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Relations Between Psychological Characteristics and Physical Abilities in a Sample of Female Police Candidates

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Abstract: The purpose of this research was to examine possible relations between basic personality traits and cognitive abilities and basic physical functions in a sample of female candidates studying at Academy of Criminalistic and Police Studies (ACPS) in Belgrade. Literature review has shown that this problem has not been sufficiently studied, so it would benefit to gain a deeper insight into understanding of psychophysical functioning. Further contribution would include a better understanding of the nature of mind-body influence. In pragmatic sense, this work should help improve professional orientation and selection tasks in Police education and different profiles of police forces in Serbia.

Samples of 267 female candidates studying at ACPS, aged 18 to 19 were given different personality and cognitive tests. Basic motoric space was covered by seven representative tests.

The data was subjected to correlational analysis. There were few small statistically significant correlation coefficients. Further analysis by canonical correlations analysis has not given statistically significant canonical correlations. There were most significant correlations between contraction and stretching test and psychological characteristics. Those findings lead authors to conclude that this very physical trait in a sample of women is sensitive to psychological influence in case of professional selection.

Keywords: Basic motoric status, cognitive abilities, personality, physical abilities.

INTRODUCTION

Personality and physical abilities are complex constructs that can be tested in various ways. Understanding of the relationship between mind and body dates back to ancient Greece when Hippocrates was considering the impact of body fluids in temperament. Nowadays, there are many attempts to correlate personality characteristics with both physical health and with physical disabilities and mental readiness. In theory, confirming the relationship between personality and body, the physical characteristics indicate psychological and physical integrity of human beings. Friedman and Boot-Kewley [1] conducted a meta-analysis of 101 studies of relationships of personality and various kinds of diseases. They came to the conclusion that the negative personality traits such as depression, anxiety, aggression and introversion are related to different types of illnesses. Smith [2] came to similar findings showing that neuroticism and hostility are risk factors for poor health.

The effect of physical activity on mental health has also been observed. For example, Stephens [3] and Morgan [4] have shown that depression is lower in people who are moderately or intensely engaged in physical activities. In addition, various studies have shown the importance of physical activity when it came to overcoming stress [5-7].

Hogan [8] raises the question: if the personality and physical activity have beneficial effects on health, what is their relationship? Apart from this theoretical aspects related to the assumption of unity, i.e. the integrated mental and physical functioning, the relationship of personality and physical abilities also has a practical aspect. It refers to the ability to create advanced programs for the development and promotion of healthy lifestyles and prevention of crime. Furthermore, knowledge of the relationship of personality and physical abilities forms the basis for the improvement of professional selection process for complex tasks and activities such as those in the military, police or sports.

The relationship of personality and physical abilities generally has not been studied much. The results of these studies have been mixed. Hogan [8] argued that in six of the nine studies inspired by Eysenck's theory was established negative correlation between neuroticism and physical activity, while five studies noted a correlation of extraversion and physical activity. As for the five-factor model of the five studies in three, negative correlation was observed between physical activity and neuroticism, in four, physical activity positively correlated with extraversion while in all five studies with conscientiousness. Hogan has shown a direct link between personality traits and physical fitness.

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Physical fitness was examined with representative set of standardized tests and was allocated three factors: muscular strength, endurance and agility. These physical characteristics were related to a set of personality traits that have made the optimism, energy, perfectionism and competitiveness. On the other hand, pathological characteristics measured by traditional MMPI (Minnesota Multiphasic Inventory) were not related to the physical readiness.

It is reasonable to assume that personality traits affect participation in physical activity. Rhodes and Smith [9] conducted a meta-analysis of multiple studies on the relationship between psychological traits and physical activities. They came to a conclusion that robust finding was the result of the impact of extraversion, conscientiousness and neuroticism at low levels of physical activity. Rhodes mentioned that, besides personality characteristics, important factors for physical exercise include: motivation, social cognition, environment and culture. The same author also stressed the importance of studying those interactions. When it comes to sports performance, besides the importance of basic personality traits for success in sports, Raglin [10] indicates the influence of psychological factors such as dynamic states and moods, which emphasizes the importance of an anxiety state.

Seefeldt, Malina and Clark [11] provide a detailed overview of the various theories which were designed to highlight the impact of the key factors in dealing with physical activities. They considered the behavior (behavioral choice theory, theory of planned behavior), environmental perspective, the model of group cohesion and other theories.

The main problem investigated in the research was the relationship between personality traits and physical abilities. The literature review indicates that the problem has not been sufficiently investigated. Theoretically it is useful to study it because of a greater insight into the nature of mental and physical functioning. Upon examination of the relationship of personality and physical abilities it would be possible to examine a possible influence between these traits (for example, the impact of motivation, temperament, personality traits to physical activity, or, conversely, the impact of physical characteristics and personality traits of the activities, resistance to stress, etc.). The aim of this research is to create a basis for improving the procedures of vocational guidance and selection of candidates for admission to the Academy of Criminalistic and Police Studies (ACPS) and the selection of candidates for the work in various police forces. Physical fitness is an essential training component for candidates of police education, and for the future police officers. After a medical examination, candidates in Serbia are referred to the entrance exam, where in addition to physical fitness candidates are succumbed to psychological testing. This research aims to contribute to integrated analysis of physical and psychological bases of female candidates for police training.

METHOD

Sample

Sample consisted of 267 female candidates who studied at the ACPS (school year 2010/2011). Age of respondents ranged from 18 to 19 years. All the candidates had previously undergone a medical examination (also part of the professional selection process), whereby they met the specific health requirements as proposed by the Ministry of Internal Affairs.

Variables and Instruments

Psychological testing included cognitive and personality tests

Cognitive abilities were tested using three tests:

1. Raven's Progressive Matrices (non-verbal ability)

2. Test of verbal reasoning (verbal ability)

3. General knowledge test

Personality characteristics were analyzed by HEDONICA battery of tests especially developed for the Ministry of the Interior of Serbia [12]. The battery consists of 8 tests. First five originated from the Five-factor model:

- extraversion – E (Energy, positive emotions, surgency, assertiveness, sociability and the tendency to seek stimulation in the company of others, and talkativeness
- neuroticism – N (The tendency to experience unpleasant emotions easily, such as anger, anxiety, depression, or vulnerability)
- openness – O (Appreciation for art, emotion, adventure, unusual ideas, curiosity, and variety of experience
- conscientiousness – C (A tendency to show self-discipline, act dutifully, and aim for achievement; planned rather than spontaneous behavior; organized, and dependable
- agreeableness – A (A tendency to be compassionate and cooperative rather than suspicious and antagonistic towards others)

Other three tests included tests of amorality – H (test of pro-criminal values and amoral dispositions), impulsiveness - I (self-control, attention, cognitive instability), and psychoticism – D (redefined Eysenck concept; dissociation of conative, cognitive and motor functions).

Scores on tests of cognitive ability were obtained by simple summation of correct answers. Scores on personality tests were also obtained by simple summing up of the answers where larger amount indicated a greater presence of the measured properties.

Physical Abilities

Adequately developed physical (motor) skills are one of the main factors for the efficient implementation of all security and risk professional duties of police officers, regardless of gender [13]. Regardless of whether a police officer works on a more or less risky position (intervention and special units), sedentary or highly physically active job, he/she is bound to be adequately prepared physically for all possible occupational situations. In critical moments, properly developed motor skills stand out as one of the

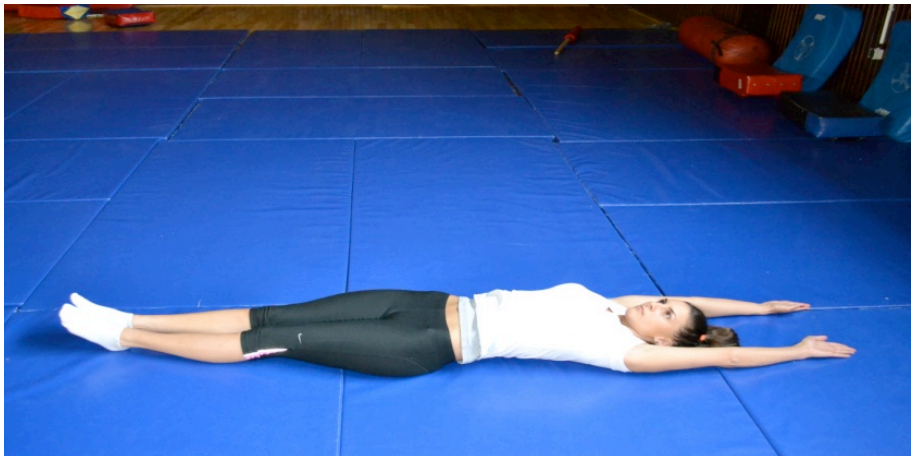

Fig. (1). Initial position.

prerequisites for the successful resolution of workers' professional obligations in the Ministry of the Interior of Serbia. This is especially applied to the use of force and in providing aid in natural disasters [14]. There is a statistically significant correlation between the level of physical fitness and health in police officers [15-19].

According to research conducted by the U.S., the need for maximum physical exertion in the case of U.S. police occurred in 5% of cases compared to the total working time [20,21]. Because of motor skills importance in the system of selection, training and education of police personnel, there is a continuing need for improving technology procedures for personnel selection, where existing models must be constantly analyzed and developed [18, 22]. The high level of development of physical skills is very important part of police work (the use of force and assistance in emergency situations), which put law enforcement officers in extremely high physical stress [13, 18, 19, 21]. Because of the specifics of police work that requires above average physical fitness compared to the average population, enrollment at ACPS required basic motor skills check in the selection of candidates [18]. The candidates were selected in based on the projected needs of the police profession. Selection model of physical ability was performed by the method of multidimensional scaling of general physical fitness [18]. Candidates for studying ACPS are examined by the use of the battery of tests which assessed the following skills:

- Repetitive power of arms extensors was estimated with test of the maximum number of push-ups performed in a time interval of 10 seconds (Push-Ups). Initial position is with prone body, hands shoulders wide, arms stretched out in the elbow joint. From the initial position subject goes down with chest to the ground and back to the starting position. Push-ups are being done from foot [23]. Result is expressed by the number of corectly done push-ups (Numb.).
- Repetitive power of abdominal flexors was estimated as the number of sit-ups, in a time interval of 30 seconds (HULL). In the initial position subjects are on the ground with their back with legs bent at the knee angle of 90 degrees, feet fixed on the ground, palms crossed behind heads and elbows apart. From the initial position subjects perform torso bend, with chest to the thighs and beck to initial position [24]. Result is expressed by the number of correctly done sit-ups (Numb.).
- Speed power of leg extensors was assessed by a standing long jump test (ON). The subjects were instructed to jump as far as possible with both feet and hands swing from the marked line. The distance from the starting point to the landing point at the heel contact with the ground was used to estimate the length of the jump expressed in centimeters (cm) [25].
- Explosive power of leg extensors was estimated by countermovement jump with arms swing (Abalac test -ABL). Subjects are instructed to jump as high as possible and also required to land approximately at the point of the take off. During the exercise, subjects stand on a rubber platform with measuring tape holder fixed at its center. End of tape was fixed at subjects' waist. While subjects jump, measuring tape is drawn from the ground. When jump is finished examiners read value from the tape and calculate the distance in centimeters (cm) [26].
- General aerobic potential was estimated by the Cooper running test - maximum running distance in meters (m) in 12 minutes time interval (COOPER) [27].
- Maximal isometric force of dominant hand finger flexors ("Hand grip" test) was measured using tensiometric probe, sliding device that measures isometric finger flexor force (HAND) [28, 29]. The tensiometric probe is connected to the force reader with the measurement precision of the probe at the level of ± 0.01 N, while the force reader shows the precision of ± 0.1 N. Results are expressed in kilonewtons (Kn).
- Educational motor potential was estimated by contractions and stretching tests (CS). More detailed description of Contraction and stretching test will be given, because other tests are much more used and well known in various physical examinations. The aim of the motor training capability test is to estimate coordinating ability of candidates i.e. the candidate's ability to learn new motor tasks.

Fig. (2). Leg bending.

Fig. (3). Side extended position.

Fig. (4). Side flexion position.

In the initial position (Fig. **1**) candidate is lying on a mat, legs and arms are fully extended with hands at shoulder width. One leg start bending, so the whole foot makes contact with the ground. The leg is bending until the moment when the foot is in the direction of the opposite knee (Fig. **2**) and the subject still extended is turning to the opposite body side (Fig. **3**). After reaching the lateral position candidate performs simultaneous flexion of the whole body (trunk, arms and legs flexion) and comes in a position with open hands on the sides of the head, elbows on the tops of the knees and coupled feet (Fig. **4**). From this side position candidate simultaneously extends the whole body back to initial position, and repeats entire movement to the other side of the body. Candidates performed 24 whole body consecutive flexions and extensions - 12 on each body side with a maximum speed; each repetition performed incorrectly was recorded as an (err).

Table 1. Descriptives

	Mean	Std. Deviation
Amorality (A)	53.68	13.49
Extraversion (E)	121.19	14.33
Psychoticism (D)	38.19	7.18
Openness (O)	112.34	20.44
Neuroticism (N)	45.80	12.43
Impulsivity (I)	44.48	10.19
Conscientiousness (C)	156.70	10.96
Agreeableness (A)	162.02	17.97
Raven progressive matrices (RAV)	13.88	2.11
Verbal ability (VER)	23.43	3.32
General knowledge test (GK)	22.91	7.12
Hand (Kn)	34.19	4.84
Push-ups (Numb)	4.92	3.19
Hull	20.91	3.09
ON (cm)	169.23	18.84
ABL (cm)	31.61	4.19
(err)	6.60	6.11
Cooper (m)	2111.84	280.43

Table 2. Intercorrelations of Variables of Personality and Physical Abilities

	H	E	D	O	N	I	C	A	RAV	VER	GK
HAND	.012	.031	.033	.070	.051	.037	-.048	.032	-.110	-.059	-.054
PUSH-UPS	-.144*	.028	-.036	.006	-.024	-.065	.068	.185**	.016	.102	.071
HULL	-.110	.032	-.036	-.014	-.075	-.057	.007	.101	.060	.130*	.091
ON	-.005	.135*	.009	.095	-.058	-.042	.113	.093	-.020	.048	.019
ABL	-.041	.116	-.032	.110	-.076	-.038	.138*	.058	.008	.025	.047
CS	.137*	-.074	.133*	.056	.163**	.071	-.134*	-.102	-.164**	-.068	-.225**
COOPER	-.112	.072	.044	.031	-.029	-.013	.094	.103	-.047	.008	.000

(HAND-hand grip test; PUSH-UPS-push-ups; HULL-sit-ups; ON-standing long jump test; ABL-high jump test; CS-contraction and stretching test; COOPER-running test; H-amorality; E-extraversion; D- psychoticism; O-openness; N-neuroticism; I-impulsivity; C-conscientiousness; A- agreeableness; RAV- Raven progressive matrices; VER- verbal ability test; GK-general knowledge test)

* p< .01

** p< .05

RESULTS

Descriptives are shown in Table **1**. Since joint research of psychological and physical characteristics is not conducted often, especially in the case of female subjects, this data could be very useful for future research and comparison.

Next step was correlation analysis. In Table **2**, correlation coefficients (Pearson "product-moment) of variables of cognitive ability and personality and physical fitness variables are shown.

It can be seen that the coefficients are low and there are few statistically significant coefficients. Success in performing push-ups negatively correlated with amorality and positively with agreeableness. Success in performing sit-ups is positively correlated with verbal ability. Long jump is related to extraversion and Abalac test to conscientiousness. Test of contractions and stretching is correlated with the

highest number of psychological variables. Given that the operationally defined by the number of errors, this test is negatively associated with immorality, psychoticism and neuroticism, and positively correlated with conscientious-sness, nonverbal IQ and general knowledge. Aerobic potential measured by the Cooper test, and hand grip test were not related to any psychological test.

Canonical correlation analysis was attempted on the correlation matrix as shown in Table **1** that did not provide any statistically significant canonical correlations.

DISCUSSION

Statistical analysis has shown that there are few low and statistically significant correlations among a representative number of psychological and physical variables in a sample of females. This suggests that there are certain trends that indicate the psychophysical unity of mental and physical functions. Results show that those candidates for police education who are better in doing push-ups are less immoral and aggressive (the opposite pole of agreeableness). Correlation of performing sit-ups and verbal skills remains unclear, also remain unclear the role of extraversion in relation to the long jump and role of conscientiousness in the Abalac test. In a sample of women, psychological characteristics are not important for success in running.

Absence of relationship between good personality functioning and basic indicators of physical fitness is unexpected. Rhodes and Smith's [9] meta-analysis of multiple studies on the relationship between psychological traits and physical activities has already been mentioned in Introduction. Also, relationship between good personality functioning and physical fitness was found by Janoski and Holmes [30] on the sample of women. Furthermore, Kull *et al.* [31] have found lower levels of depression in women who had spent more time in physical activity. One of the possible reasons of absence of correlations between personality and basic physical tests could be the general attitude towards physical activities in Serbia. In rural parts of country, girls and women in general are still not expected to engage in recreational and sports activities as man are.

Since majority of psychological variables correlated with Contractions and stretching test, its educative component is confirmed. This very component is most probable reason of those correlations. Absence of pro-criminal values and moral dispositions, neuroticism as emotional stability, and psychoticism as a measure of personality integration in a sample of women affect the success in Contraction and stretching test which is performance test that requires coordination of movements of upper and lower extremities accompanied by appropriate orientation relative to the substrate. Nonverbal ability and cognitive knowledge are also connected with success in Test of contractions and stretching. Nonverbal ability probably has importance for candidate's orientation and coordination of movements, while general knowledge reflects mental flexibility and practical attitude that can be important in certain physical tasks.

The practical application of these findings is in the possibility of integrating the findings from psychological testing and their physical ability. This means that there is a possibility that during the professional selection of candidates for police education for comparing their success in Contraction stretching test in relation to personality traits and intellectual abilities, in order to detect and examine any variations in either test group.

Future research should be directed toward broader use of both personality and physical tests, and toward gender differences. Comparison of these findings with male results would bring to more detailed picture of relationship of personality and physical fitness.

CONCLUSION

One of the several components of physical examination of the female candidates for studying APCS, Test of contractions and stretching is correlated with psychological characteristics. Although correlations are low, they are most frequent with this very test and they are statistically significant. It can be assumed special importance of this physical test in professional selection because of its educational potential, and there is possibility that psychological data could be compared to this test in order to reexamine or avoid candidates whose results on this test and psychological test are in discrepancy.

Relation between psychological and physical characteristics should be replicated and also examined in sample of male candidates for police profession.

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