THE INFLUENCE OF CONATIVE FACTORS AND COGNITIVE CHARACTERISTICS ON ATHLETIC ACHIEVEMENT IN WATER POLO: A META-ANALYSIS

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Review paper

Abstract

The objective of this meta-analysis is to synthesize available research that has evaluated the influence of conative factors and cognitive characteristics on athletic achievement in water polo Research were identified through electronic databases and hand-searching volumes of pertinent journals. Water polo is a team sport characterised by inter-dependence of individual and collective achievements and the opposing team's achievement. Due to such complex and multi-factorial nature, it is not easy to predict the level of water polo achievement. Based on the research, it can be concluded that the athlete's behaviour is determined by the interaction and interplay of personality traits and the environment factors. Some research indicates that the improvements in cognitive functions may be influenced by a long-term engagement in complex sports, including water polo. According to some research, water polo players, especially water polo players at higher-quality level, have a significantly better personality profile and cognitive capacities with respect to non-athletes. In the selection process, it is assumed that water polo players with a suitable genetic predisposition regarding conative and cognitive capacities are generally more successful, as well as those who are predisposed to develop personality traits and intellectual capacities under the influence of the environment and training.

***Key words**: **personality traits**, cognitive abilities, water polo players*

Introduction

Achievement in each athletic discipline, including water polo, depends on a range of factors such as morphological structure and constitution, psychomotor abilities, cognitive abilities, conative characteristics, motivational structure, physiological and functional characteristics, technical and tactical competences, theoretical knowledge of water polo players and similar items (Hraste, 2020).

Personality traits may be defined as a set of features determining specific responses to the environment (Musek, 1999). It is very important to identify personality traits that distinguish individuals and determine the consistency in their behaviour in different situations. It is necessary to consider a specific situation and the mental traits of an athlete to understand his/her behaviour, because it is determined by interaction and interplay of personality traits and environment traits. Larsen and Buss (2014) believe that personality traits are subject to change over time.

Cognitive or intellectual capacities enable reception, transfer and processing of information. All definitions of intelligence may be classified into three groups/categories: biological, pedagogical and psychological. *Biological definitions* of intelligence represent the capacity to adapt and handle new situations. *Pedagogical definitions* identify intelligence as the capacity to learn new or use previous experiences. *Psychological definitions* emphasise the capacity to think and solve problems. None of these definitions is wrong in itself, however neither of them is complete or comprehensive. However, we usually refer to general cognitive capacity or general intelligence or general G-factor. It is assumed that G-factor affects the results in virtually all sports. The research has shown that G-factor is very complex, since it is composed of the following specialised factors: the factor of perceptual reasoning (responsible for quick perception, observing spatial relations and memorising data); the factor of symbolic reasoning (responsible for the capacity to interpret symbols and entertain abstract thinking); the factor of education (capacity to establish rules and integral thinking).

Conative factors and athletic achievement in water polo

Conative factors or personality traits also affect athletic achievement in water polo. Lewis Goldberg`s personality theory (1994), also known as the "Big Five Factor Model", describes personality as consisting of five factors which represent it at the highest level of abstraction, which means that each of these dimensions includes a large number of distinctive and specific traits. The five factors include Extroversion, Agreeableness, Conscientiousness, Emotional Stability/Neuroticism and Intellect/Openness to new experiences. These principal five factors are at the high level of the personality hierarchy, however each of them contains specific traits (facets) at a lower hierarchical level. Each of these five factors, including the lower level facets, shows how the individuals behave. According to this model, it is necessary to complete the questionnaire evaluating

these five factors to determine the person`s personality. The result of the personality test is a score in each category placing the subject in a high, medium, or low level for each trait. *Neuroticism or emotional stability* addresses the ability or inability to deal with difficult situations in life. Neuroticism is a general tendency to experience negative feelings such as anxiety, depression, agitation, anger, feeling of guilt and hurt. Men and women with a dominant neuroticism trait tend to behave irrationally, have a weaker control of their impulses and have a lower stress coping ability. Persons with lower scores in neuroticism are generally characterised as emotionally stable, calm, relaxed and able to cope with stressful situations without agitation. *Extroversion* is the ability to relate to others and enjoy their company. Extroverts prefer larger groups of people, they are very talkative, self-confident, active, enthusiastic, cheerful and optimistic, impulsive and bursting with energy. They usually connect well with people and enjoy other people`s company. They feel well in company and act completely naturally. Extroverts are team players who engage in activities with optimism and enthusiasm. On the other hand, introverts keep to themselves, they are emotionally aloof, more independent (but not necessarily antisocial) and moderate in their interactions, they have better control of their emotions and do not give in to impulses. Introverts achieve better results when they work alone. In general, they feel caution and/or mistrust with other people. They have a smaller circle of friends and feel unpleasant in larger groups. *Openness* is a personality trait which includes aesthetic sensibility, intellectual curiosity, imaginativeness, preference of diversity, need for change, independence of opinion, tendency towards non-dogmatic attitudes and tolerance of ambiguity. Open-spirited people are open to internal experiences and external events. Their life is rich in experience, they are open to experimenting, new ideas and unconventional values. These people have a more intense experience of positive and negative emotions. They are ready to question authority, they are open to accepting new ideas and values, which does not necessarily mean that they lack personal standards or consistency. People with a low score in terms of this personality dimension have a conventional appearance and behaviour, they are prone to conservative attitudes and prefer rigid schedules instead of new experiences. Their emotional responses are moderate. Their interests are more specific and less intense. *Conscientiousness* (with the ability to follow through and being persistent as sub-dimensions) is one of the basic personality traits reflected in individual differences within the processes of planning, organisation and task performance as an aspect of self-control. Conscientious people are determined, goal-oriented, organised, punctual and trustworthy. People with a lower score are more nonchalant about the work leading towards a certain goal. *Agreeableness* (co-operability) is a personality trait addressing a person`s capacity for empathy. This person sympathises with others, feels the need to help them and believes that he/she will be treated as generously by others. The person with a low score of agreeableness is egocentric, sceptical towards others, hostile and combative.

By observing a vast base of research (Radonjić, 2016), it has been determined that athletes are less anxious, less compulsive and more emotionally stable, more socially adaptable and self-confident than non-athletes. The results of a study (Velikić, Knežević & Rodić, 2014) confirmed that the dimension of neuroticism is an important predictor of competitive anxiety. The dimension of openness towards new experiences is also an important predictor of success, and even the leading factor of athletic achievement or failure. The only dilemma is whether the differences in the dimensions of personality traits between athletes and non-athletes occur as a result of the athletes` experience or the process of natural selection. According to the gravitational hypothesis (Morgan, 1974), an individual with stable, extroverted personality tends to gravitate towards the athletic experience. The viability of the gravitational model, however, does not preclude the possibility that sport participation can enhance personality development. Tattersfield (1971) monitored the personality profiles of boys participating in an age-group swimming program across a five-year training period. Significant changes toward greater extroversion and stability were observed in the boys during this period. It has been demonstrated that athletic participation before maturity has a developmental effect on personality and that the experience of a young athlete is crucial for the development of positive personality traits such as confidence and independence (Cox, 2005).

A study (Reyes, 2013) was conducted to evaluate whether female water polo players of the highest student level of competition had a distinctive personality profile compared to non-athlete students. The results indicated that the female water polo players, with respect to non-athletes, have significantly better personality profiles in 3 out of 5 traits (conscientiousness, emotional stability and openness). These results may help the players and coaches understand the cohesion elements and select the female water polo players according to the suitable levels of personality traits. Compared to younger water polo players, senior players show more pronounced levels of agreeableness and conscientiousness (impulse-control capacity), which encourages their goal and task-oriented behaviour (Trninić, Trninić & Penezić, 2016). In addition, openness is also more pronounced in senior players. These results indicate a more stable behaviour (or the correlations of said factors) in senior players during training and competition (more mature, pro-social, flexible, imaginative and creative behaviour) within a sports environment.

Cognitive abilities and athletic achievement in water polo

It has been established that complex sports activities require high-level cognitive capacities. The acknowledgement of direct correlation between psychological factors and athletic achievement has led to the fact that psychological cognition is considered an inevitable part of an athlete`s training. The first step in the psychological approach to working with athletes is to evaluate the psychological dimensions which are relevant for athletic achievement, but also those relevant for the integral development and the functioning of personality which can be influenced in pedagogical work. Intelligence can be evaluated and it is generally believed that it is extremely important in sport for the achievement of top results. Intelligence perceived as a capacity is dominantly influenced by the genetic code. It has an upward trend until the age of 40, after which it decreases. The testing of intellectual capacities of athletes is performed by a licensed psychologist (testing cannot be performed by experts from other fields), and his/her interpretation of results and possible interventions depend on the coordination between the coach and the psychologist (Lozovina, 2009). Athletic performances at the highest level require many cognitive functions such as attention, decision-making and working memory so that the athletes could function at optimal levels in stressful and demanding environments (Walton, Keegan, Martin & Hallock, 2018). Even though a lot of research has been focussed on psychological competences regarding performance or emotion management therapy methods, there is insufficient research on whether an increase in basic cognitive capacities affects the improvement of athletic performance (Walton, Keegan, Martin & Hallock, 2018). There are also several studies on the correlation between cognitive functions and water polo performance. According to research conducted by Kioumourtzoglou, Kourtessis, Michalopoulou and Derri (1997), water polo players achieved significantly better results than the control group in kinesthetics, decision making, visual response time, spatial orientation and grouping/organisation of information. A possible explanation for this is that elite athletes are distinguished from non-athletes by the way their motor, perceptual and cognitive capacities are developed due to the nature of sport. Falk, Lidor, Lander and Lang (2004) evaluated the quality of decision making in water polo players during a game by applying subjective training analyses as a reference (specifically, the anticipation of ongoing activities and appropriate decision making). They determined that higher-quality level water polo players achieved better results. Tucher, de Souza Castro, Garrido and Martins da Silva (2014) assumed that better results in the functional agility test may be found in the cognitive sphere of perception and decision making. After two years of longitudinal monitoring of cognitive functions of water polo players, significant improvements were detected in ten out of twelve tests (Butler, Forsythe, Beverly & Adams, 1993).

Conclusion

We need to consider a specific situation and an athlete`s mental capacities in order to understand his/her behaviour. Based on the research, it can be concluded that the athlete`s behaviour is determined by the interaction and interplay of personality traits and the environment factors.

Even though cognitive functions are vastly influenced by heritage, some research indicates that the improvements in cognitive functions may be influenced by a long-term engagement in complex sports, including water polo. It is assumed that perceptual, symbolic and educational reasoning are improved by training and competition in complex sports.

More longitudinal research is needed to confirm whether a long-term engagement in water polo affects the development of conative and cognitive component of athletic achievement, and if yes, to what extent. According to some research, water polo players, especially water polo players at higher-quality level, have a significantly better personality profile and cognitive capacities with respect to non-athletes. In the selection process, it is assumed that water polo players with a suitable genetic predisposition regarding conative and cognitive capacities are generally more successful, as well as those who are predisposed to develop personality traits and intellectual capacities under the influence of the environment and training.

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Received:08.01.2020.
Accepted: 17.05.2020.
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