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CORRELATION OF MOTOR ABILITIES AND AEROBIC CONDITIONING WITH PERSONALITY TRAITS OF SOLDIERS IN A BATTLE UNIT OF THE SLOVENIAN ARMED FORCES

POVEZANOST GIBALNIH SPOSOBNOSTI IN AEROBNIH ZNAČILNOSTI Z OSEBNOSTNIMI LATNOSTMI V BOJNI ENOTI SLOVENSKE VOJSKE

ABSTRACT

The aim of the study was to find a correlation of motor abilities and aerobic conditioning with personality traits of soldiers in a battle unit of the Slovenian Armed Forces (SAF). The subject sample consisted of 94 soldiers serving in the 1st brigade of the SAF aged 21 to 36. Motor abilities were assessed with ten tests, measuring strength, speed, flexibility, coordination and balance. Functional capabilities were evaluated by means of the endurance run. The structure of personality traits was measured using a medium version of FPI (Freiburg Personality Inventory), adapted and standardised in Slovenia. The version included 114 items and measured 9 personality traits of order I (neuroticism, impulsivity, depression, irritability, sociability, calmness, dominance, suppression, sincerity) and 3 personality traits of order II (extraversion, emotional instability, masculinity). By using Pearson correlation coefficient some statistically significant correlations between variables of motor abilities and variables of personality traits were found. However, using the Bonferroni correction, no statistically significant correlations were found. Also canonical correlation analysis showed no statistically significant correlation between two spaces.

Key words: motor abilities and aerobic conditioning, personality traits, army, Slovenian Armed Forces

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POVZETEK

Namen raziskave je bil raziskati povezanost med gibalnimi sposobnostmi in funkcionalnimi značilnostmi ter osebnostnimi lastnostmi pri vojakih Slovenske vojske (SV) v bojni enoti. Vzorec merjencev je obsegal 94 vojakov 1. brigade SV v starosti od 21 do 36 let. Z baterijo desetih testov je bilo merjenih pet gibalnih sposobnosti: moč, hitrost, gibljivost, koordinacija in ravnotežje, funkcionalna značilnost je bila ocenjena z vzdržljivostnim tekom. Struktura osebnostnih lastnosti je bila merjena s srednjo verzijo Freiburškega osebnostnega vprašalnika FPI, ki je standardizirana pri nas (Bele- Potočnik s sod. 1984). Vprašalnik je bil sestavljen iz 114 postavk in je meril devet osebnostnih lastnosti prvega reda (nevrotičnost, impulzivnost, depresivnost, razdražljivost, družabnost, mirnost, dominantnost, zavrtost, iskrenost) in tri osebnostne lastnosti drugega reda (ekstravertiranost, emocionalno labilnost, maskuliniteto). Povezanost med gibalnimi sposobnostmi in funkcionalno značilnostjo ter osebnostnimi lastnostmi je bila ocenjena z Pearsonovim koeficientom korelacije, ki je sicer pokazala nekaj statistično značilnih povezav med spremenljivkami, vendar pa se je po uporabi Bonferronijevega popravka pokazalo, da nobena od povezav v resnici ni statistično značilna. Tudi kanonična korelacijska analiza med obema prostoroma spremenljivk ni pokazala statistično značilne povezave.

Ključne besede: motorične sposobnosti, funkcionalna sposobnost, osebnostne lastnosti, vojska, Slovenska vojska

INTRODUCTION

Slovenia became a member of NATO and the European Union in the year 2004. Both of these partnerships required new solutions in the organization and functioning of the SAF. Furthermore, it is also necessary to consider the changes from a conscript army to a professional one, which is completed by a compulsory and voluntary reserve. All these changes demand a higher level of professionalization and standard combat readiness. Combat readiness is one of the main characteristics of all armies. It represents the ability and readiness of armed forces as a whole or its branches, services and units to incorporate themselves in an action in different circumstances and at different times. The level of combat readiness is dependent on many factors: the defence doctrine, the level of country's readiness for war, the efficiency of the mobilization system, the level of preparedness of a territory, reserves and others (Vojna enciklopedija, 1973). The motor abilities of both an individual soldier and the whole unit are increasingly considered key elements of combat readiness in training a modern army (Karpljuk, Žitko, Rožman, Suhadolnik and Karpljuk, 2000). Novak (2003) also cites the psychological capability apart from the motor ability of an individual soldier as the basis of combat readiness. As can be seen, motor and psychological capabilities are of primary importance for adequate combat readiness of an army.

Physical exercise is of basic importance of a modern army and is also the first condition for the proper motor qualification of an individual soldier. Jošt, Dežman and Pustovrh (1992) state that the main goal of physical exercise in the SAF is to ensure the proper psycho-motor development of its members, so that they can persevere in the efforts of everyday life as well as of the defence of their country. Sport in the SAF is defined precisely by the Directive of Sport (Direktiva za šport, 2005). It states that the readiness of the members of the SAF is provided by planned and organized execution of physical training of the units, in sports education, and in sports competitions. Readiness is also provided by sport for all, checking motor abilities, top-level sport, international sports cooperation, and the development of sport in the SAF. The Directive also states that military personnel should attend sports exercises (expert-led physical training) up to an hour daily as part of on-the-job training. Apart from that, the training must include combat sports, orienteering, military pentathlon, swimming, cycling, climbing horizontal and vertical ropes, ball games, selection competitions at the unit level, and especially marches. The training is complemented by recreational exercises in the afternoon hours. Two sports days must be held annually (in summer and winter). Once a year, all military personnel have to take part in at least one test and evaluation of physical competence, which represents a constituent part of the training process in the SAF. Its purpose is to ensure systematic insight into the physical readiness of the members and units of the SAF, which is important for executing military service as well as for giving grades related to promotion and fulfilling the conditions for renewing employment contracts (Direktiva za šport, 2005). In addition, physical testing is also a means of evaluating the efficiency of programs of training, planning, organizing, and executing sports activities in the SAF (Direktiva za šport, 2005).

The tasks of the modern military are connected to extremely high-level and long-lasting physical and psychological efforts, demanding proper physical training and psychological conditioning from soldiers (Tkavc, 2004). In extreme conditions, soldiers can reach their physiological limits due to their exertion, in which case the activation of the body's organic system influences the psychology of the soldier. This may cause a temporary loss of alertness and rational comprehension of reality for some time. Many individuals come to a point at which their own bodies represent a bigger problem than the task to be completed. These problems are usually due to poor health

status: an increased body weight accompanied by other health risk factors, dealing with stressful situations on a daily basis, and illnesses of the loco-motor and cardiovascular system (Karpljuk et al., 2000; Novak, 2003). All this has a negative effect upon the working regime in operative units on the field, as well as at headquarters, branches and services (Tkavc, 2004). Therefore, physical training has to be based both on endurance, strength and speed training, as well as on the development of mental abilities, cohesion within the group and cohesion of factors, related to the conditions on the battlefield (Picarielo, 2000).

This research deals with the motor abilities and personality traits in a very specific population, i.e. the soldiers in a battle unit of the SAF. Thus far much research dealing with the connections between motor abilities and personality traits has been done. However, our research is the first of that kind in the SAF. Much research has shown a high correlation between different motor abilities and extraversion, which may be influenced by control mechanisms in brain that regulate the level of inhibition/excitation (Mrakovič, 1977). Extraversion features are highly connected to the tests of explosive strength (Mrakovič, Juras and Metikoš, 1972; Ismail, Kane and Kirkendall, 1976; Pavlovič, 1978), speed (Ismail et al., 1976), coordination (Mrakovič, 1977; Caprara, Barbaranelli, Borgogni, Bucik, and Boben, 1997), balance (Ismail et al., 1976), endurance (Kane, 1984; Mrak, 2000) and repetitive strength (Mrakovič et al., 1972). Emotional stability correlates with tests of coordination and balance (Ismail, 1976). In addition, a connection between anxiety and coordination has been proved (Horga, 1979; Tušak and Tušak, 2003). Over time, sportsmen become more self-conscious and dominant (Tušak and Tušak, 2003). Connections that have been proved with the aid of mathematic and statistic methods and can be observed in the manifest level have a common background in the functioning of a central nervous system. It is a biological model that helps us understand these functional mechanisms. The main functions of the central nervous system are produced in three functional units (Luria, 1983): balancing muscle tonus and level of awareness; input, processing and storage of information; programming, balancing, and control of complicated psychological information.

The first unit is important for connections between motor abilities and personality traits (Kolar, 2001), the second and the third are important for connection between motor abilities and cognitive characteristics (Kovač, 1999).

In addition to some major changes, when Slovenia became a member of NATO and the EU and changed from a conscript army to a professional one, global security circumstances have also changed dramatically in recent years. Slovenia enjoys a relatively high level of security in a relatively unstable regional environment as cited by the Slovenian Military Doctrine (Slovenska vojaška doktrina, 2006). An important factor influencing the development of the army at the present time is the vision of future warfare with information technology representing the key element and the basis of battle. This will require fast-paced and intense actions from soldiers. The dangers one will face may be unknown and unexpected. Armament will be more accurate and will enable working in radiological, chemical and biological environments. Armament, equipment and information technology will offer more individual work. All this will lead to more on-the-job stress and, because of a higher level of independence, to moral and other dilemmas at taking certain decisions, especially in cases of civilians appearing as attackers. Personal initiative, creativity, humanity, moral and physical courage, clear-minded judgment and flexibility will be required more than ever before (Slovenska vojaška doktrina, 2006). Thus a new, different profile of Slovenian soldiers is needed, which confronts the SAF and the soldiers with new expectations and challenges. With all this in mind, the main goal of this paper is to analyze whether there is

any correlation between the motor abilities and aerobic conditioning of the soldiers in the battle unit of the SAF and their personality traits.

MATERIALS AND METHODS

Sample of participants

The sample of the persons tested consisted of 94 male soldiers of the SAF, aged 21 to 36 (26.5±3.4 years). The soldiers were serving in a battle unit in the first brigade of the SAF.

Sample of variables

For the assessment of motor abilities, ten tests were applied, measuring five dimensions of motor space:

- strength: medicine ball throw (MBT), standing long jump (SLJ), sit-ups (SU), squats (SQU), pull-ups on horizontal bar (PU);
- speed: hand tapping in two fields with the better arm (HT);
- flexibility: shoulder flexibility[1] (SF), sit and reach (SR);
- coordination: polygon backwards* (PB), figure-8 duck* (F8D), in literature also known as running and bending test;
- balance: balance on T-bench (BTB).

Functional capabilities were assessed using the 2400-meter-run* (COO).

The description of all tests can be found in Šturm (1977).

The structure of personality traits was measured using a medium version of FPI (Freiburg Personality Inventory), adapted and standardized in Slovenia (Bele-Potočnik et al., 1984). The version included 114 items and measured nine personality traits of Order I (neuroticism, impulsivity, depression, irritability, sociability, calmness, dominance, suppression, sincerity) and three personality traits of Order II (extraversion, emotional instability, masculinity).

At first, Pearson's Correlation Coefficients for all the variables, along with their statistic significance were calculated. Then, the Bonferroni correction for these correlations was used. A canonical correlation between both groups of variables was also calculated.

RESULTS

As can be seen in Table 1, the motor test correlating most with personality traits is the so called *polygon backwards*. It correlates slightly positively with suppression, neuroticism and impulsivity. As in this test a higher value means a worse result, this means that soldiers that were slower in the polygon backwards, show a higher degree of suppression, neuroticism and impulsivity.

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[1]*tests in which lower values mean better results

Table 1: Pearson's Correlation Coefficients and their statistic significance between variables of motor space and aerobic conditioning with personality traits of order I

	NEUR	*IMPUL*	*DEP*	*IRRIT*	*SOCIA*	*CAL*	*DOM*	*SUPP*	*SIN*
MBT	.027	-.042	.096	-.032	.021	-.083	-.042	.033	.043
SLJ	-.088	-.097	-.109	-.031	.030	-.036	-.116	-.067	-.014
PU	-.037	.029	-.130	.099	-.039	.164	-.122	.004	-.119
SU	-.102	.001	-.014	.043	-.146	.173	.078	.068	-.111
SQU	-.167	-.021	.052	.115	-.023	.152	.038	-.045	.052
PB	.250*	.215*	.093	.061	-.172	-.152	.102	.297**	.010
F8D	-.048	-.098	-.052	-.087	-.076	-.096	-.128	.140	-.003
SF	.082	-.023	.006	.095	-.065	-.102	.072	-.067	-.159
SR	-.099	-.073	-.116	-.038	.061	.064	.010	.046	.134
HT	.147	.182	.063	.079	.018	.102	.142	-.054	.032
BTB	-.188	-.008	-.106	-.032	.015	-.008	-.112	-.037	-.065
COO	.093	-.161	-.007	-.010	.190	-.232*	-.112	-.119	-.116

** correlation is statistically significant with a 1% error

* correlation is statistically significant with a 5% error

Legend: NEUR – l neuroticism, IMPUL – impulsivity, DEP – depression, IRRIT – irritability, SOCIA – sociability, CAL – calmness, DOM – dominance, SUPP – suppression, SIN – sincerity

Also, correlations between *pull-ups on the horizontal bar* and masculinity, the *figure-8 duck* with extraversion as well as *2400-meter-run* and calmness (Table 2) are statistically significant. The correlation between *pull-ups on the horizontal bar* and masculinity is positive, which means that soldiers who do better in pull-ups, show more signs of masculinity. The correlation between the *figure-8 duck* and extraversion is negative, showing that better soldiers in this test are more extroverted or less introverted. The correlation between *2400-meter-run* and calmness is a negative one, meaning that calmer soldiers perform better in endurance run.

Table 2: Pearson's Correlation Coefficients and their statistic significance between variables of motor space and aerobic conditioning with personality traits of order II

	EXTRO	*EM.INST*	*MASC*
MBT	.011	.020	-.070
SLJ	-.014	-.072	-.001
PU	.084	-.080	.251*
SU	-.097	-.045	.135
SQU	.051	.052	.132
PB	-.134	.066	-.164
F8D	-.247*	-.050	-.067
SF	-.099	-.005	.068
SR	.008	-.095	.020
HT	.082	.046	-.163
BTB	-.053	-.142	.129
COO	.021	.019	-.134

** correlation is statistically significant with a 1% error

* correlation is statistically significant with a 5% error

Legend: EXTRO – extraversion, EM.INST – emotional instability, MASC – masculinity.

As can be seen in Table 3 and Table 4, no correlations between motor abilities and personality traits, using the Bonferroni correction, were found to be statistically significant.

Table 3: Pearson's Correlation Coefficients and their statistic significance between variables of motor space and aerobic conditioning with personality traits of order I, using Bonferroni correction

	NEUR	IMPUL	DEP	IRRIT	SOCIA	CAL	DOM	SUPP	SIN
MBT	.027	-.042	.096	-.032	.021	-.083	-.042	.033	.043
SLJ	-.088	-.097	-.109	-.031	.030	-.036	-.116	-.067	-.014
PU	-.037	.029	-.130	.099	-.039	.164	-.122	.004	-.119
SU	-.102	.001	-.014	.043	-.146	.173	.078	.068	-.111
SQU	-.167	-.021	.052	.115	-.023	.152	.038	-.045	.052
PB	.250	.215	.093	.061	-.172	-.152	.102	.297	.010
F8D	-.048	-.098	-.052	-.087	-.076	-.096	-.128	.140	-.003
SF	.082	-.023	.006	.095	-.065	-.102	.072	-.067	-.159
SR	-.099	-.073	-.116	-.038	.061	.064	.010	.046	.134
H	.147	.182	.063	.079	.018	.102	.142	-.054	.032
BTB	-.188	-.008	-.106	-.032	.015	-.008	-.112	-.037	-.065
COO	.093	-.161	-.007	-.010	.190	-.232	-.112	-.119	-.116

** correlation is statistically significant with a 1% error
* correlation is statistically significant with a 5% error

Table 4: Pearson's Correlation Coefficients and their statistic significance between variables of motor space and aerobic conditioning with personality traits of order II, using Bonferroni correction

	EXTRO	EM.INST	MASC
MBT	.011	.020	-.070
SLJ	-.014	-.072	-.001
PU	.084	-.080	.251
SU	-.097	-.045	.135
SQU	.051	.052	.132
PB	-.134	.066	-.164
F8D	-.247	-.050	-.067
SF	-.099	-.005	.068
SR	.008	-.095	.020
HT	.082	.046	-.163
BTB	-.053	-.142	.129
COO	.021	.019	-.134

** correlation is statistically significant with a 1% error
* correlation is statistically significant with a 5% error

Canonical correlation showed no statistically significant correlation between motor abilities and personality traits.

DISCUSSION

This research project was the first of a kind in Slovenia as well as in the SAF. Due to it being exploratory research, our main goal was to observe and to evaluate current the situation and connections. Due to that, only a small sample of soldiers was tested, and consequently all the conclusions can be set for this sample only and cannot be extrapolated to the entire population. The results of the current research will help us in establishing new, wider research projects, using improved measuring instruments, especially by using another instrument for measuring the structure of personality traits instead of the FPI.

At first, the Pearson's correlation coefficient was used to expose connections between motor abilities and personality traits that seemed to be statistically significant (Table 1 and Table 2).

Secondly, the Bonferroni correction was used, as it is methodologically correct to use it in a research such as this in order to avoid making a Type II error. As seen from Table 3 and Table 4, which present correlations and their statistical significance using the Bonferroni correction, no correlation between motor abilities and personality traits were found.

This occurs because the power of a statistical test is not sufficient. Although there are no formal standards for power, most researchers who assess the power of their tests use 0.80 as a standard for adequacy. The power of a statistical test in our research is only about 0.15, which means we needed approximately 600 soldiers (614 soldiers, to be precise) to meet the need for an adequately large sample (which is close to the entire existing population of the Slovene soldiers in the first brigade). However, this means that the results obtained cannot be extrapolated to a whole population, but can only be explained as a sample results.

The second main reason for not obtaining correlations when using the Bonferroni correction is that there may actually be no connections at all. Although many previous research projects have shown that connections between motor abilities and personality traits exist, according to our research this may not be the fact. It is also important that so far we have not come across research similar to ours that has used the Bonferroni correction, which sets stricter criteria for statistical significance than the Pearson correlation coefficient alone. If the Bonferroni correction had been used, previous researches may have shown different results.

Furthermore, canonical correlation analysis showed that there is no statistically significant connection between motor abilities and personality traits, meaning that these two fields are independent. This conclusion deserves some attention, especially because some other authors write about these two fields as being connected (Tušak, 1997; Ismail, 1976; Strel and Šturm, 1981). However, it is also true that many researchers focus only on connections between the variables of personality traits and the manifest variables of motor abilities or latent motor abilities (factors of motor abilities). Very rarely has the connection between fields as a whole been examined. The fact that these two fields seem not to be connected brings us to an important conclusion: personality traits and motor abilities have to be tested separately. This may also be an important indicator to the SAF to test soldiers or recruits in their motor abilities as well as personality traits separately when selecting them for admission or annual testing.

CONCLUSIONS

The main goal of our research was to find correlations between personality traits and motor abilities in a sample of 94 soldiers in the battle unit of the SAF. In the first stage, some statistically significant correlations between the variables of motor abilities and the variables of personality traits were found using Pearson correlation coefficient. However, using the Bonferroni correction, no statistically significant correlations were found. This may mean that there actually are no connections whatsoever, which implies some important guidelines for practical work in the SAF. The power of the statistical test should also be increased in the next research project. Canonical correlation analysis showed no statistically significant correlation between two spaces, meaning that motor abilities and personality traits are independent and should be tested separately.

It has to be emphasised that this was the first research of that kind in the SAF and, therefore, it was only exploratory. It revealed some important facts and opened interesting areas for further research. On this basis, we will be able to use improved measuring instruments and perhaps focus on particular areas more in the next research project.

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