural stability, these associations were of similar magnitude: Order was significantly and negatively correlated with RCoPEA ( $r = -0.21, p < 0.05$ ) and CoGEA ( $r = -0.22, p < 0.05$ ); while Dutifulness significantly and negatively correlated with RCoPEA ( $r = -0.24, p < 0.05$ ); Achievement Striving correlated with CoGEA ( $r = -0.24, p < 0.05$ ); Self-Discipline with RCoPEA ( $r = -0.25, p < 0.05$ ) and CoGEA ( $r = -0.21, p < 0.05$ ); Deliberation with RCoPEA ( $r = -0.27, p < 0.05$ ) and CoGEA ( $r = -0.27, p < 0.05$ ); Conscientiousness as a scale in itself was significantly and negatively correlated with RCoPEA ( $r = -0.26, p < 0.05$ ) and CoGEA ( $r = -0.25, p < 0.05$ ). Conscientiousness can be characterized as a degree of organization, persistence, control and motivation in goal

directed behavior. Individual differences in these characteristics are the essence of the dimension of conscientiousness. Trait Order explains personal organization; people who score high on this dimension are orderly and systematic. Dutifulness emphasizes the importance of fulfilling moral obligations. Those with a high score on this subscale strictly adhere to the ethical principles they have set and are anxiously fulfilling their moral obligations. Achievement Striving is defined as need for personal achievement and sense of direction. People with a high score on this subscale have high aspirations and work hard to achieve their goals. Self-Discipline describes capacity to begin tasks and follow through to completion despite boredom or distractions. People with a high score on this subscale have the ability to motivate themselves to complete work. Deliberation is the tendency to think things through before acting or speaking. The negative associations between facets of Conscientiousness and postural stability indicate that soldiers who are conscientious have better performances in postural stability.

As summarized in Table IV, our data analyses establish a correlative relationship between Neuroticism and Conscientiousness ( $r = -0.52, p < 0.05$ ) and with thus facets of Conscientiousness: Competence ( $r = -0.61, p < 0.05$ ), Dutifulness ( $r = -0.42, p < 0.05$ ), Self-Discipline ( $r = -0.55, p < 0.05$ ), Deliberation ( $r = -0.38, p < 0.05$ ).

There were also significant negative associations among Conscientiousness with all facets of Neuroticism: Anxiety ( $r = -0.33, p < 0.05$ ), Angry Hostility ( $r = -0.39, p < 0.05$ ), Depression ( $r = -0.35, p < 0.05$ ), Self-Consciousness ( $r = -0.48, p < 0.05$ ), Impulsiveness ( $r = -0.40, p < 0.05$ ), Vulnerability ( $r = -0.57, p < 0.05$ ). These relationships are illustrated in Table III.

Conscientiousness was significantly and negatively correlated with all the facets of Neuroticism: Anxiety ( $r = -0.33, p < 0.05$ ), Angry Hostility ( $r = -0.39, p < 0.05$ ), Depression ( $r = -0.35, p < 0.05$ ), Self-Consciousness ( $r = -0.48, p < 0.05$ ), Impulsiveness ( $r = -0.40, p < 0.05$ ), Vulnerability ( $r = -0.57, p < 0.05$ ). The negative correlation between neuroticism and conscientiousness further confirms the existing evidence that people with high neurotic impulsivity find it difficult to resist temptation or delay gratification. These findings suggest the conscientious personality is more emotionally stable and neurotic personality is often associated with a lower degree of conscientiousness.

Among combat troops one of six facets of neuroticism was associated with parameters of postural stability and five facets of conscientiousness. Results showed that military units with worse performance in postural stability were also more self-conscious, less conscientious, less orderly, less dutiful, less strive for achievement and less deliberate. Throughout the analysis there is a tendency that a higher score in one of the facets of neuroticism was associated with larger ellipse area of CoP and CoG while a higher score in facets of conscientiousness was associated with smaller ellipse area of CoP and CoG.

TABLE III  
ASSOCIATIONS BETWEEN FACETS OF NEUROTICISM AND POSTURAL STABILITY

	Anxiety	Angry Hostility	Depression	Self-Consciousness	Impulsiveness	Vulnerability	Neuroticism
LCoPEA	0.00	0.11	-0.01	0.05	0.03	-0.03	0.04
RCoPEA	-0.01	0.12	0.07	<b>0.23</b>	0.10	0.13	0.15
CoGEA	-0.04	0.07	0.04	0.07	0.00	0.09	0.05
Competence	<b>-0.41</b>	<b>-0.43</b>	<b>-0.46</b>	<b>-0.57</b>	<b>-0.37</b>	<b>-0.66</b>	<b>-0.61</b>
Order	-0.04	-0.15	0.00	<b>-0.25</b>	<b>-0.24</b>	<b>-0.23</b>	-0.17
Dutifulness	-0.19	<b>-0.35</b>	<b>-0.32</b>	<b>-0.37</b>	<b>-0.37</b>	<b>-0.45</b>	<b>-0.42</b>
Achievement Striving	<b>-0.27</b>	-0.15	<b>-0.29</b>	<b>-0.31</b>	-0.03	<b>-0.44</b>	<b>-0.31</b>
Self-Discipline	<b>-0.37</b>	<b>-0.39</b>	<b>-0.43</b>	<b>-0.49</b>	<b>-0.30</b>	<b>-0.58</b>	<b>-0.55</b>
Deliberation	<b>-0.26</b>	<b>-0.38</b>	-0.19	<b>-0.28</b>	<b>-0.50</b>	<b>-0.38</b>	<b>-0.38</b>
Conscientiousness	<b>-0.33</b>	<b>-0.39</b>	<b>-0.35</b>	<b>-0.48</b>	<b>-0.40</b>	<b>-0.57</b>	<b>-0.52</b>

Marked correlations are significant at  $p < 0.05$ ;  $N = 98$ .

TABLE IV  
ASSOCIATIONS BETWEEN FACETS OF CONSCIENTIOUSNESS AND POSTURAL STABILITY

	Competence	Order	Dutifulness	Achievement Striving	Self-Discipline	Deliberation	Conscientiousness
LCoPEA	-0.05	-0.09	-0.05	-0.09	-0.07	-0.11	-0.07
RCoPEA	-0.12	<b>-0.21</b>	<b>-0.24</b>	-0.13	<b>-0.25</b>	<b>-0.27</b>	<b>-0.26</b>
CoGEA	-0.07	<b>-0.22</b>	-0.17	<b>-0.24</b>	<b>-0.21</b>	<b>-0.27</b>	<b>-0.25</b>
Anxiety	<b>-0.41</b>	-0.04	-0.19	<b>-0.27</b>	<b>-0.37</b>	<b>-0.26</b>	<b>-0.33</b>
Angry Hostility	<b>-0.43</b>	-0.15	<b>-0.35</b>	-0.15	<b>-0.39</b>	<b>-0.38</b>	<b>-0.39</b>
Depression	<b>-0.46</b>	0.00	<b>-0.32</b>	<b>-0.29</b>	<b>-0.43</b>	-0.19	<b>-0.35</b>
Self-Consciousness	<b>-0.57</b>	<b>-0.25</b>	<b>-0.37</b>	<b>-0.31</b>	<b>-0.49</b>	<b>-0.28</b>	<b>-0.48</b>
Impulsiveness	<b>-0.37</b>	<b>-0.24</b>	<b>-0.37</b>	-0.03	<b>-0.30</b>	<b>-0.50</b>	<b>-0.40</b>
Vulnerability	<b>-0.66</b>	<b>-0.23</b>	<b>-0.45</b>	<b>-0.44</b>	<b>-0.58</b>	<b>-0.38</b>	<b>-0.57</b>
Neuroticism	<b>-0.61</b>	-0.17	<b>-0.42</b>	<b>-0.31</b>	<b>-0.55</b>	<b>-0.38</b>	<b>-0.52</b>

Marked correlations are significant at  $p < 0.05$ ;  $N = 98$ .

There is evidence that personality traits and postural stability performance are to some extent interconnected and interact while in general neuroticism and postural stability are positively correlated and conscientiousness and postural stability are negatively correlated.

#### IV. DISCUSSION

Little is known about the impact of personality to postural stability. Based on the available literature [24], [31], [35], [42] it is evident that some of The Big Five and other personality traits are significantly related to posture and postural stability, but reports regarding which of the facets of personality traits neuroticism and conscientiousness best predicts postural stability performance are unknown.

The aim of the current study was to investigate the connection between personality traits and postural stability among military combat units, trying to find a relationship between parameters postural stability (CoP, CoG) and personality traits (Neuroticism facets, Conscientiousness facets). Soldiers of combat units completed the NEO-PI-R and performed a balance test. Postural stability was assessed by force plates during quiet upright stance, whereas CoP and CoG parameters were measured during 60 seconds in open eye conditions. Results showed different significant correlations between the variables of postural stability and personality traits. At the facet level, those who were self-conscious (N4: Self-Consciousness) had poorer postural stability, whereas those who were personally organizing (C2: Order), those who emphasize the importance of fulfilling moral obligations (C3:

Dutifulness), those who possess high achievement needs (C4: Achievement Striving), those who were self-disciplined (C5: Self-discipline) and deliberate (C6: Deliberation) had better static postural control. All of these associations were statistically significant at the 0.05 level. Correlations suggest that conscientious personality is also more emotionally stable and neurotic personality is less conscientious.

It is well known that changes in a person's affective state are reflected by changes in body posture. Facets of Neuroticism predicted negative changes in static postural control, whereas the Self-Consciousness facet of Neuroticism was the strongest predictor of the ability to maintain balance. In personality research, conscientiousness has been the most consistent and universal predictor of sport performance [38]-[40]. Conclusions of this study confirm these findings while facets of Conscientiousness scale best describe the relationship between personality characteristics and postural stability, which is an important prerequisite for sports performance, whereas Deliberation is the best predictor of performance in postural stability among combat troops, followed by Self-Discipline.

According to the available literature [35], [42] the relationship between personality and posture is not yet completely clear, as previous studies have shown inconsistent results due to methodological differences or postural parameters used. The present study is consistent with previous research [34] which established a relationship between postural sway and conscientiousness among football players but is not agreeing with recent research [41] which has not

found conscientiousness as a personality trait associated with the parameters of postural stability. There can be many variables that mediate the relationship between postural control and personality, where each study emphasizes different parameters. Due to the absence of studies based on theoretical approaches, it is difficult to better understand the whole issue. This finding also corroborates the earlier reports that neuroticism is associated with conscientiousness [42]. In our study neuroticism and conscientiousness were significantly negatively correlated at the between-person level of analysis.

Postural stability is a combination of biomechanical, neurophysiological, psychological aspects. Postures and motions generated by the human body are influenced by physiological factors such as fatigue or psychological factors such as anxiety arousal, state of mind, attention or cognitive load. We can affirm that psychological issues are presented in the movements of the body. The nature of military operations requires both units to be mentally and physically resilient, but their scope of work and specific skills for performing various tasks in the field differ. The aim of this study is to predict which facets of the personality traits are related to performance of postural stability. However, static postural stability tasks poorly replicate the dynamic military environment, which places considerable emphasis on the postural control system during tactical and combat training. Further research could examine the relationship between psychological factors and dynamic postural stability.

Coaches or military officers can use the results of this study to optimize the training process. Balance training should be individualized and dependent on levels of emotional stability and conscientiousness. The study has some limitations. The group consisted of soldiers of combat units and only of men; therefore, the results of this study cannot be generalized to population or other military units; future studies may include other units and their comparisons.

#### V. CONCLUSION

The purpose of this study was to verify possible bi-directional relationship between personality characteristics and postural stability aspects with particular attention to emotional stability and conscientiousness and their components. 98 soldiers of combat units completed the NEO Personality Inventory and performed postural task in open eye condition. Some personality traits were found to be the significant predictors of parameters related to the CoP and CoG ellipse area. Among facets of neuroticism and conscientiousness personality traits, Self-Consciousness, Order, Dutifulness, Achievement Striving, Self-Discipline, Deliberation seems to be related to static balance in combat troops.

This study had indicated that facets of Neuroticism and Conscientiousness personality traits are important factors in determining soldier's postural stability performance while soldiers of combat troops who were emotionally stable and conscientious reported better postural stability performance. On the other hand, soldiers displaying higher levels of aspects of neuroticism reported a lower performance in postural

stability.

Our data uncover a yet undefined correlative relationship between mind and body, connecting personality type with ellipse area of CoP and CoG. The exact mechanism of how posture affects our personality is still not well understood. These findings suggest that a Five-factor personality model can help to distinguish different levels of postural stability performance and can help to determine which specific subscales relate to static postural control. The results of this study may have indirect implications for balance assessment and training but further investigation of these factors is needed in different groups.

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