AN EXPLORATION OF THE PSYCHOLOGICAL IMMUNE SYSTEM IN HUNGARIAN GYMNASTS

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ABSTRACT

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Elite athletes' participation in sports is oftentimes associated with considerable physical and psychosocial stressors as it requires a continuous strive for success in a highly competitive environment. Coping has been identified as an extremely influential factor in an athlete's life, affecting both the performance and satisfaction of the individual. Its effectiveness is determined by various potentials of the personality that provide the necessary resources when dealing with stressful situations. The multidimensional Psychological Immune System (PIS) model integrates 16 of such personal resilience resources that provide immunity against stress.

The purpose of the study was to examine the personal resources of adolescent Hungarian gymnasts with the PIS Inventory, and to explore whether any constellations of personality resources can be identified as contributing to their performance and their subjective feelings of satisfaction. The sample consisted of female gymnasts (*n*=67, age 14-24) of different competitive levels. The PIS Inventory was assessed, followed by a demographic questionnaire that included questions regarding the participants' performance and their subjective levels of satisfaction. When compared to the general population, the gymnastic sample reported significantly higher scores on the scales Creative Self-Concept and Social Mobilizing Capacity as well as on the Creating-Executing Subsystem of the PISI, while they showed lower scores on Sense of Self-Growth, Synchronicity, Goal Orientation and Emotional Control as well as on the Self-Regulating Subsystem of the PISI. Results were interpreted as a result of the athletes' young age and various characteristics of their sport, and specific recommendations for improvement were made for coaches and sport psychologists.

The personality resources comprised by the PISI were found to predict the gymnasts' level of satisfaction, with Sense of Coherence exerting the highest influence, however, they did not seem to contribute to their level of performance. The former result carries important practical implications as providing meaningful and personally important experiences in sport can enhance athletes' feelings of satisfaction and eudaimonic well-being.

Keywords: coping, well-being, psychological immune system, competitive athletes

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1 INTRODUCTION

'It is not stress that kills us. It is effective adaptation to stress that permits us to live.' (Vaillant, 1977)

Participation in sports is usually associated with positive experiences and outcomes, such as physical fitness, reduced anxiety, improved mood, self-perception and self-esteem, personal and social development (Blanchard, Amiot, Perreault, Vallerand, & Provencher, 2009; Gould & Carson, 2008) and in general, increased physical and psychological well-being (Biddle & Mutrie, 2008). However, the world of competitive athletes shows a different side of this picture. Elite athletes' participation in sport often involves the necessity to deal with potential stressors and threats, including pain, injuries, lack of confidence, loss (Nicholls & Polman, 2007), overtraining, burnout (Brenner, 2007), competitive anxiety (Lundquist, 2011), and various inter- and intrapersonal demands. The continuous strive for success in a highly competitive environment requires athletes to face diverse physical and psychosocial stressors – expected or unexpected – on a regular basis. They are often dedicated to attaining highly uncertain, long-term goals while giving up other important aspects of their lives (higher education, time spent with their friends and family, etc.) (Wiersma, 2000). It is evident, therefore, that participation in high-level competitive sport can have a considerable – beneficial or detrimental – influence on their well-being and quality of life (Lundquist, 2011).

It is well-documented that a high level of psychological functioning and adaptive emotional responses are essential for an optimal performance under high pressure (Lundquist, 2011). The ability to cope effectively has found to be one of those extremely crucial factors in an athlete's life that can affect both their performance and satisfaction (Nicholls & Polman, 2007). In order to perform well in practice and competitions, and at the same time make sport a satisfying and fulfilling experience, it is necessary to cope effectively with the demands, difficulties and stressful situations of competitive sport. Less effective ways of coping have proved to be associated with sport withdrawal (Klint & Weiss, 1986, as cited in Nicholls & Polman, 2007), decreased performance (Lazarus, 2000) and difficulties for athletes in pursuing their professional sports career (Holt & Dunn, 2004).

The effectiveness of coping is usually evaluated by looking at the individual's preferences in use of coping strategies. Problem-focused coping is generally considered more effective and useful in controllable situations; while emotion-focused coping is better in situations where the athlete has very little control (Nicholls & Polman, 2007). However, Oláh (2005) suggests that when studying coping effectiveness, besides looking at the primary coping strategy of the person, researchers should also examine the characteristics of the individual's personality that contribute to successful coping. The salutogenic approach of Antonovsky (1987, as cited in Oláh, 2005) led to a paradigm shift in coping research – from focusing on risks, ill-being and disease, to focusing on peoples' resources and capacity to maintain health (Lindström & Eriksson, 2005). Since then, several different factors have been identified as playing an important role in coping with stress effectively, such as sense of control, learned resourcefulness, personality hardiness, dispositional optimism, sense of coherence, self-consciousness, and self-efficacy (Oláh, 2005). The common feature of these factors is that they all provide potential resources for the individual when dealing with a certain stressful event, and as a consequence, contribute to effective coping.

This health-protective aspect was utilized in the Psychological Immune System (PIS) Theory. Oláh (1996, 2009) provided this concept, grounded in positive psychology, with the aim to incorporate the above potentials into an integrated system. He defined the Psychological Immune System 'as a multidimensional but integrated unit of personal resilience resources or adaptive capacities that provide immunity against damage and stress' (Oláh, 2009, p. 1). These resources – such as Positive Thinking, Sense of Coherence, Sense of Self-Growth, among others – provide the ability for the individual to tolerate stress and cope with it effectively. These potentials help the individual to cope in a way that does not harm the personality in any way, rather enrich its effectiveness and developmental capacity due to the active and constructive engagement in the stressful situation (Oláh, 2005).

A number of these potentials of the personality, comprised in the PIS, have already been researched in the field of sport psychology, including in relation to high performance or subjective well-being. Incorporating these resources under one theoretical umbrella provides the opportunity to study their effects – which may be simultaneous or combined – on the two most important outcomes of the athletic experience: high performance and high satisfaction.

Therefore, the purpose of this study is (1) to explore the Psychological Immune System of a particular athletic population (namely, young Hungarian female gymnasts); (2) to investigate how the different components of the PIS affect their level of performance and their satisfaction – more precisely, whether there are different patterns or constellations of personality resources that contribute to these two different outcomes.

In the following sections a more thorough revision of the relevant literature will be presented. Firstly, the importance of coping in competitive sports will be shortly emphasized, then coping effectiveness and its contributing factors will be reviewed from a positive psychological perspective. Next the concept of the Psychological Immune System will be introduced both from theoretical and empirical perspectives. Finally, relevant research will be reviewed concerning the athletic experience. Based on these results the hypotheses of the current study will be specified before presenting the practical completion of the research.

2 LITERATURE REVIEW

2.1 The athletic experience and coping

The term ‘competition’ in itself implies rivalry, continuous effort and challenge to perform one’s best. Even focusing on one’s own performance can be quite stressful, aside from the stress caused by the performance or behavior of other competitors (Madden, 1995), changes in the environment, unexpected events, or the behavior of teammates. Individuals differ in their attitude towards competitive situations – some feel confident and challenged, others feel overwhelmed by anxiety and self-doubt. Similarly, individuals possess different types of knowledge, experience, skills and mindsets, which all ‘underlie differences in the way [they] cope with the many and changing situations that occur in sport’ (Madden, 1995, p. 288). Correspondingly, Hanin (2010, p. 159) emphasizes the aspect of change as well, when he states: ‘High-achievement sport is a special setting with a constant change and the need for change-management.’ In sport psychology literature, it is widely accepted that athletes, regardless of their age, ability or competitive level, need to be able to cope with various stressors they face in practices and competitions. The ability to cope effectively highly affects their success in performing their best, just as their perceptions of sport as being a satisfying and fulfilling experience (Nicholls & Polman, 2007; Nicholls, Polman & Levy, 2012). Children and adolescents have been found to be particularly vulnerable as high pressure from close adults (parents and coaches) can lead to damaged self-esteem, mood disturbances (Gagné, 2003), overtraining, injuries or burnout (Brenner, 2007). Therefore it is even more important for them to learn and use effective coping strategies.

The transactional approach of coping – which is applied more frequently in sport psychology research than the trait approach (Nicholls & Polman, 2007) – states that coping with stress is a dynamic interaction between a person’s internal and external environments (Lazarus, 1993). Lazarus defined coping as ‘constantly changing cognitive and behavioural efforts to manage specific external and/or internal demands that are appraised as taxing or exceeding the resources of the person’ (Lazarus & Folkman, 1984, as cited in Nicholls & Polman, 2007). Based on their function and intention, we can differentiate between coping strategies (Crocker, Kowalski & Graham, 1998). The aim of problem-focused coping strategies is to change the stressful

situation itself (e.g. seeking information, setting goals), while emotion-focused coping strategies focus on the emotional distress associated with the situation, trying to change or modify these experiences (e.g. seeking emotional support, relaxation). Another macro-level coping method that has been proposed and proved to be relevant is avoidance coping, which is defined as behavioral and psychological efforts to disengage from the stressful situation (e.g. to physically remove oneself from the stressor) (Krohne, 1993, as cited in Nicholls & Polman, 2007).

The importance of appropriate and effective coping is underlined by the fact that less effective ways of coping were found to be associated with withdrawal from sport (Klint & Weiss, 1986, as cited in Nicholls & Polman, 2007), decreased performance (Lazarus, 2000) and athletes having difficulties in pursuing their professional sports career (Holt & Dunn, 2004; as cited in Nicholls & Polman, 2007). It is therefore essential to make attempts to attain a greater understanding of the determinants of successful coping in sport in order to design appropriate and helpful interventions that help athletes reach their true potential.

2.2 Coping effectiveness and its determinants

In order to evaluate the effectiveness of coping, it is necessary to look at the outcome of the specific coping strategy applied in how successful the person was in eliminating negative emotions and deal with the stressful situation. In a sport setting, Nicholls and Polman (2007) defines coping effectiveness as 'the extent to which a coping strategy, or combination of strategies, is successful in alleviating the negative emotions caused by stress' (p. 15). The 'goodness-of-fit' model (Folkman, 1991, 1992, as cited in Nicholls & Polman, 2007) has been strongly supported in sport psychology research (Anshel, 1996; Anshel & Kaissidis, 1997). This model proposes that during situations where the athlete has the potential for personal control, problem-focused coping will be more effective, while emotion-focused coping is used more when there is less perceived controllability.

Nicholls and Polman (2007) summarizes that in sport, coping effectiveness is associated with improved performance (Haney & Long, 1995), reduced anxiety (Campen & Roberts, 2001), and pleasant affective experiences (Ntoumanis & Biddle, 1998). The

importance of studying the effectiveness of coping therefore stems from the large impact it has both on performance and satisfaction (Nicholls & Polman, 2007).

However, the result of the coping process – i.e. how effective it is – is not only determined by the specific strategies used, but also by characteristics of the personality. Antonovsky (1987, as cited in Lindström & Eriksson, 2005), as an early precursor of the positive psychological movement, proposed a shift in focus from risks and ill-being to peoples' resources and capacity to maintain health. His salutogenic approach focuses on the orientation towards problem solving and the individual's capacity to use the resources available. It 'gives the answer why people despite stressful situations and hardships stay well.' (Lindström & Eriksson, 2005, p. 440). Oláh (2005) interprets his work as a shift of paradigm in the research of stress and coping, as researchers' attention has been directed more towards personal traits and characteristics that could provide protection against stress. These characteristics have been studied individually and isolated, as the positive psychological movement evolved.

Several personality strengths or characteristics have been identified in the stress-tolerant personality, as will be reviewed here (Oláh, 2005). One such characteristic, sense of control refers to the extent to which an individual perceives himself as in control of what is happening to him (described as having internal or external locus of control by Rotter, 1966). This perception strongly determines whether the individual perceives a certain situation as controllable and manageable, and as a consequence, determines the type of coping strategy (e.g. problem- or emotion-focused) to be applied when dealing with the stressful event.

Another characteristic is learned resourcefulness, which was described by Rosenbaum (1988, as cited in Oláh, 2005) as a behavioral repertoire necessary for both redressive and reformative self-control. 'Coping with acute stress requires redressive self-control; the adoption of new behaviors such as health related behaviors requires reformative self-control.' (Rosenbaum, 1989). This behavioral repertoire has a strong influence on the process of coping and its effectiveness via the preferred strategies chosen (Oláh, 2005). Highly resourceful individuals have been found to cope more effectively with stressful situations, as well as to have higher capability to adopt health related behaviors (Rosenbaum, 1988, as cited in Oláh, 2005).

Personality hardiness, first described by Kobasa and Maddi (1982) is characterized by a combination of commitment, control and challenge-orientation. Oláh (2005) reports that high scores of personality hardiness have been associated with better physical and mental health (Kobasa, Maddi & Courington, 1981), interpersonal effectiveness (Magnani, 1986) and constructive, problem-focused strategies of coping (Wiebe & McCallum, 1986).

Dispositional optimism as a broad personality characteristic (Scheier & Carver, 1985) refers to a global expectation that more good things than bad will happen in the future. It is an important factor in dealing with stress as it directs the individual's attention towards potential positive consequences instead of negative ones, and has been correlated with internal locus of control and self-esteem (Oláh, 2005), learned resourcefulness, hardiness (Scheier & Carver, 1985), and problem-focused approaches of coping (Scheier & Carver, 1987, as cited in Oláh, 2005; Lai & Wan, 1996).

Sense of coherence, as defined by Antonovsky (1987, as cited in Oláh, 2005) is the ability to comprehend the whole situation and the capacity to use the resources available. As Lindström and Eriksson (2005) describe, 'It is a global orientation to view life as structured, manageable, and meaningful or coherent. It is a personal way of thinking, being, and acting, with an inner trust, which leads people to identify, benefit, use, and re-use the resources at their disposal.' (p. 441). Its components are comprehensibility, meaningfulness, and manageability, which all refer to how the individual perceives external events and situations. Sense of coherence, or SOC, directs the process of choosing the most effective coping strategy which is most relevant to the specific situation (Oláh, 2005).

Self-consciousness was described by Fenigstein and colleagues (1975, as cited in Oláh, 2005), and Carver & Glass (1976), and includes two main aspects. Private self-consciousness refers to a willingness and aptitude to introspection and self-reflection by monitoring one's own motives, drives and emotional states. Public self-consciousness means the ability to monitor the social environment as well as the social consequences of one's own actions, and the integration and effective use of these experiences. Private self-consciousness contributes to effective coping by monitoring and selecting adequate coping resources (Oláh, 2005).

Self-efficacy refers to a subjective judgment of a person about their abilities to perform a particular task under certain environmental demands (Bandura, 1977). It influences both the motivation, since a person is more likely to choose a task and exert more effort in it if it is associated with high efficacy-beliefs, and the actual performance of the individual since high-efficacy beliefs about a certain task lead to greater persistence (Morris, 1995), and consequently, higher likelihood of great performance. This relationship between the level and strength of self-efficacy has been supported in diverse sport psychological research (Morris, 1995). Moreover, athletes who show higher self-efficacy have been found to be more likely to actively seek problem-solving strategies and manage stress (Chase, Magyar & Drake, 2005). Similarly, Haney and Long (1995, as cited in Nicholls & Polman, 2007) found the perceived level of self-efficacy to be related to engagement coping strategies.

Furthermore, when listing the above protective dimensions of the personality, Oláh (2005) also mentions the constructs of ego-strength of Barron (1968), competence of White (1959), and hope of Snyder and colleagues (Snyder, Harris, Anderson, Holleran, Irving, Sigmon, Yoshinobu, Gibb, Langelle & Harney, 1991), as resources of the individual which have a potential to beneficially influence coping effectiveness.

To summarize, the above listed traits of the personality have proved to serve as valuable resources for the individual in the process of coping. They provide greater immunity and tolerance against stress, and therefore contribute to the effectiveness of coping.

One rationale behind studying these determinants rather than the actual coping strategy applied stems from the general limitations of coping research, as reported by Nicholls and Polman (2007) in their systematic review of coping in sports. After reviewing 64 papers in coping in a sport setting, the researchers conclude that the results are limited by the retrospective nature of most studies. They often included a significant time delay between the actual stressful situation and the recall of this event and the coping strategy used. This raises concerns about the unreliability of recall and retrospective bias (e.g. adding effort after meaning) (Brewer, Linder, Van Raalte & Van Raalte, 1991). In order to exclude the bias of recall, researchers can alternatively study characteristics of the personality. This way those traits can be identified which provide the capability to tolerate stress in general and as such, contribute to mature ways of coping.

2.3 The Psychological Immune System

2.3.1 Theoretical foundations

The concept of the Psychological Immune System was developed based on the above listed resources of coping effectiveness, with the aim to integrate these isolated, but empirically correlated character strengths and resources of the personality into one comprehensive system (Oláh, 1996). The theory utilizes the positive psychological view, which wishes to emphasize human strengths and potentials instead of weaknesses and flaws of the personality (Oláh & Kapitány-Föveny, 2012).

This inclusion of several character strengths into one comprehensive model is scientifically supported by Aspinwall and Staudinger (2003) who state ’It seems that it is not so much one or the other personality characteristic [...] that should be called a human strength. Rather, it seems that human strengths may primarily lie in the ability to flexibly apply as many different resources and skills as necessary to solve a problem or work toward a goal.’ (p. 13). The relevance of such approach in the field of sport psychology stems from the fact that this area has always been looking for factors (cognitive, behavioral, social, emotional, environmental) that can be utilized to enhance and improve the performance and well-being of athletes. This is despite the acknowledgement that these character strengths, such as dispositional optimism, self-efficacy, self-control and so forth, all have diverse theoretical backgrounds, foundations and measurement traditions that make them difficult to compare, for example when examining their role in an athlete’s performance.

The Psychological Immune System is defined as ’an integrated system of cognitive, motivational and behavioral personality dimensions that should provide immunity against stress, promote healthy development and serve as stress resistance resources or psychological antibodies’ (Dubey & Shahi, 2011, p. 37.). The incorporated resources provide the ability for the individual to tolerate stress and deal with threats in a way that does not harm the personality in any way, rather serves as a base for potential improvement and enrichment. This improvement is due to the knowledge, experience and wisdom gained through the process of active engagement in the specific issue or stressful situation and the utilization of the available resources (Oláh, 2005).

The Psychological Immune System (PIS) is built up by three parts (subsystems) which incorporate 16 different resources or potentials that fulfill a similar function. The three subsystems, namely the Monitoring-Approaching Subsystem, the Creating-Executing Subsystem and the Self-Regulation Subsystem dynamically interact with each other in order to facilitate the flexible adaptation and self-development of the individual.

The Monitoring-Approaching Subsystem steers the person's attention to the physical and social environment. It helps the individual in exploring, understanding and controlling their surroundings, while directing their attention towards anticipating positive consequences. The subsystem incorporates Positive Thinking, Sense of Coherence, Sense of Control, Sense of Self-Growth, Change and Challenge Orientation, Social Monitoring, and Goal Orientation.

The Creating-Executing Subsystem integrates potentials that can help in changing the circumstances in a stressful situation, or in generating opportunities in the surrounding environment. It represents the person's ability to modify either their internal or external environment in order to pursue their valued goals. Creative Self-Concept, Problem Solving, Self-Efficacy, Social Mobilizing Capacity and Social Creating Capacity belong to this subsystem.

The third subsystem, that of, the Self-Regulating, contains potentials that provide control over cognitions, attention, emotions and impulses that often emanate as a result of failure, disappointment or loss. It fosters the proper functioning of the other two subsystems by keeping the emotional life of the person stable (Gombor, 2009), and includes Synchronicity, Impulse Control, Irritability Control and Emotional Control.

The three subsystems work together in a dynamic interaction, constantly regulating each other's operation in the process of coping, guiding the individual to use flexible and self-developing strategies (Oláh, 2005; Oláh, Szabó, Mészáros & Pápai, 2012). In other words, the Psychological Immune System creates a balance between the person and their environment to be able to reach higher levels of adaptive strength (Gombor, 2009).

2.3.2 Empirical research

The theoretical model of the Psychological Immune System was operationalized in the Psychological Immune System Inventory, an 80-item questionnaire that measures the 16 scales described above. Confirmatory factor analysis has been used (Oláh, 2005; Gombor, 2009; Oláh, et al., 2012) to verify the empirical validity of the concept. The examined protective components are sorted according to the stated (Monitoring-Approaching, Creating-Executing, Self-Regulating) functions, based on the components' psychological content, proving that the three subsystems are empirically separated. The factor structure shows some differences according to different populations (Oláh, 2005 and Oláh, et al., 2012) and therefore in the current study, the factor structure of Oláh and colleagues (2012) will be used, as discussed previously. It does not only present the most recent results, but it was also conducted in an adolescent athlete sample, therefore is considered most relevant for the purposes of current research.

Convergent and discriminative validity have been tested in relations to several personality tests (BFQ, EPQ, TCI, etc.). Moderate but relevant correlations between the dimensions show the convergent validity of the test, while the irrelevancy of most scales to the personality dimensions provide discriminative validity (Oláh, 2005). The test has also been standardized for Hungarian population.

There has been extensive research conducted on various populations to assess their general psychological immunity and its relations to several health-related factors. Patients with chronic diseases, alcohol and drug addiction (Oláh, 2005); military soldiers (Hullám, Győrffy, Végh & Fűrész, 2006); Hungarian and Swedish emergency nurses (Gombor, 2009); kayak-canoe athletes (Szabó, 2011); Hungarian and Latvian adolescents (Voitkāne, 2004); Indian medical professionals (Dubey & Shahi, 2011); and psychedelic drug users (Móró, Simon, Bárd & Rácz, 2011) have been examined with the aim to describe their protective potentials expressed in the PIS Inventory. Some of the studies also aimed to examine its correlations to other health-related constructs such as coping strategies, flow, psychological well-being, burnout, life purpose and spirituality. In general, it can be established that high scores in the PIS Inventory are associated with more effective coping strategies, higher sense of psychological well-being, flow, spirituality and purpose in life, as well as with lower levels of burnout.

Sport psychological research has also recently started to recognize the relevance and usefulness of the Psychological Immune System. Szabó (2011), when comparing kayak-canoe athletes with non-athletes found that they showed higher scores in the Sense of Control, Social Creating Capacity and Impulse Control scales of the PISI, and lower scores in Sense of Coherence than non-athletes. However, the author failed to interpret the implications of the results or point out possible explanations behind the phenomenon. On the other hand, Oláh and his colleagues (2012) conducted a longitudinal research on adolescent athletes participating in a talent development program in Hungary which provides diverse and valuable information regarding this population, and will be elaborated in the following paragraphs.

The researchers examined the psychological characteristics of adolescent athletes participating in a talent development program in 2001 and later in 2008 (n=1670, age M=16,12), in twenty different sports. Their aim was to unfold those psychological factors that can be the predictors of a successful athletic career. Results of the longitudinal study show that talented adolescent athletes have higher scores on the Positive Thinking, Sense of Control, Sense of Coherence, Sense of Self-Growth, Problem Solving, Self-Efficacy and Synchronicity subscales of the PISI, compared to the mean scores of their own age group. This means that besides their athletic talent they also have particularly strong coping potentials even in the beginning of their sporting career. Moreover, they are characterized by a direct, development- and solution-oriented, internally controlled attitude and view their lives as meaningful and coherent. When examining other measures of this sample, they have found to be more dynamic, confident, persistent and use more effective coping strategies than their non-athletic peers.

The aforementioned study has empirically confirmed that various personality and motivational factors can be identified in adolescents that later contribute to athletic success. If these potentials are attended to from the very beginning of their athletic career, if these strengths and resources of the personality are developed and supported in adolescents, it is more likely that they will utilize the full capacity and spectrum of their coping potentials (Oláh et al., 2012), and deal with stress and pressure in a more effective and less harmful way, eventually leading to greater athletic success and well-being. Moreover, identifying skills or strengths that are apparent and have the

possibility to contribute to a successful career on any level of competitive performance is necessary for athletes, coaches and sport psychologists.

2.4 High performance and athletic satisfaction

High quality of performance and high satisfaction are the two most important outcome variables of participation in sport (e.g. Chelladurai, 1984; Lundquist, 2011), which do not only affect the athlete's experiences as separate entities, but also have a circular influence on each other. Performing well has the possibility to influence an athlete's self-esteem, confidence and satisfaction, while having positive experiences in sport and being satisfied with one's own performance can act as a driving force for one's maintained participation in sport. The interrelated nature of this relationship of performance and satisfaction seems obvious, however, they are determined by, and affect different psychological variables. An athlete can perform at an outstanding level, but still may experience negative emotions, be dissatisfied with his performance, feel depressed, tired or burned out. On the other hand, an athlete may feel completely satisfied with his sport performance, even though he does not perform on a high level or ever reach his peak during his sports career. Being too satisfied, in fact, might even prevent the individual to exert more effort in his training and to be fully motivated in perfecting his technique. In other words, 'Too satisfied is a big threat for performance.' (Hanin, 2014, personal communication).

It would be a mistake to state that high-performing athletes can never be satisfied, or that highly satisfied athletes will never perform on an outstanding level, especially since the reassurance of good performance can boost the athlete's motivation in pursuing personal goals and polishing skills and techniques. Even though both constructs have found to be related to more autonomous forms of motivation (Deci & Ryan, 2000) for instance, there are certainly different psychological processes that determine these two outcomes. In the following sections, the determinants and associated constructs of these two variables will be reviewed briefly.

When examining factors that contribute to athletic success, Gould & Maynard (2009) reviewed research that reveal how Olympic medalists' upbringing, family background (Côté, 1999) and parents' values (Gould, Diffenbach & Moffett, 2002), coaches'

behavior (Gould et al., 2002), effective emotional regulation (Pensgaard & Duda, 2003), use of mental techniques, and naturally, deliberate practice (Durand-Bush & Salmela, 2002) play an important role in their high achievements. Of course the list of determinants could be continued, since there has been extensive research aiming to shed light on the physical, social, psychological and situational contributors of athletic success (e.g. Gould et al., 2002; Durand-Bush & Salmela, 2002; Gould & Maynard, 2009). However, in the scope of the current thesis psychological (cognitive, behavioral, emotional and personality) factors are examined. When assessing Olympic medalists' characteristics based on extensive research, Gould and Maynard (2009) identified several psychological skills or states that proved to be important in athletic success (e.g. confidence, concentration, determination, emotional control), and several cognitive or behavioral strategies athletes use in order to arrive to these states or skills (e.g. competitive plans, environmental control, goal-setting, imagery). Finally, they also identified those personal characteristics or dispositions that 'are likely to influence athletes' cognitive and behavioural strategies as well as their psychological skills or states' (p. 1395), which are optimism, goal orientation, adaptive perfectionism, competitiveness, sport intelligence, trait hope, locus of control and intrinsic types of motivation. Similarly, Durand-Bush and Salmela (2002) found that the factors that contribute to expertise in both investment and maintenance years are self-confidence, motivation, creativity and perseverance.

Self-efficacy is a construct that has been frequently investigated in relation to high performance (e.g. Martin & Gill, 1991; Moritz, Feltz, Fahrbach, & Mack, 2000; Daroglou, 2011). The majority of studies propose that high self-efficacy predicts higher performance. The stronger belief an athlete has about her abilities, the more persistent she will be and more effort will she exert in order to reach the goal she believes she can achieve – and as a consequence, the more likely will she actually reach that goal. This has been confirmed for example by the review of Wurtele (1986) and more recently, by Moritz and colleagues (2000). When examining young gymnasts, Lee (1982), McAuley & Gill (1983) and Weiss, Wiese and Klint (1989) found evidence for the linear relationship between high self-efficacy and high performance.

Personality hardiness is described as 'interrelated self-perceptions of commitment, control, and challenge that help in managing stressful circumstances in a manner that turns them into developmental rather than debilitating experiences' (Maddi &

Khoshaba, 1994, p. 265). In sport research, the concept has been related to better management of anxiety (Hanton, Evans & Neil, 2003), more effective coping (Goss, 1994), a better ability to withstand burnout (Hendrix, Acevedo & Hebert, 2000), and performance excellence as reported by Sheard and Golby (2010).

Finally, persistence or perseverance has also proved to contribute to success in various areas of life (Peterson & Seligman, 2004) as it increases the chances of goal attainment, improves the person's skills and resourcefulness, and the enjoyment of subsequent success. In sport realms, Gould and Maynard (2009) points out its importance as persistence proved to contribute to the success of Olympic athletes.

To sum up, high-performing athletes often possess characteristics that direct their attention towards a specific goal. Psychological attributes such as high self-efficacy, personality hardiness (internal locus of control, challenge orientation and competence), perseverance or persistence (worded as goal orientation in the PIS) and optimism or positive thinking all contribute to the athlete's intrinsic determination by enabling him to focus on the goal, on controllable factors and positive consequences, and therefore help him to achieve high levels of success.

However, when it comes to satisfaction and well-being of athletes, research does not show such a clear picture. Studies often examine athletes' satisfaction with sport, quality of life, subjective well-being, psychological well-being, just to name a few constructs assessed (Lundquist, 2011).

For example, Chelladurai and Riemer (1997) defines athlete satisfaction as a "positive affective state resulting from a complex evaluation of the structures, processes, and outcomes associated with the athletic experience" (p. 135), and Duda and Nicholls (1992) reported that satisfaction in sport shows high associations with one's perceived ability in that particular sport. In relation to performance, Nicholls and colleagues (2012) found that higher satisfaction with the athlete's own performance was associated with positive emotions as a direct effect. Moreover they had an indirect effect on satisfaction, as positive emotions mobilized task-oriented ways of coping. From the perspective of Self-Determination Theory, the fulfilment of the three basic needs (autonomy, competence and relatedness) was found to be associated with higher levels of well-being (Bartholomew, Ntoumanis, Ryan & Thogersen-Ntoumani, 2011).

However, as Lundquist (2011) concludes, the field of athletic well-being suffers from conceptual ambiguity and lack of agreement in the theoretical background and assessments applied. Most studies have utilized the perspectives of either the hedonic or the eudaimonic traditions of well-being. According to the hedonic tradition (e.g. Diener, Scollon & Lucas, 2003) well-being is achieved by experiencing pleasurable moments, rewarding goals and stimuli that increases positive affect. In contrast, the eudaimonic tradition (Ryff, 1989) views positive affect as not necessarily helpful to the growth and development of the individual; it is rather concerned about the activities and challenges people engage in to reach their individual potential rooted in the self (Lundquist, 2011). When applying a hedonic perspective, researchers usually use the PANAS (Watson, Clark & Tellegen, 1988) or the Satisfaction With Life Scale (Diener, Robert, Larsen & Griffin, 1985), while the eudaimonic approach has been operationalized in the Psychological Well-Being Scale (Ryff & Keyes, 1995), which comprises self-acceptance, positive relation to others, autonomy, environmental mastery, purpose in life and personal growth.

From a hedonic perspective, an athlete's well-being would be represented by his pleasant emotions and positive experiences related to his sport. On the other hand, from a eudaimonic perspective, athletic well-being would mean a general satisfaction stemming from the fact that the athlete is thriving towards his individual, valued goals, sees his personal and professional development in perspective and as a continuum, and sees his achievements as representing his beliefs and values. Some researchers (e.g. Brady and Shambrook, 2003) consider the eudaimonic approach as more relevant when examining athletic well-being, since in high-achievement competitive sport athletes usually devote their whole lives to a certain goal while giving up other important areas. Besides the hedonically pleasant feelings of winning or giving their best they also often experience quite painful, negative or insecure emotions. They often need to deal with the monotonic nature of long trainings, physical pain, pushing one's mental limits (e.g. Tracey & Elcombe, 2004), anxiety or extreme fatigue, painful sacrifices (Durand-Bush & Salmela, 2002) and so forth – and despite those, athletes can still evaluate their overall sport participation as meaningful, valuable and coherent. They still feel that competitive sport plays a very important, integrated and meaningful part in their lives.

In summary, extensive research have contributed to our current knowledge on the determinants and contributors of outstanding athletic performance as well as high levels

of well-being and satisfaction. Researchers have found that highly determined, focused, self-controlled, self-efficacious, persistent and optimistic athletes are more likely to achieve high levels of success. When examining athletic satisfaction, results vary according to the measures used to report well-being (e.g. self-esteem, subjective vitality, satisfaction with sport or life, etc.). However, from a eudaimonic point of view, well-being and satisfaction would be provided by feelings of autonomy (Brady & Shambrook, 2003), self-growth, actualization of athletic potentials, and acting in congruence with one's beliefs and values (Ryan & Deci, 2001).

Of course, these two constructs cannot be considered as completely separate entities in an athlete's life; high performance and high satisfaction are intertwined and influenced by each other. Similarly, certain variables (social, environmental or psychological factors) may play an important role in both of these outcomes. The role of optimism or positive thinking illustrates this relationship quite well. Dispositional optimism has the potential to affect every single aspect of an individual's cognitive, emotional and social behavior. A highly optimistic athlete, when facing difficulties, will be more likely to continue pursuing his valued goals, regulate his emotions and use effective coping strategies than a less optimistic athlete (Scheier, Carver & Bridges, 2000, as cited in Carr, 2004). Since his view about himself and the world are more positive, with expectations that more good things will happen than bad, even when facing adversity, he will be more likely to believe in himself (stay self-efficacious), stay committed to his goals (Martin-Krumm, Sarrazin, Peterson & Famose, 2003), solve problems by seeking social support – and generally adapt faster to changes in their environment (Davis & Nolen-Hoeksema, 2000). Or to take another example, the higher someone is on self-efficacy, the more he will be oriented towards changes and challenges, due to a firm belief that he will overcome any obstacles – just as he will be more successful in regulating his emotions, since he sees potentially threating demands as manageable challenges (Carr, 2004).

These connections between personal resources or human potentials illustrate the complex mechanisms taking place in the mind and psyche; and shed light on the complicated roles they play in the experiences of an athlete related to his sport. Therefore, when exploring the role they play in an athlete's ability to perform on a high level or to experience high levels of satisfaction, these protective resources should be examined in patterns or constellations. The aforementioned research shows that even

though there are certain constructs that contribute to both athletic success and satisfaction (e.g. intrinsic motivation, dispositional optimism), the patterns of the underlying constructs are slightly different. Therefore, after reviewing the relevant literature regarding the relationship of personal strengths and the athletic experience, it is assumed that some of these resources will more likely to be related to high performance, while others are more likely to be related to high satisfaction. These assumptions will be elaborated to a deeper extent in the Purpose section.

2.5 Characteristics of gymnastics and psychological attributes of gymnasts

Gymnastics is a an artistic and aesthetic, highly challenging skill-based sport that requires early specialization and long hours of practice from a very early age (Gagné, 2003; Wiersma, 2000). In order to attain proficiency, strength and endurance, the gymnasts need to participate in strict and rigorous trainings as well as to constantly maintain a strict diet (Tracey & Elcombe, 2004). Consequently, facing the challenges of intense training and competition, the maintenance of their physique (which is particularly difficult during their adolescence, Gagné, 2003), and sport-specific features such as the uncertain consequences of a subjective scoring system (Tracey & Elcombe, 2004; Tsopani, Dallas & Skordilis, 2011) is a natural part of their lives. A study conducted by Daroglou (2011) confirms that ability and skills should not be the only concern of gymnastics coaches, rather they should equally focus on the development of psychological skills such as self-efficacy, confidence and goal setting in order to contribute to successful outcomes at a competition.

Because of the highly challenging nature of gymnastics combined with the early age of specialization (Bobo-Arce & Mendez-Rial, 2013) it seems obvious that the experiences an athlete gains related to her sport have the possibility to shape the physical and mental development of a gymnast, as well as their self-concept, body image, coping skills and strategies, and so forth (Wiersma, 2000). Therefore it is important to gain knowledge about the experiences of these young athletes, and use that knowledge to contribute to their healthy development both inside and later outside of their sport (e.g. facilitate healthy career transitions and adaptive physical activity behaviors, as proposed by Tracey & Elcombe, 2004). Moreover, research on coping proves that the ways how someone copes with stress is developed during puberty, ‘and becomes entrenched

during adult life' (Daroglou, 2011, p. 2.), thereby emphasizing the importance of the recognition of valuable personality potentials of a person that can act as resources for effective coping.

3 PURPOSE

After reviewing the relevant literature, the aim of this thesis is firstly to explore the levels of psychological immunity of Hungarian gymnasts in order to examine their personal resources that can be utilized in coping with stressful situations associated with a competitive and demanding sport. Secondly, another purpose is to investigate how the different scales and the overall score of the Psychological Immune System are related to their performance and satisfaction with their performances. More specifically, to find out if any constellations of personality resources can be identified as contributing to these two outcome variables.

Based on the presented review of the literature it is hypothesized that (1) when compared to the general population, the gymnast sample will show different results on certain subscales of the PISI, which may, to a certain extent, be due to their unique circumstances (e.g. extensive and strict training at a young age, pressure of time to reach their peak, etc.). It is assumed that they will have higher scores especially on scales such as Sense of Control, Goal Orientation, Self-Efficacy and Emotional Control, as it was found by Oláh and colleagues (2012) when comparing athletes to non-athletes, and as identified by Gould and Maynard (2009) when examining successful athletes.

Secondly, it is hypothesized that (2) high performance and high satisfaction are influenced by different resources of the personality, and as such, will be able to be predicted by different scales of the PISI. Performing at a high level requires high levels of perfectionism, crystal-clear goals and determination, and possibly lower level of satisfaction with own performance in general. This relatively low satisfaction may be one of the driving force in the athlete's motivation for constantly mastering new skills and polishing the existing ones, to eventually perform at an even higher level. A quote from Newburg and colleagues illustrates this assumption quite clearly as they posit: 'the biggest obstacle to engagement often is success' (Newburg, Kimiecik, Durand-Bush & Doell, 2002, p. 262). On the other hand, satisfaction with one's own performance is probably influenced by an overall optimistic view, and the feeling that experiences in sport are meaningful and valuable in the individual's life (as supported by Ryff & Keyes, 1995) – on whatever level they may be. Satisfaction with the own performance implies the acceptance of the self and the efforts the individual made, and this also might prevent the athlete from more outstanding efforts in her sport. From a eudaimonic

perspective, feelings of personal growth and environmental mastery provide feelings of well-being rather than the actual achievements (Ryff, 1989; Ryff & Keyes, 1995). Therefore, it is assumed that (2A) high performance is more likely to be predicted by a constellation of scales that includes Positive Thinking, Sense of Control, Self-Efficacy, Change and Challenge Orientation, Goal Orientation, and one or more of the four scales of the Self-Regulating Subsystem (Synchronicity, Emotional Control, Impulse Control, Irritability Control). On the other hand, (2B) high satisfaction is more likely to be predicted by a constellation of scales that includes Positive Thinking, Sense of Coherence, Sense of Self-Growth, Creative Self-Concept, and one or more of the scales of the Self-Regulating Subsystem.

Due to the exploratory nature of the study, however, these assumptions will not be specified to a deeper extent, and it is also possible that the constellations behind the two outcomes will turn out slightly different. The reason for this is firstly the interconnected nature of these resource variables, and secondly the relative novelty of the Psychological Immune System in sport research, especially in a gymnastics population. Therefore, the purpose of this study is rather to explore this population with regard to their psychological immunity and shed light on the existence of any patterns that might exist in relation to high performance and high satisfaction; than to confirm precise assumptions about the individual scales.

Thirdly, I assume that (3) the coaches' evaluations on the gymnasts' physical and mental talent will both play an additional role in predicting their level of performance (3A), and to a smaller extent, their satisfaction as well (3B). The purpose of testing this relationship is to find out whether the coaches' evaluations contain any additional information about the gymnasts' physical and mental skills related to the two outcome variables. It is assumed that the evaluation of the gymnasts' Mental Talent is based on various psychological skills and therefore (3C) it will show correlations with some scales of the PISI, depending on which criteria the coaches used to estimate their athletes' talent.

4 METHODOLOGY

4.1 Participants

Participants were 67 young female rhythmic gymnasts from Hungary. They represented nine different clubs, eight of which were located in the suburbs or the city of Budapest, and one in the countryside. The limit of age was thirteen years, since the questionnaires required a certain level of self-reflection and abstract thinking. Therefore the youngest participant was 13, the oldest was 24 years old (*M*=16.14, *SD*=2.69). 33 athletes were currently in the senior age-group, 30 in junior, and 4 in the sub-junior group. 37 gymnasts were competing in category A (the highest level in Hungary), 21 girls in category B, and 9 gymnasts in category C. The time of competing in the sport was varying between 2 and 18 years (*M*=8.52, *SD*=2.84).

The criterion for including a certain club in the study was that they have at least two gymnasts above the age of 14. The head coaches were contacted based on their e-mail addresses or phone numbers available on the website of the Hungarian Gymnastics Association. A consent form (Appendix 1) was handed out to the participants to explain the purposes of the study and obtain their informed consent.

4.2 Measures

Demographics, performance and satisfaction. The first part of the questionnaire battery (Appendix 2) contained information of demographic data (name, age, club, city, category and years of competing); information on performance (best result, results in the past 3 years' national competitions and international competitions); and finally a question regarding athletic satisfaction. In this last question the participants were asked to indicate on a 5-point scale how satisfied they were with their performances so far. Measuring satisfaction with individual performance this way has traditions in sport psychology research, for example in the study of Chelladurai (1984); Pensgaard & Duda (2003); or Nicholls and colleagues (2012). Satisfaction with performance as a variable is supposed to represent the context-specific feelings of well-being of the individual as it is proposed by Lundqvist (2011).

Psychological Immune System Inventory (PISI). The scale was developed by Oláh (1996, 2005, Oláh et al., 2012) and is operationalized to measure the mental resistance and coping capacity of the individual (Appendix 3). It consists of 80 items that stand for 16 different factors. These 16 subscales are comprised into three subsystems based on their main psychological functions. The Monitoring-Approaching Subsystem (1) includes Positive Thinking, Sense of Coherence, Sense of Control, Sense of Self-Growth, Change and Challenge Orientation, Social Monitoring, and Goal Orientation. The Creating-Executing Subsystem (2) includes Creative Self-Concept, Problem Solving, Self-Efficacy, Social Mobilizing Capacity and Social Creating Capacity The Self-Regulating Subsystem (3) contains Synchronicity, Impulse Control, Emotion Control and Irritability control. The items are simple statements that the participants required to respond to on a 4-point scale (*1 – completely does not describe me* to *4 – completely describes me*). The three subsystems, sixteen scales and sample questions are presented in Table 1.

Table 1

Subsystems, scales and sample questions of PISI (Oláh, 2005)

Subsystem	Subscale	Sample question
Monitoring-Approaching Subsystem (MAS)	1. Positive Thinking	I am convinced that most of the things that happen around me are positive in the long run.
	2. Sense of Control	I am convinced that everything that happens to me depends on myself rather than fate or unlucky circumstances.
	3. Sense of Coherence	When I look at my life, I see it as meaningful and coherent.
	4. Sense of Self-Growth	I think that I succeed more and more in different areas of my life.
	5. Change- and Challenge Orientation	I consider the unexpected changes in my life as exciting challenges and hold possibilities for development.
	6. Social Monitoring	I can often discover the roles people have in a group, even if they are hidden from the people

	Capacity	themselves.
	7. Goal Orientation	If I start something, I finish it.
Creating-Executing Subsystem (CES)	8. Creative Self-Concept	I see myself as a strongly resourceful person.
	9. Problem Solving Capacity	Even when I am under pressure, I am very good at working out alternative solutions to problems.
	10. Self-Efficacy	If I see a solution to a problem, I am sure that I can do what needs to be done.
	11. Social Mobilizing Capacity	I can usually find someone that can help me to solve my problems when I need to.
	12. Social Creating Capacity	I see myself as a driving force in cooperating others to develop and influence whatever happens to us.
Self-Regulating Subsystem (SRS)	13. Synchronicity	*(reversed item)* Lately, I have felt that I cannot catch up with what is going around me.
	14. Impulse Control	I can listen to my feelings without they taking over me.
	15. Emotional Control	*(reversed item)* I easily become upset when I make a mistake.
	16. Irritability Control	It takes a lot for me to lose my temper.

In previous research the Cronbach's Alpha was found from .62 to .80 for all sixteen subscales, and the questionnaire also has a quite high convergent and discriminant validity (Oláh, 2005). The Cronbach's Alpha values found in this study are presented below in Table 2.

Table 2

Reliability of PISI subscales and subsystems

Subscale	Cronbach's alpha	Subsystem	Cronbach's alpha
1. Positive Thinking	0.73	Monitoring - Approaching Subsystem (MAS)	0.82
2. Sense of Control	0.46		
3. Sense of Coherence	0.60		
4. Sense of Self-Growth	0.66		
5. Change- and Chall. Orient.	0.68		
6. Social Monitoring Cap.	0.73		
7. Goal Orientation	0.75		
8. Creative Self-Concept	0.79	Creating-Executing Subsystem (CES)	0.85
9. Problem Solving Cap.	0.71		
10. Self-Efficacy	0.65		
11. Social Mobilizing Cap.	0.64		
12. Social Creating Cap.	0.75		
13. Synchronicity	0.73	Self-Regulating Subsystem (SRS)	0.86
14. Impulse Control	0.70		
15. Emotional Control	0.57		
16. Irritability Control	0.65		

In the present study Cronbach's Alpha varied mostly between .57 and .79 which proves an acceptable to high internal consistency. However, in the case of the Sense of Control subscale the value was α=.46, which shows a rather poor internal consistency for this scale. Taking a closer look reveals that it is caused by the very low item-total correlation of item 66 (r=.048). Apparently this item, at least in this sample did not measure the same construct as the other four items in the scale. Since it cannot be confirmed that the scale is reliable, the variable Sense of Control will be excluded from the analysis and the interpretation of the results.

Besides the individual scales, the reliability of the three subsystems was also found high, α=.81 for MAS, α=.85 for CES, α=.86 for SRS which confirms the overall reliability of the instrument.

Evaluation by the Coach. In all 9 clubs the head coach was asked to provide her professional opinion regarding each gymnast's performance. This information sheet contained two questions, concerning each individual: (1) On a scale from 1 to 10, how talented is this athlete in rhythmic gymnastics, in your opinion? and (2) On a scale from 1 to 10 to what extent does she live up to this talent in her performance (mental aspect)?

4.3 Procedure

Data collection started in August 2013 and lasted until February 2014. After contacting the clubs and obtaining their agreement in participating in the study, the information sheets, consent forms and questionnaires were distributed to the gymnasts. With the exception of one club this was done personally in order to provide help if needed, and maximize returning rate. In one case the documentation was distributed by e-mail to a club situated in the countryside due to convenience reasons. The returning rate is considered high: 74 gymnasts were contacted overall, out of which 61 returned both questionnaires, 64 returned the Demographic Questionnaire and 64 returned the PISI.

The coach was asked to indicate her professional evaluation on the gymnasts' performance on a separate sheet and it was secured the athlete-participants were not aware of this information about themselves. This was both to assure that the research process does not harm the athlete participants in any way e.g., if the evaluation is negative for them, and to maximize the coach's honesty.

The PISI was scored according to manual instructions (Oláh, 2005). After recoding the reversed items, the score of each subscale is added by the scores of five questions, and the overall score of the PISI is obtained by the total scores of all sixteen subscales. The three main subsystems representing different psychological functions (Monitoring-Approaching Subsystem, Creating-Executing Subsystem and Self-Regulating Subsystem) can be calculated from the overall score of the corresponding subscales (Oláh, 2012).

In order to be able to compare participants according to their levels of performance, three questions were asked in the Demographic Questionnaire (What is your best result so far?, What results did you have in the past 3 years' national competitions?, and Have you ever participated in international competitions? If yes, when and with what

results?). Unfortunately but quite understandably, responses for these three questions were quite diverse and vague in their nature. Especially for younger and / or high-level gymnasts it was a rather difficult task to remember all their results from national and international competitions as many of them have competed in several tournaments during one season. Therefore, their answers were confirmed by the official records of national competitions, which are available on the website of the Hungarian Gymnastics Association. Based on the above information a new variable 'Level of Performance' was created. This process meant transforming diverse data into five clear sections that represent different zones of achievement and as such, make a fair comparison possible. The criteria for Level 5 was to compete in category A (the highest level in Hungary) and having been part of the national team at least once during the athletic career (*n*=21). The girls who compete in category A but have not been selected to the national team so far, were categorized into Level 4 (*n*=16). Level 3 (*n*=13) included all the girls competing in category B in a national level, while Level 2 contained gymnasts from the lower levels of category B (*n*=8). Finally, all athletes from category C were categorized to Level 1 (*n*=9) as they usually do gymnastics as a hobby and / or compete only on local levels.

4.4 Data Analysis

Data was analysed with the help of SPSS 21 version software. First reliability of the specific scales was assessed, as presented above. Secondly, the PISI scores of the gymnast sample were compared to the standard scores of the questionnaire (Oláh, 2005). This was to find out about any differences that would exist in the psychological immunity (coping resources) of the gymnast sample compared to the general population. Thirdly, multiple linear regressions were performed in order to predict the two outcome variables, Level of Performance and Satisfaction with Performance, respectively, with the help of the PISI scales. Finally, the coaches' physical and mental evaluations were added to both linear regression models in order to find out about their roles in the Level of Performance and the Satisfaction of the gymnasts.

5 RESULTS

After assessing the reliability of the scales as described in the Methods section it can be established that all PISI scales show acceptable reliability and therefore can be used for further analysis of the data – with the exception of Sense of Control which will not be analyzed due to low reliability.

5.1 Descriptives

In order to explore the characteristics of a given population – in this case, the sample of Hungarian gymnasts – the descriptive statistics is the first step to present (Table 3).

Table 3

Descriptive statistics

	N	Mean	Std. Deviation	Skewness		Kurtosis	
	Stat.	Stat.	Stat.	Stat.	Std. Error	Stat.	Std. Error
Age	65	16.14	2.69	1.05	.29	.18	.58
Years of competing	64	8.52	2.84	.80	.29	1.40	.59
Satisfaction with Perf.	60	3.40	.78	.23	.30	-.24	.60
Physical talent	67	6.19	2.23	-.55	.29	-.30	.57
Mental talent	67	8.09	1.99	-.94	.29	.35	.57
Positive Thinking	64	14.94	2.65	-.47	.29	-.02	.59
Sense of Control	64	13.84	2.32	-.45	.29	.50	.59
Sense of Coherence	64	16.20	2.67	-.96	.29	1.29	.59
Creative Self-Concept	64	15.22	2.91	-.86	.29	.59	.59
Sense of Self-Growth	64	15.77	2.85	-.71	.29	.24	.59
Change Chall. Orient.	64	14.17	2.73	.11	.29	-.56	.59
Social Monitoring	64	14.09	2.68	-.07	.29	-.25	.59
Problem Solving	64	13.05	2.83	-.16	.29	-.65	.59
Self-Efficacy	64	14.55	2.53	-.12	.29	-.74	.59
Social Mobilizing Cap.	64	15.34	2.86	-.88	.29	.74	.59
Social Creating Cap.	64	12.84	3.02	-.05	.29	-.42	.59
Synchronicity	64	13.89	3.26	-.24	.29	-.82	.59

Goal Orientation	64	16.13	2.75	-.53	.29	-.40	.59
Impulse Control	64	14.42	3.03	-.34	.29	-.01	.59
Emotional Control	64	11.83	2.87	-.17	.29	-.30	.59
Irritability Control	64	13.41	3.08	-.22	.29	-.86	.59
MAS	64	102.92	10.76	-.59	.29	.00	.59
CES	64	71.00	9.67	-.25	.29	.38	.59
SRS	64	53.55	9.67	-.41	.29	-.26	.59
Σ PISI	64	227.47	24.38	-.84	.29	.58	.59

The attributes of the demographic variables as well as the means and standard deviations of the sixteen subscales of PISI, the three subsystems of PISI and the overall score of the questionnaire is presented in the table above. The gymnasts scored the lowest on the Emotional Control subscale (*M*=11.83, *SD*=2.871), and the highest on the Goal Orientation subscale (*M*=16.13, *SD*=2.75) of the PISI.

The skewness and kurtosis values are also shown in the table. Most PISI scales have negative values on skewness, which means that scores are more likely to be piled up on the right side of the distribution (most individuals have higher scores on a specific scale). Kurtosis values vary more, and they are both positive and negative, which shows evidence for pointy distributions on some scales and flat distributions on others. These results suggest that data is probably not normally distributed regarding some scales; however, statistical literature agrees (Field, 2013) that in the case of large samples these values tend to show significant differences even when the data in fact is normally distributed. Therefore it is advised that in samples exceeding 30, normal distribution should be assumed with reference to the Central Limit Theorem.

Since the variable ’Satisfaction with performance’ is an ordinal one, it is also reasonable to present not only the average satisfaction of the athletes but also the number of gymnasts in each group of level of satisfaction. Therefore they are presented below in Table 4.

Table 4

Frequencies of the variable 'Satisfaction with Performance'

	Value	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	2 (*a little*)	6	9.0	10.0	10.0
	3 (*average*)	29	43.3	48.3	58.3
	4 (*quite much*)	20	29.9	33.3	91.7
	5 (*very much*)	5	7.5	8.3	100.0
	Total	60	89.6	100.0	
Missing	System	7	10.4		
Total		67	100.0		

As the table illustrates, to the question 'How satisfied are you with your performance so far?' none of the gymnasts answered with 1 *('not at all')*. 6 gymnasts were *'a little'* satisfied, most of them (*n*=29, 43.3%) are *'averagely'* satisfied, almost one third of them (*n*=20, 29.9%) are *'quite much'*, and 5 are *'very much'* satisfied with their own performances.

The gymnasts were categorized into five different levels of performance according to their competitive levels and past results, as described earlier in the methods section. The frequencies of the different groups are presented below (Table 5).

Table 5

Frequencies of the variable 'Level of Performance'

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Level 1 (cat. C)	9	13.4	13.4	13.4
	Level 2 (cat. B)	8	11.9	11.9	25.4
	Level 3 (cat. B, national level)	13	19.4	19.4	44.8
	Level 4 (cat. A)	16	23.9	23.9	68.7
	Level 5 (cat. A, ever made to NT)	21	31.3	31.3	100.0
	Total	67	100.0	100.0	

The gymnasts are characterized also by the age group they are currently competing (junior and senior). There were four girls competing in sub-junior age-group, but because of the low frequency of this group they were also categorized into the junior group. The frequencies of the age-groups are presented below (Table 6.).

Table 6

Frequencies of Age-Groups

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	junior	34	50.7	50.7	50.7
	senior	33	49.3	49.3	100.0
	Total	67	100.0	100.0	

The following correlation matrix tables (Table 7 & Table 8) present the correlations between the main variables of the study.

Table 7.
Correlation matrix of the variables (1)

		Age	Age group	Yrs of Competing	Level of Perf.	Satisfaction with Perf.	Physical Talent	Mental Talent	Positive Thinking	Sense of Control	Sense of Coherence	Creative Self-Concept	Sense of Self-Growth	Change Challenge Orient.	Social Monitoring	Problem Solving	Self-Efficacy	Social Mobilizing	Social Creating	Synchronicity	Goal Orientation	Impulse Control	Emotional Control	Irritability Control	MAS	CES	SRS	Σ PISI
Age	Pearson	--	.73**	.75**	.06	.04	-.13	-.10	.03	.01	.10	-.07	.04	-.11	.14	.02	-.05	-.07	-.15	.05	.14	-.10	-.18	.02	.09	-.09	-.06	-.02
	Sig. (2t)		.00	.00	.63	.73	.31	.44	.79	.94	.43	.61	.74	.38	.26	.88	.72	.61	.25	.70	.28	.43	.15	.88	.49	.47	.63	.86
Age group	Pearson	.73**	--	.50**	.05	.04	-.11	-.03	.08	-.12	.02	-.13	-.04	-.11	.09	-.07	-.09	-.10	-.26*	.02	.13	.14	-.15	.13	.02	-.20	.05	-.05
	Sig.	.00		.00	.70	.75	.36	.81	.51	.35	.89	.31	.76	.39	.46	.57	.46	.44	.04	.85	.32	.27	.24	.30	.88	.12	.69	.70
Years of Competing	Pearson	.75**	.50**	--	.25*	.05	.04	-.14	.04	.06	.03	.06	.15	.04	.10	.10	.16	.05	.06	.12	.23	-.15	-.26*	-.04	.16	.12	-.09	.08
	Sig.	.00	.00		.05	.68	.78	.28	.76	.62	.82	.62	.26	.78	.45	.43	.20	.71	.64	.34	.07	.24	.04	.75	.21	.34	.46	.52
Level of Performance	Pearson	.06	.05	.25*	--	.10	.67**	.27*	-.21	.05	-.05	-.04	.03	.01	-.10	-.09	.05	-.18	.02	.14	.13	.04	.05	-.05	-.03	-.07	.06	-.02
	Sig.	.63	.70	.05		.44	.00	.03	.10	.72	.72	.78	.81	.92	.45	.49	.70	.15	.90	.26	.30	.73	.67	.69	.80	.57	.63	.88
Satisfaction with Performance	Pearson	.04	.04	.05	.10	--	.30*	.09	.11	-.06	.23*	.38**	.17	.19	-.26*	.00	.29*	.15	-.13	.04	.26*	.03	-.02	.06	.18	.20	.04	.17
	Sig.	.73	.75	.68	.44		.02	.51	.40	.66	.03	.00	.20	.15	.05	1.00	.02	.25	.32	.74	.04	.84	.87	.63	.17	.14	.78	.19
Physical Talent	Pearson	-.13	-.11	.04	.67**	.30*	--	.45**	.01	.12	.15	.14	.15	.06	-.06	.13	.17	.04	.06	.19	.18	-.03	.14	-.04	.15	.16	.09	.16
	Sig.	.31	.36	.78	.00	.02		.00	.91	.36	.22	.26	.25	.63	.63	.30	.18	.77	.63	.13	.15	.84	.28	.78	.23	.22	.50	.20
Mental Talent	Pearson	-.10	-.03	-.14	.27*	.09	.45**	--	.00	-.04	.13	.10	-.09	-.14	-.09	-.01	.06	-.08	-.03	.05	-.02	.07	.00	.00	-.06	.01	.04	-.01
	Sig.	.44	.81	.28	.03	.51	.00		.98	.77	.29	.44	.50	.27	.46	.95	.62	.54	.79	.69	.89	.57	1.00	.98	.64	.94	.75	.96
Positive Thinking	Pearson	.03	.08	.04	-.21	.11	.01	.00	--	.09	.50**	.44**	.45**	.17	.09	.35**	.41**	.19	.03	.38**	.47**	.16	.20	.34**	.69**	.41**	.34**	.60**
	Sig.	.79	.51	.76	.10	.40	.91	.98		.50	.00	.00	.00	.19	.50	.01	.00	.12	.80	.00	.00	.21	.12	.01	.00	.00	.01	.00
Sense of Control	Pearson	.01	-.12	.06	.05	-.06	.12	-.04	.09	--	.13	.29*	.22	-.09	-.10	.19	.43**	.03	.19	.23	.29*	-.03	.06	-.11	.34**	.32**	.05	.30*
	Sig.	.94	.35	.62	.72	.66	.36	.77	.50		.30	.02	.09	.46	.45	.14	.00	.82	.14	.07	.02	.82	.64	.39	.01	.01	.69	.02
Sense of Coherence	Pearson	.10	.02	.03	-.05	.30*	.15	.13	.45**	.13	--	.36**	.63**	.08	.04	.33**	.31*	.35**	.07	.59**	.52**	.34**	.40**	.44**	.73**	.41**	.56**	.71**
	Sig.	.43	.89	.82	.72	.03	.22	.29	.00	.30		.00	.00	.52	.74	.01	.01	.00	.60	.00	.00	.01	.00	.00	.00	.00	.00	.00
Creative Self-Concept	Pearson	-.07	-.13	.06	-.04	.38**	.14	.10	.44**	.29*	.36**	--	.44**	.24	-.09	.39**	.57**	.34**	.20	.34**	.40**	.04	.18	.16	.51**	.73**	.23	.61**
	Sig.	.61	.31	.62	.78	.00	.26	.44	.00	.02	.00		.00	.06	.46	.00	.00	.01	.11	.01	.00	.77	.14	.21	.00	.00	.06	.00
Sense of Self-Growth	Pearson	.04	-.04	.15	.03	.17	.15	-.09	.45**	.22	.63**	.44**	--	.23	.02	.52**	.42**	.24	.25*	.68**	.60**	.28*	.37**	.41**	.80**	.55**	.55**	.79**
	Sig.	.74	.76	.26	.81	.20	.25	.50	.00	.09	.00	.00		.07	.87	.00	.00	.06	.05	.00	.00	.03	.00	.00	.00	.00	.00	.00
Change and Challenge Orient	Pearson	-.11	-.11	.04	.01	.19	.06	-.14	.17	-.09	.08	.24	.23	--	-.02	.26*	.27*	.37**	.30*	.09	.19	.04	.14	.04	.40**	.42**	.10	.38**
	Sig.	.38	.39	.78	.92	.15	.63	.27	.19	.46	.52	.06	.07		.88	.04	.03	.00	.02	.50	.13	.75	.28	.75	.00	.00	.45	.00

Note. * p< .05, ** p< .01

Table 8.
Correlation matrix of the variables (2)

		Age	Age group	Yrs of Competing	Level of Perf.	Satisfaction with Perf.	Physical Talent	Mental Talent	Positive Thinking	Sense of Control	Sense of Coherence	Creative Self-Concept	Sense of Self-Growth	Change Challenge Orient.	Social Monitoring	Problem Solving	Self-Efficacy	Social Mobilizing	Social Creating	Synchronicity	Goal Orientation	Impulse Control	Emotional Control	Irritability Control	MAS	CES	SRS	Σ PISI
Social Monitoring	Pearson	.14	.09	.10	-.10	-.26*	-.06	-.09	.09	-.10	.04	-.09	.02	-.02	--	.25*	.00	.00	.13	.03	.05	-.12	.02	.01	.28*	.09	-.02	.15
	Sig.	.26	.46	.45	.45	.05	.63	.46	.50	.45	.74	.46	.87	.88		.04	1.00	1.00	.30	.84	.67	.35	.86	.95	.03	.49	.88	.24
Problem Solving	Pearson	.02	-.07	.10	-.09	.00	.13	-.01	.35**	.19	.33**	.40**	.52**	.26*	.25*	--	.35**	.21	.54**	.30*	.38**	.02	.30*	.05	.57**	.73**	.21	.63**
	Sig.	.88	.57	.43	.49	1.00	.30	.95	.01	.14	.01	.00	.00	.04	.04		.01	.10	.00	.01	.00	.85	.02	.70	.00	.00	.09	.00
Self-Efficacy	Pearson	-.05	-.09	.16	.05	.29*	.17	.06	.41**	.43**	.31*	.57**	.42**	.27*	.00	.35**	--	.35**	.20	.38**	.56**	.08	.19	-.03	.59**	.70**	.20	.62**
	Sig.	.72	.46	.20	.70	.02	.18	.62	.00	.00	.01	.00	.00	.03	1.00	.01		.00	.12	.00	.00	.55	.13	.81	.00	.00	.12	.00
Social Mobilizing	Pearson	-.07	-.10	.05	-.18	.15	.04	-.08	.19	.03	.35**	.34**	.24	.37**	.00	.21	.35**	--	.20	.20	.13	.03	.21	.15	.33**	.61**	.19	.47**
	Sig.	.61	.44	.71	.15	.25	.77	.54	.12	.82	.00	.01	.06	.00	1.00	.10	.00		.11	.11	.30	.79	.09	.24	.01	.00	.14	.00
Social Creating	Pearson	-.15	-.26*	.06	.02	-.13	.06	-.03	.03	.19	.07	.20	.25*	.30*	.13	.54**	.20	.20	--	.17	.07	-.21	.16	-.06	.26*	.64**	.02	.38**
	Sig.	.25	.04	.64	.90	.32	.63	.79	.80	.14	.60	.11	.05	.02	.30	.00	.12	.11		.19	.61	.10	.20	.63	.04	.00	.89	.00
Synchronicity	Pearson	.05	.02	.12	.14	.04	.19	.05	.38**	.23	.59**	.34**	.68**	.09	.03	.30*	.38**	.20	.17	--	.58**	.31*	.50**	.46**	.64**	.40**	.73**	.73**
	Sig.	.70	.85	.34	.26	.74	.13	.69	.00	.07	.00	.01	.00	.50	.84	.01	.00	.11	.19		.00	.01	.00	.00	.00	.00	.00	.00
Goal Orientation	Pearson	.14	.13	.23	.13	.26*	.18	-.02	.47**	.29*	.52**	.40**	.60**	.19	.05	.38**	.56**	.13	.07	.58**	--	.30*	.33**	.30*	.78**	.44**	.48**	.71**
	Sig.	.28	.32	.07	.30	.04	.15	.89	.00	.02	.00	.00	.00	.13	.67	.00	.00	.30	.61	.00		.02	.01	.02	.00	.00	.00	.00
Impulse Control	Pearson	-.10	.14	-.15	.04	.03	-.03	.07	.16	-.03	.34**	.04	.28*	.04	-.12	.02	.08	.03	-.21	.31*	.30*	--	.49**	.60**	.25*	-.02	.75**	.40**
	Sig.	.43	.27	.24	.73	.84	.84	.57	.21	.82	.01	.77	.03	.75	.35	.85	.55	.79	.10	.01	.02		.00	.00	.05	.89	.00	.00
Emotional Control	Pearson	-.18	-.15	-.26*	.05	-.02	.14	.00	.20	.06	.40**	.18	.37**	.14	.02	.30*	.19	.21	.16	.50**	.33**	.50**	--	.65**	.38**	.31*	.83**	.62**
	Sig.	.15	.24	.04	.67	.87	.28	1.00	.12	.64	.00	.14	.00	.28	.86	.02	.13	.09	.20	.00	.01	.00		.00	.00	.01	.00	.00
Irritability Control	Pearson	.02	.13	-.04	-.05	.06	-.04	.00	.34**	-.11	.44**	.16	.41**	.04	.01	.05	-.03	.15	-.06	.46**	.30*	.60**	.65**	--	.37**	.08	.85**	.53**
	Sig.	.88	.30	.75	.69	.63	.78	.98	.01	.39	.00	.21	.00	.75	.95	.70	.81	.24	.63	.00	.02	.00	.00		.00	.53	.00	.00
MAS	Pearson	.09	.02	.16	-.03	.18	.15	-.06	.69**	.34**	.73**	.51**	.80**	.40**	.28*	.57**	.59**	.33**	.26*	.64**	.78**	.25*	.38**	.37**	--	.65**	.53**	.91**
	Sig.	.49	.88	.21	.80	.17	.23	.64	.00	.01	.00	.00	.00	.00	.03	.00	.00	.01	.04	.00	.00	.05	.00	.00		.00	.00	.00
CES	Pearson	-.09	-.20	.12	-.07	.20	.16	.01	.41**	.32**	.41**	.73**	.55**	.42**	.09	.73**	.70**	.61**	.64**	.40**	.44**	-.02	.31*	.08	.65**	--	.25*	.78**
	Sig.	.47	.12	.34	.57	.14	.22	.94	.00	.01	.00	.00	.00	.00	.49	.00	.00	.00	.00	.00	.00	.89	.01	.53	.00		.05	.00
SRS	Pearson	-.06	.05	-.09	.06	.04	.09	.04	.34**	.05	.56**	.23	.55**	.10	-.02	.21	.20	.19	.02	.73**	.48**	.75**	.83**	.85**	.53**	.25*	--	.73**
	Sig.	.63	.69	.46	.63	.78	.50	.75	.01	.69	.00	.06	.00	.45	.88	.09	.12	.14	.89	.00	.00	.00	.00	.00	.00	.05		.00
Σ PISI	Pearson	-.02	-.05	.08	-.02	.17	.16	-.01	.60**	.30*	.71**	.61**	.79**	.38**	.15	.63**	.62**	.47**	.37**	.73**	.71**	.40**	.62**	.53**	.91**	.78**	.73**	--
	Sig.	.86	.70	.52	.88	.19	.20	.96	.00	.02	.00	.00	.00	.00	.24	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	

Note.* p< .05, ** p< .01

As it can be seen, there is a strong significant relationship between the age and age group of the gymnasts (junior or senior) (r=.73, p=.00), and the number of years they have been competing so far (r=.75, p=.00) – for obvious reasons. However, age does not seem to correlate with any other variables of the study.

For the same mentioned obvious reason there was a strong significant correlation between the age group of the gymnasts and the number of years they have been competing for (r=.50, p=.00). The age-group of the girls, whether they compete in junior or senior category, seems to have a weak but significant negative correlation with the Social Creating Capacity subscale of the PISI (r=-.26, p=.04).

There is a weak but significant positive correlation between Years of competing and Level of Performance (r=.25, p=.05). There is a weak positive correlation between the Years of competing and Goal Orientation (r=.23), although this result does not reach significance (p=.07). A weak but significant negative correlation was also found between the Years of competing and the Emotional Control subscale of the PISI (r=-0.26, p=.04).

There is no correlation between the Level of Performance and the Satisfaction with Performance of a gymnast. Similarly, there was no linear relationship found between the Level of Performance and any of the subscales of the Psychological Immune System Inventory. Nevertheless, there was a significant positive correlation between the Level of Performance of a gymnast and how the coach evaluated her; a strong relationship with Physical Talent (r=.67, p=.00), and a weak one with Mental Talent (r=.27, p=.03).

There is a moderate significant relationship between the gymnasts' Satisfaction and the coach-evaluated Physical Talent (r=.30, p=.02). There are also weak but significant correlations between Satisfaction with Performance and the following subscales of the PISI: Sense of Coherence (r=.23, p=.03); Self-Efficacy (r=.29, p=.02); Goal Orientation (r=.26, p=.04), and a significant moderate relationship with Creative Self-Concept (r=.38, p=.00). There is also a weak but significant negative correlation between Satisfaction and Social Monitoring (r=-.26, p=.05).

The coach-evaluated Physical and Mental Talent also seem to have a quite strong positive relationship with each other (r=.45, p=.00).

Finally, the correlation matrix also shows weak to strong positive correlations between the subscales of the PISI which were expected based on previous research (Oláh, 2005).

These preliminary results suggest that the performance level of the gymnasts does not have a linear relationship with their levels of satisfaction – in other words, high performance does not necessarily complies with high levels of satisfaction, and vice versa. These results also show that there are no specific subscales correlated with the Level of Performance, but there are some subscales of the Psychological Immune System that seem to have a significant relationship with the Satisfaction with one's own performance. A further analysis will explore these relationships to a deeper extent.

5.2 Group comparisons (Hypothesis 1)

In order to compare the gymnast sample to the general population, a One-Sample T-test was performed on the means of the Psychological Immune System Inventory subscales, subsystems and overall scores. An important assumption of the t-test is that data set is normally distributed – with reference to the central limit theorem (Field, 2013) a normal distribution can be assumed since $n>30$.

A t-statistics was carried out on each of the subscales, subsystems and on the overall score of the PISI, each compared to the observed mean of a previous large-scale study conducted on a 1612 people sample (Oláh, 2005). This research resulted in establishing the standard scores of the PISI. However, it has to be stressed that the mean age of that sample was $M=25.3$, ($SD=10.43$) – which is undoubtedly much higher than this sample. This limitation has to be kept in mind when interpreting the results. The results of the group comparisons are presented in Table 9.

Table 9

Results of one-sample T-tests

Subscale/Subsystem	Sample mean	Sample *SD*	Population mean (Test Value)	Popula-tion *SD*	*t*	*df*	Sig. (2-tailed)
Positive Thinking	14.94	2.65	14.30	4.31	1.91	63	.06
Sense of Control	13.84	2.32	13.87	3.98	-.09	63	.92
Sense of Coherence	16.20	2.67	15.97	3.97	.69	63	.49
Creative Self-Concept	15.22	2.91	13.55	4.43	4.56	63	.00 **

Sense of SelfGrowth	15.77	2.85	16.51	3.82	-2.09	63	.04 *
Change Challenge Orient.	14.17	2.73	14.02	4.33	.41	63	.68
Social Monitoring	14.09	2.68	13.81	4.16	.82	63	.41
Problem Solving	13.05	2.83	13.05	3.95	-.02	63	.98
Self Efficacy	14.55	2.53	14.67	3.95	-.38	63	.70
Social Mobilizing Cap.	15.34	2.86	13.37	4.39	5.49	63	.00 **
Social Creating Cap	12.84	3.02	12.66	4.21	.47	63	.64
Synchronicity	13.89	3.26	14.78	4.08	-2.19	63	.03 *
Goal Orientation	16.13	2.75	17.62	6.14	-4.34	63	.00 **
Impulse Control	14.42	3.03	15.00	3.91	-1.54	63	.13
Emotional Control	11.83	2.87	13.77	4.56	-5.42	63	.00 **
Irritability Control	13.41	3.08	13.92	4.54	-1.35	63	.18
MAS	102.92	10.76	106.12		-2.38	63	.02*
CES	71.00	9.67	67.31		3.04	63	.00**
SRS	53.55	9.67	57.49		-3.26	63	.00**
Σ PISI	227.47	24.38	230.94		-1.14	63	.26

* $p<0.5$; ** $p<0.1$

As it can be seen in the table, the gymnasts have somewhat lower scores on the overall questionnaire, but this difference does not reach significance, therefore it seems that they possess similar levels of psychological immunity as the general population. However, there are several significant differences between the two groups on certain subscales and even subsystems of the PISI. The gymnasts scored significantly higher on Creative Self-Concept (t=4.56, p=.00), Social Mobilizing Capacity (t=5.49, p=.00), and on the Creating-Executing Subsystem of the PISI (t=3.04, p=.00) than the general population. They also have higher scores on Positive Thinking (t=1.91), however, this shows only a tendency and is not significant (p=.06). The gymnast sample scored lower than the general population on Sense of Self-Growth (t=-2.09, p=.04), Synchronicity (t=-2.19, p=.03), Goal Orientation (t=-4.34, p=.00), Emotional Control (t=-5.42, p=.00), and on the Monitoring-Approaching Subsystem (t=-2.38, p=.02) as well as the Self-Regulating Subsystem of the PISI (t=-3.26, p=.00). Since the Monitoring-Approaching Subsystem contains the scores of the Sense of Control scale which did not prove to be reliable, the difference in the Subsystem will not be analyzed further either.

These results reveal that remarkable differences exist between young female gymnasts and the average Hungarian population on the realm of the different aspects of their Psychological Immune System. In order to dig deeper in these differences, one-way ANOVA tests were performed on each of the subscales that have shown significant differences. The purpose of this was to test whether these differences are due to one or more determining factors, namely the different levels on which the gymnasts compete or their level of satisfaction; or the differences are general for the whole gymnast population.

Therefore, Creative Self-Concept, Sense of Self-Growth, Social Mobilizing Capacity, Synchronicity, Goal Orientation, Emotional Control, and two subsystems (CES and SRS) were tested individually. The one-way ANOVA tests, however, did not reveal any significant differences according to the grouping variable Level of Performance for seven out of these eight variables. With other words, the differences that exist between the gymnast sample and the general population are due to general characteristics of the gymnasts, and not to a third factor (namely the level which they compete on).

Nevertheless, in the case of one variable, Social Mobilizing Capacity, one-way ANOVA revealed significant differences. The F ratio was F=3.46, p=.01, which proves a significant difference between some of the sub-groups in case of this one scale. Since the assumed homogeneity of variances was not violated (p=.093), but the sample sizes of the sub-groups were quite different, Field (2013) suggests to use Hochberg's GT2 procedure as the most suitable post-hoc method for sub-group comparisons.

Most of the sub-groups did not differ according to their Social Mobilizing Capacity. The gymnasts in Level 5 (the highest level) however, did significantly differ from the gymnasts in Level 4. The mean difference is 3.26, p=.00. (This result was also confirmed with the Games-Howell procedure, p=.00.) Therefore it can be concluded that those girls who have been part of the National Team at least once in their lives, have significantly lower Social Mobilizing Capacity than their counterparts competing one level lower than them.

Furthermore, one-way ANOVA tests were also performed on these eight variables with the grouping variable being Satisfaction with performance. In the case of most variables, it did not yield any significant differences between sub-groups of the gymnasts. However, in the case of Creative Self-Concept and Goal Orientation,

ANOVA tests revealed significant differences. Since the Levene Statistic showed significant differences in the variances of the different groups of Satisfaction for both subscales, the robust Welch-tests were used as it shows a more accurate value of *F* (Field, 2013). The F ratio was F=4.49, p=.02 in the case of Creative Self-Concept, and F=7.00, p=.00 in the case of Goal Orientation. As both group sizes are unequal and variances are different, Games-Howell procedure was used as the most appropriate post-hoc test of ANOVA for these conditions (Field, 2013).

When looking at the scale Creative Self-Concept, there is a significant difference (2.31 points) between the groups 3 *('average'*) and 4 *('quite much'*), p=.00. With other words, gymnasts who are a little more satisfied with their performances than average, have approximately 2.3 points higher scores on Creative Self-Concept. Similarly, the scores of Goal Orientation also show a gradual increase according to one's level of Satisfaction: the gymnasts in group 5 *('very much'*) have significantly higher Goal Orientation than their peers in group 3 *('average'*) (3.45 points, p=.00) and in group 4 *('quite much'*) (2.11 points, p=.04).

To summarize, the gymnast sample shows significant differences in six subscales and two subsystems of the PISI when compared to the general population. One way ANOVA tests revealed that in the case of Social Mobilizing Capacity, this difference is due to the high scores of the gymnasts performing in Level 4. Furthermore, in the case of Creative Self-Concept and Goal Orientation, the differences are due to the higher scores reported by girls in the higher Satisfaction groups. In the case of the scales Sense of Self-Growth, Synchronicity, Emotional Control and the two subsystems (CES and SRS) ANOVA tests did not show any significant differences between sub-groups. These results will be explicated in more details in the Discussion section.

5.3 Predicting Level of Performance and Satisfaction (Hypothesis 2)

In order to find out more about the influencing factors behind the two outcome variables (Level of Performance and Satisfaction with Performance), multiple linear regressions were performed to predict both variables.

Predicting Level of Performance with the scales of PISI (Hypothesis 2A)

Looking at the correlation matrix of the variables it can already be seen that none of the scales or subsystems of the Psychological Immune System Inventory has a significant correlation with Level of Performance. However, to test the first hypothesis, the variables were entered into a multiple linear regression model (using a forced entry method, Field, 2013).

The model summary indicates that the subscales of the PISI explain some of the variance in the Level of Performance (R=.44), however, this does not reach significance (p=.76). Entering the three subsystems of the PISI (MAS, CES, SRS) did not yield any significant prediction either. Therefore we can conclude that none of the PISI variables have a significant effect in predicting the Level of Performance of a gymnast.

Predicting Satisfaction with Performance with the scales of PISI (Hypothesis 2B)

In order to test the second hypothesis, more specifically to find out which components of the Psychological Immune System predict the Satisfaction of the gymnasts, the sixteen subscales of PISI were entered into a multiple linear regression model (with a forced entry method, Field, 2013).

The model summary indicates that the scales of PISI have a significant effect in predicting the level of satisfaction of a gymnast. The explained variance is R=.65, p=.04. The coefficients of the variables explain more about this effect: the Beta values show how the individual variables influence the outcome variable. Only in one case, in Sense of Coherence is this effect significant (β=.41, p=.04). However, none of the variables seem to weaken the power of the model, which means that the 16 subscales together have a good power to predict the satisfaction level of an athlete.

Nonetheless, it is important to know which are the most relevant variables. Therefore the subscales were tested individually as well. Sense of Coherence have an individual effect of β=.28, p=.02. Four additional variables have found to have a significant individual effect on Satisfaction; these are Creative Self-Concept (β=.38, p=.00), Social Monitoring (β=-.25, p=.05), Self-Efficacy (β=.29, p=.02) and Goal Orientation (β=.26, p=.04).

These results show that when taking every subscale into account, they have a general predicting force in the Satisfaction with one's own performance, with Sense of Coherence having the most influence. When individually tested, Creative Self-Concept, Self-Efficacy and Goal Orientation also have a positive force in predicting Satisfaction while Social Monitoring has a negative one. The inter-correlations of these subscales explain why their coefficients do not reach significance in the overall model.

5.4 Predicting Level of Performance and Satisfaction (Hypothesis 3)

Predicting Level of Performance with the scales of PISI and the Coach-Evaluated Mental and Physical Talent (Hypothesis 3A)

In order to test Hypothesis (3A), the coaches' evaluations were added to the linear regression in a second block to predict the Level of Performance of the gymnasts, and see if these two additional variables yield any differences in the overall model.

It was found that entering the coach-evaluated Physical Talent and Mental Talent causes a significant difference in predicting Level of Performance. This second model explains more than 70% of the variance (R=.77, p=.00). The coefficients of the variables reveal that only Physical Talent has a significant predicting effect on the outcome (β=.70, p=.00).

Therefore the conclusion can be drawn that even though the overall model is significant, the coach-evaluated Mental Talent does not seem to have a significant contributing effect when predicting Level of Performance. The only variable that has a considerable and significant predicting force is the coaches' evaluation about a gymnast's Physical Talent.

Predicting Satisfaction with the scales of PISI and the Coach-Evaluated Physical and Mental Talent (Hypothesis 3B)

In order to test how the coach-evaluated Physical Talent and Mental Talent affect the regression model, these two variables were entered in a second block into the regression model.

Entering these two additional variables increases the explained variance of the outcome variable (R=.70). However, this effect, although close, but does not reach significance

(p=.07). The Beta values of the variables show that only Physical Talent has a considerable contributing effect when predicting the Satisfaction of a gymnast (β=.32, p=.02). In the overall model therefore, Sense of Coherence and the coach-evaluated Physical Talent are the two variables that play a significant role when predicting a gymnast's satisfaction with her own performance.

6 DISCUSSION

The purpose of this study was to explore the psychological characteristics of a young Hungarian rhythmic gymnast sample – more precisely, to describe their psychological immunity (personal coping resources) measured by the Psychological Immune System Inventory, and then to examine how these psychological attributes relate to the competitive level they perform in, and their satisfaction with their own performances. The coaches' evaluations of the gymnasts' physical and mental talent were also included, and tested in relation to these two aforementioned outcome variables.

The sample had fairly good characteristics for an exploratory study, because the number of participants was 67, representing nine different clubs; they were varying in age (from 13 to 24, equally distributed into junior and senior age-groups) and performance levels (A, B and C categories; international, national and local levels); and they had been competing for 8.5 years on average. They were categorized according to their current category of competition and past achievements into five performance levels; and additionally their coaches' evaluations were obtained regarding the gymnasts' physical and mental talent. The mean scores of these evaluations were quite different: the coaches evaluated their athletes' mental talent almost two points higher than their physical talent. This means they were much stricter in evaluating skills and achievements than hard work, motivation, commitment, concentration and other mental skills.

The PIS Inventory has proved to be a reliable measure – although the internal consistency of one scale (Sense of Control) seemed to be quite poor and therefore it was not included in the analysis of the results. In this one case, further research should explore the reasons behind this phenomenon; whether it is due to some specific characteristic of this sample (e.g. the items do not represent their feelings of control), or it is simply a coincidence. Other than this, all scales and subsystems showed acceptable reliability.

The average satisfaction of the athletes was 3.4 on a 5-point scale. Deeper examination showed that most individuals in the sample chose either *'average'* or *'quite much'*, all other values were rare, or non-existent in the case of *'not at all'*. This latter result suggests that these gymnasts have a healthy image of themselves, as they all feel at least a little satisfied with their own performances. However, data is distributed mostly on the

higher end of the scale which shows that they mostly evaluate their achievements positively, but there is still place for improvement.

In a preliminary analysis of the variables, Pearson correlations revealed that the two outcome variables, Level of Performance and Satisfaction do not have a linear relationship. With other words, performing on a high level does not necessarily mean that the athlete will be satisfied with his or her own performance, nor does a high level of satisfaction necessarily imply that the person is performing on a high level. This confirms the initial assumption that high performance and high satisfaction are not necessarily attendants of each other in one's athletic experience. The independence of Subjective Well-Being from normative standards (Lundquist, 2011) highlights the subjective, judgmental and affective nature of feelings of satisfaction, which seems to be supported by the current results. These findings also support the results of Durand-Bush and colleagues (Durand-Bush, Doell, Soulard, Trudel, & Newburg, 2002, as cited in Newburg et al., 2002) who reported that participants from various performance levels of their sport experienced resonance and consequently, positive feelings and satisfaction on a daily basis. This highlights the importance of examining these two outcome variables as they certainly depend on different personal, social and situational characteristics.

6.1 Group comparisons

The first purpose of the study was to examine the Psychological Immune System of the young gymnasts, and explore any possible differences that may exist when compared to the general population. Based on previous research on young athletes it was assumed that some differences will exist, and those may be due to some special characteristics of the athletic sample (Oláh et al., 2012). When comparing this sample to the general population, results indicated that the gymnasts do not differ from them in their overall score of the Psychological Immune System Inventory – in other words, the athletes have similar levels of psychological immunity, and therefore are considered to have a proper level of healthy psychological functioning (Oláh, 2005). The implications of this finding are extremely important, considering firstly that the participants were compared to a much older sample, which means that they already possess similar levels of personal coping resources as a more mature population; secondly that these young athletes

constantly have to deal with various stress-factors related to high performance and participation in an extremely demanding sport (Bobo-Arce & Mendez-Rial, 2013). Having utilizable and effective psychological capacities means that in general, these girls prone to be able to cope effectively with diverse stressful events in their lives. The importance of the results is also highlighted by their young age (most of the gymnasts in the sample were below 16 years). Gymnastics is a sport that requires extremely early specialization (Wiersma, 2000), and also very often escalates in early retirement (before turning 18). Due to this fact, it is very important to pay attention to the young girls' psychological development and adjustment, and to make sure that they leave the sport with fulfilling and growth-inducing experiences as well as proper psychological resources that they can use when coping with difficulties (Daroglou, 2011). This result shows that taking the average, this sample is equipped with a proper level of psychological immunity and consequently useful and effective resources to cope with stress.

Nevertheless, as assumed, the gymnasts do show significant differences compared to the general population in some aspects of the questionnaire. The gymnasts scored significantly higher on the Creative Self-Concept and Social Mobilizing Capacity scales, and the Creating-Executing Subsystem of the PISI than the general population. They scored lower on Sense of Self-Growth, Synchronicity, Goal Orientation, Emotional Control subscales, and on the Monitoring-Approaching as well as the Self-Regulating Subsystem of the PISI.

Before discussing these results, it is important to note that it cannot be determined for a hundred percent certainty whether a certain psychological characteristic has been developed due to the sport and through participating in it, or a certain characteristic drives people to do certain sports and stick to it. As Lazarevic, Petrovic and Damnjanovic (2012) suggest, it probably needs to be viewed as a mixed result: an individual may have a tendency towards a certain characteristic that sports can help to bring out, realize and improve; and sport itself sometimes make people develop entirely new behavioral, emotional or cognitive strategies and characteristics that are especially needed for that specific sport. When explaining the results, this point of view will be applied. It is possible that this sample possess some characteristics because these are the ones particularly needed in this one sport (so the gymnasts who do not possess these

eventually drop out), and from the other hand, it is also possible that gymnastics is a type of sport that makes them develop these characteristics during their career.

Positive differences

The Creating-Executing Subsystem (CES) refers to personal and social capacities that the person can use right on the spot in the process of dealing with stress. It contains Creative Self-Concept, Problem Solving Capacity, Self-Efficacy, Social Mobilizing Capacity and Social Creating Capacity. Even though not all of the individual scales differ significantly from the average population, the function they represent altogether seems to be of more weight in gymnasts. The fact that they have higher scores on the CES suggests that they can utilize both their own personal resources and the help and support of their environment when coping with a certain stressful situation. They seem to manage more effectively to bring out good solutions from themselves as well as from others.

In nurturing promising individuals with talent Bloom (1985) found that considerable social-emotional support is essential in their development – and based on current results, these gymnasts can utilize this support effectively. Judgments of self-efficacy are based on experiences such as enactive mastery, vicarious experience, verbal persuasion and physiological arousal, however, the ultimate evaluation stems from the individual's cognitive appraisal and integration of these experiences (Gist & Mitchell, 1992). Since the PIS Inventory evaluates general, and not task-specific or sport-specific self-efficacy, further research is needed to explore the experiences the gymnasts build their judgments of self-efficacy on. Examining other talented adolescents, their social support system and how they can utilize it to their advantage could also help answering the question whether this is a result of some unique characteristic of gymnasts, or a natural phenomena emerging from the social network of a talented child.

Besides the subsystem overall, the gymnasts showed significantly higher scores on Social Mobilizing Capacity. This means that in general, they are better in utilizing the capacities of their social environment; better in contacting and convincing people to help and support them. This may be a combined effect of their young age and the high demands of the sport: besides being at the age when they still naturally rely on their parents in various everyday tasks (Cole & Cole, 2001/2006), they also need more instrumental and emotional help for activities related to their sport very often (e. g. their

parents driving them to practices and competitions; emotional support in the very regular cases of performance anxiety, etc.) (Gagné, 2003). Social Mobilizing therefore is a very useful asset, utilizing this resource can probably make the athletes' lives much easier and their coping more effective – moreover, Gagné (2003) found that gymnasts who experienced more social support from their parents were more likely to adopt intrinsic and identified motivational styles. This illustrates well how a personal characteristic can be developed and facilitated by sport: Social Mobilizing Capacity is probably a potential that is present in many children's personality, but participating in a highly demanding sport has the potential to nurture it to an even more effective level. This assumption seems to be confirmed by the fact that the gymnasts competing on Level 4 (category A) had the highest scores on this scale – probably because they were more likely to use this capacity on their advance in the first place, or because they were able to develop this skill as they moved to higher and higher levels of the sport. Social support indeed has been found to be a crucial factor in preventing career termination: Hayashi (1998, abstract) reported that gymnasts with higher social support were less likely to drop out from their sport. Similarly, relatedness, as part of the peer-created motivational climate has proved to serve as an important factor in autonomous forms of motivation that helps to keep athletes in their sport (Jõesaar, Hein & Hagger, 2011) – which explains why Social Mobilizing Capacity seems to grow with performance.

However, not all gymnasts seem to possess this useful resource. A particularly interesting result was the difference between the gymnasts who compete on the highest level (Level 5; have been part of the national team at least once in their lives), and the ones competing one level lower (Level 4; in category A, competing on mostly national and international level). When comparing the gymnasts according to their performance levels, ANOVA tests revealed that the girls on Level 5 have significantly lower scores on Social Mobilizing Capacity than the girls on Level 4. Normally one would assume the other way around, since it requires even more acceptance and effortful support from parents and friends when a gymnast is involved in the national team and that affects every single aspect of her life (Gould & Maynard, 2009). However, the results show that they have much lower Social Mobilizing Capacities. A possible explanation turns up when we take a look at the single items this scale contains: 'I can usually find someone that can help me to solve my problems when I need to.', 'When I have been in situations where I had a problem to solve, I have found the right people to help me.', 'If

I need help, I do not mind asking for it from others even if I do not know them well.', 'Of my acquaintances, there are many that I can totally rely on.', and 'I would not hesitate to call different people if I needed advice in a personal problem.'.

Low scores on this scale can be interpreted not only in the way that they have poor capacities in finding people who support and help them, but also in a way that they have this image about themselves of not being supported enough. This might be a result of the isolated nature of participating in the national team, since most of the time it involves withdrawal from regular high school and follow an individual curriculum – consequently, not having the same social environment as their peers on one level lower (Brenner, 2007). The girls in the national team often train 7-8 hours per day in most months of the year which naturally limits their time spent with friends and peers. As Wiersma (2000) puts it when writing about elite sport participation in adolescents: 'Athletes who devote most of their time to training may suffer from "social isolation", lack opportunities for social growth, and feel "socially handcuffed" by training constraints.' (p. 16). For this reason, they might have the impression that they only have a couple very close friends, but maybe not 'many acquaintances that they can totally rely on' or that they can call any time. This limited opportunity to pursue alternative interests or social contacts in the world of elite sport has been reported before (e.g. Brady & Shambrook, 2003; Tracey & Elcombe, 2004), however, it is still worth of particular interest in every individual case whether the athletes interpret this as a painful sacrifice or a necessary part of elite athletics and their pursue of success.

This result carries an important warning. When looking at other psychological immunity variables, there are no particular differences between the levels on which the gymnasts compete; Social Mobilizing Capacity is the only one. This means that the gymnast population is more or less homogeneous regarding their psychological resources (at least the differences do not reach significance), except for this scale – the fact that the girls involved in the national team tend to have much lower scores on it indicates that there is at least one important aspect where they do not feel completely healthy. This result does not necessarily mean that they lack in social support in general, but it definitely implies that they do not feel supported enough by their broad environment. They do not feel they can ask for help or contact anyone when in need. Being isolated from their schoolmates might result in a separation from an important reference group (Cole & Cole, 2001/2006) which has the function to shape one's self-

image and –evaluation, as well as to help developing and maintaining acquaintances of all types which is one particularly important developmental task of this age (Erikson, 1968; as cited in Cole & Cole, 2001/2006). Of course, the result has to be evaluated carefully, with consideration of individual differences. If a gymnast with low scores on Social Mobilizing Capacity has a few close friends from her age-group but no broader contacts that is not a reason for being concerned. However, if an athlete feels that there is no one she could contact in stressful times other than her parents that is a clear sign for important lacks in her psychological resources that has a potential to affect her self-image and ways of coping detrimentally. Research (Wiersma, 2000; Brenner, 2007) cited earlier shows that it is a common risk of being involved in high-level sport in adolescence, and the current results support this notion. Further investigation is suggested to explore the experiences of this particular sub-group related to their social resources, perhaps in an in-depth, qualitative manner, in order to confirm this assumption.

Nevertheless, all the gymnasts in lower levels of performance show higher Social Mobilizing Capacities than the average population, which shows that they can utilize their social support quite effectively.

Besides this, the gymnasts also scored higher on the Creative Self-Concept scale of the PISI than the general population. This means that in general, they have an overall positive opinion about themselves; they appreciate and are proud of their achievements. Having a realistic and healthy evaluation of the self gives confidence and motivation to the individual to keep pursuing his or her important goals, and also to protect the self from any harmful consequences of disappointments, failures and stressful events – related to their sport or life in general. When looking at the possible sources of this rich self-image, one plausible explanation is that it comes from their sport itself – considering that even in the lower levels, rhythmic gymnastics requires precise and highly refined motor skills, aesthetic movements and flexibility (Bobo-Arce & Mendez-Rial, 2013). Having required these skills to a certain extent can strengthen the individual's image of herself as talented, skilled, hard-working, mentally strong and so forth. Indeed, research indicates that since sport socialization starts in childhood (especially in sports that require early specialization, Wiersma, 2000) and is accompanied by considerable encouragement from significant others through later periods of life. Consequently, female adolescent athletes' self-perceptions of athletic

ability, body image and femininity are higher than their non-athlete counterparts' (Synder & Spreitzer, 1976). On the other hand, Donti, Theodorakou, Kambiotis and Donti (2012) reported that competitive gymnasts' self-esteem is lower than that of recreational gymnasts. Current results support the former findings of Synder and Spreitzer (1976), however, a qualitative, in-depth investigation is suggested in order to explore the sources of high Creative Self-Concept in these young gymnasts.

Moreover, a following ANOVA test revealed that the gymnasts' level of satisfaction differentiates between their Creative Self-Concept: the higher scores they had on the scale the more satisfied they are with their own performances (this gradual increase reached significance between groups 3 and 4, *'average'* and *'quite much'* satisfaction). It is possible that it is a circular relationship that exists between Creative Self-Concept and Satisfaction: the more satisfaction an athlete feels about her own performance, the more likely she has a rich, resourceful self-image; and the more resourceful she is, the more likely she is to find ways to be satisfied with how she performs. This can be interpreted via the concept of eudaimonic well-being (Ryff & Keyes, 1995) where feelings of satisfaction and well-being stem from actualizing various potentials and values rooted in the self. With reference to that, the more resourceful the individual perceives herself, the more ways she can utilize when growing and developing towards her autonomous goals – and consequently, it is more likely to reach these potentials and the positive affect associated with them. The current results support the eudaimonic interpretation of this relationship, however, a more thorough investigation of these variables could refine this assumption. However, it sounds safe to say that by increasing athletes' self-awareness and providing new aspects to discover their strengths and resources in order to build a healthy self-image it is possible to enhance their feelings of satisfaction, and ultimately, their positive experiences about their sport and themselves.

Negative differences

Besides these two scales and one subsystem of the PISI the gymnasts scored higher on, they showed lower scores on some other scales than the general population. One of these is Sense of Self-Growth, which refers to the extent to which an individual sees herself as a continuously improving, developing person; as someone who is capable of renewing and growing as an individual. It requires the continuous assimilation of experiences, and a sense of continuity when viewing at one's personality (Oláh, 2005).

This is one of those results where cautious interpretation is needed because of the average age of the sample – younger individuals have less experience and therefore are less likely to see themselves changing over the years (Cole & Cole, 2001/2006). Since the mean age of this sample is considerably lower than those the standard scores of PISI emerged from, at least some part of this difference in the scores could probably be attributed to this fact. However, there is still a possibility that these gymnasts in fact do have lower Sense of Self-Growth than their peers in the average population and this should not be overlooked. Further research should address this issue by comparing the athlete population to a non-athletic sample that matches in age – this way the true differences in Sense of Self-Growth could be revealed (as well as in the other scales).

Sense of Self-Growth is a particularly important aspect in sports since it utilizes the meta-view of experiences and their merge into a complete whole (Oláh, 2005). Just as in personality development, it is equally important in sports to have an overview of one's achievements, his or her strengths, weaknesses and their evolvement over the years (Gyömbér & Kovács, 2012). It is natural that younger athletes do not necessarily see their performances in terms of improvement (Cole & Cole, 2001/2006), but eventually they do need to develop this skill in order to have a more realistic, strength-focused view of their careers, while they can also rely on this sense of growing when aiming to new achievements.

The development of this skill could be supported and strengthened by coaches. By giving realistic feedback as well as evaluation of an extended period (e.g. in every half a year) they could enhance a sense of meta-experience in young athletes. By giving individual, detailed and realistic positive feedback every year or after every competition season, the coaches could help building up a sense of self-growth in gymnasts – a sense of viewing themselves as constantly growing and improving individuals.

Another one of the subscales the gymnasts scored lower is Goal Orientation – which is a quite surprising result given that they participate in a highly competitive sport. Even if not athletes in general, at least the ones in higher levels of performance would be assumed to be more persistent and goal oriented (as it was also assumed in the first hypothesis of this study) (Gould & Maynard, 2009; Durand-Bush & Salmela, 2002).

One possible explanation for a lower Goal Orientation is the simplest one: that these athletes simply do not have clear enough goals to focus on. Since the coach-related

motivational climate highly affects the exerted effort and persistence of the athletes (Dowdell, 2013), it is possible that the gymnasts in this sample train in an environment where goal-setting, goal-clarification and –evaluation are not encouraged for example. It also might be due to a defensive mindset where fear of failure is a guiding force – if one does not set specific goals, disappointment may be less hurtful. According to Dweck, Goetz & Strauss (1980) females in general tend to attribute failure to lack of ability instead of external and modifiable factors as males do. By not setting specific and challenging goals the individual protects herself better from feeling incompetent and disappointed.

Another plausible reason for this finding stems from the age of these athletes. Persistence has found to be associated with age: as the individual gets older, he or she tends to persist longer even on harder tasks, and tasks that involve less enjoyment (Peterson & Seligman, 2004). The gymnasts in this sample were quite young, 16 years on average; therefore it is possible that they simply have not developed such strong persistence an adult athlete would possess with more years of experience. This idea of an improving Goal Orientation by growing experience seems to be supported by the correlation between the number of years the gymnasts have been competing and their Goal Orientation which showed a weak positive (however, not significant) relationship.

Finally, the picture is also refined by a subsequent ANOVA test performed on the variable Goal Orientation: the level of Satisfaction with performance was able to differentiate between the groups. The Goal Orientation scores gradually increased with the athletes' level of Satisfaction, which reached significance between the groups 3 and 5 (*'average'* and *'very much'*) and groups 4 and 5 (*'quite much'* and *'very much'*). Similarly to Creative Self-Concept, Goal Orientation also seems to be a variable that increases with satisfaction – as well as the level of satisfaction increases as the more persistent and goal oriented an athlete is. Again a circular relationship is quite possible to imagine – being more focused on a goal and exert a persistent effort increases satisfaction with one's own performance, while being more satisfied with how one performs enhances their motivation to persevere more consciously towards their valued goals. Smith, Ntoumanis, Duda and Vaanstenkiste (2011) confirmed this relationship from one direction by proving that autonomous goal motives are linked to exerted effort, which predicts goal attainment and consequently, subsequent changes in emotional well-being. Gaudreau and Antl (2008) explained this relationship by the

nature of the goals: if they represent the values and interests of the athlete, goal attainment provides a greater satisfaction for them than otherwise.

The explanation for this finding may be a combined result of these mentioned causes. Either is the case, subsequent research is needed to confirm these assumptions and to dig deeper in the causes of low Goal Orientation among these gymnasts. Either the cause is the motivational climate they train in, or their fear of failure, or their young age, or finally a lower level of satisfaction, specifically designed interventions could help them in developing a more persistent attitude by reviewing their motives and goals, goal-setting exercises and improving self-awareness. Coaches could be also helped by raising their awareness on applying goal-setting in practices and competitions, and motivating the athletes with their own self-relevant (Peterson & Seligman, 2004), or self-concordant (Smith et al., 2011) goals.

Another aspect that contributes to greater persistence is positive feedback (possibly through an increase in self-determination, Mouratidis, Vansteenkiste, Lens & Sideridis, 2008). Therefore coaches would be encouraged to express more positive feedback to their athletes to increase their intrinsic motivation, competence and self-efficacy. The most important part of positive feedback should be praising effort instead of ability (Mueller & Dweck, 1998) as in the latter case children were more persistent in the task and reported more enjoyment.

Improving Goal Orientation is especially important as it is one of the most important life-skills (e.g. Danish & Nellen, 1997) that contributes to later success in life and effective coping with challenges; because it is strongly associated with high performance in sports (Maynard & Gould, 2009), and because it ‘is one human strength that can certainly be improved’ (Peterson & Seligman, 2004, pp. 245).

The Self-Regulating Subsystem of the PISI contains four scales, two of which the gymnasts scored significantly lower than the general population, just as well as on the subsystem itself. The function of the SRS is mainly to keep the other two subsystems in balance, to provide the optimal cooperation between them by regulating the emotional life of the individual. It contains Emotional Control, Irritability Control, Impulse Control and Synchronicity, all of which are regulating different aspects of the individual’s affective life. Having lower scores in this subsystem overall shows that these gymnasts do not have as effective self-regulating potentials as the general

population, and as they should have in order to cope well with the regular emotional demands of gymnastics. Caution is also recommended here again, as they were much younger on average than those they have been compared with. Self-regulation is a very complex skill that requires several years to develop, therefore at least a part of this result can be attributed to their young age. As Bebetsos and Antoniou (2003) reports, older athletes tend to cope better with adversity and show higher emotional self-control. Goyen and Anshel (1998) also suggested that older athletes control their negative emotions following stressful events more easily than adolescents. However, this result also draws attention to the areas where they most need development – especially that self-regulation is of high importance in elite sports.

Besides the subsystem overall, the sample also had lower scores on the Emotional Control subscale than the average population. This means that the gymnasts are not that successful in regulating their anxiety when they experience a difficult or threatening situation, or a situation that involves the possibility of failure. They cannot turn this anxiety into constructive behavior as much as the population they were compared to. Since mature self-regulation strategies are associated with higher performances (Jones, 2012) it seems essential for young athletes to master this skill. However, as with the other scales, it is also possible that they simply have not developed that mature self-regulating skills due to their young age. On the other hand, correlations of the main variables show that Emotional Control has a significant, weak negative relationship with Years of Competing – which means the more experience the gymnasts have, the less they seem to be able to control their emotional life. This is a surprising result (that also contradicts the first hypothesis), and carries an important warning. Children are supposed to develop more mature and effective self-regulation skills as they grow older (Cole & Cole, 2001/2006), hence, the longer they are competing, the better they should be in controlling their emotions. However, competitive gymnastics has been claimed to be one of the most stressful sports and results have shown that gymnasts experience higher pre-competitive anxiety than their peers in various other sports (Kolt & Kirkby, 1994). Therefore it is also possible that a perceived lower Emotional Control is actually due to a generally higher level of anxiety. Further qualitative research is recommended to find out whether this is a particular characteristic of this sport, or it is simply a ‘side-effect’ of the stressful atmosphere of competitions or the demanding nature of the sport.

As it was already stressed, the athletes' lower scores might be due to their younger age and relative immaturity in developing self-regulating skills. But it is also possible that they have serious lacks in this area, considering especially that they have lower scores on not only one but two Self-Regulating subscales. The other one is Synchronicity, which shows how much a person is capable of synchronizing external and internal events. With other words, to what extent is she capable of focusing his or her attention and mental energy to where it needs to be focused in the environment. This skill is essential in athletes since they constantly have to adapt to ever changing situations; to be focused all the time to be able to recognize when new strategies are needed; and to note all relevant information from any given situation. This is one skill again that develops by age and experience, therefore it is understandable why does this young gymnast sample have lower scores on it. Nevertheless, the importance of this result should not be overlooked as it is a crucial asset in an athlete's hand, together with Emotional Control and other self-regulating skills (Tamminen & Crocker, 2013). How effectively is the athlete able to regulate her disappointment when getting a low score at a competition; alter her fear and anxiety into determination before the next performance in that same competition; and quickly adapt to any changes that occur in the environment (e. g. a teammate makes a mistake in a group routine); can have a pivotal influence on her evaluation and final scores (Skinner & Brewer, 2004).

Therefore, whether the low scores on the Self-Regulating Subsystem of the PISI are due to the gymnasts' young age or personal characteristics, special attention is recommended to pay on this area. Further research could reveal more about the possible reasons and contribute to specifically designed interventions to enhance self-regulating skills of gymnasts.

To summarize the results of the group comparisons, in line with the first hypothesis, the gymnast sample indeed showed significant differences in their Psychological Immunity potentials when compared to the general population. However, the assumptions of the first hypothesis were not confirmed, as contrary to the expectations the gymnasts reported lower scores on Goal Orientation and Emotional Control than the general population. Sense of Control scores were also assumed to be higher in gymnasts, but unfortunately this assumption could not be tested as the scale showed low reliability. Another specific assumption was that they will report higher Self-Efficacy than the general population, but this was not confirmed either – however, they did show higher

scores on the Creating-Executing Subsystem, which contains the Self-Efficacy scale. This means that they still seem to possess a broad ability to bring out good solutions from themselves as well as from their environment.

Other than the specific assumptions, the gymnasts also showed significant differences in other scales of the PISI: namely higher scores on Creative Self-Concept, Social Mobilizing Capacity and the Creating-Executing Subsystem of the questionnaire, while lower scores on Sense of Self-Growth, Synchronicity, and the Self-Regulating Subsystem of the PISI. Some of these differences were further refined by the competitive level they perform on (in case of Social Mobilizing Capacity) or the level of satisfaction they feel towards their own performances (in case of Creative Self-Concept and Goal Orientation). The results show that this sample indeed differs from the general population in their coping resources, which might be due to their young age; characteristics of the sport; or various other reasons as explicated above. Nonetheless, further research should also compare the gymnasts to a non-athletic sample in their own age-group in order to draw more reliable conclusions about the resources and potentials they can utilize in the process of coping.

6.2 Predicting Level of Performance and Satisfaction with the Psychological Immune System

The second hypothesis of this study was that the outcome variables Level of Performance and Satisfaction with Performance will be related to different coping resources of the personality. More specifically, that they will be predicted by different scales of the Psychological Immune System Inventory as they are determined by different psychological characteristics. As explicated earlier, these two outcomes of the athletic experience were not found to be correlated with each other – therefore, it was confirmed that they are determined by different psychological variables. The gymnasts' achievements, and whether they compete in a higher or lower level does not affect their satisfaction with their performances – with other words, satisfaction with oneself does not depend on objective indicators of the performance. And vice versa, how satisfied a gymnast is with her own performance does not seem to affect her actual performance, or with other words it does not drive her to compete on higher levels.

In order to test the second hypothesis of the study (that Level of Performance and Satisfaction are related to different constellations of variables of the Psychological Immune System), two linear regression models were built, one for each of the outcome variables.

Level of Performance

The initial correlation analysis of the variables already revealed that Level of Performance did not show a linear relationship with any of the PISI variables. Nevertheless, in order to test the second (A) hypothesis, the PISI scales were entered into a linear regression model. Contrary to the assumptions of the study, Level of Performance could not seem to be predicted by any of the Psychological Immune System variables, therefore the first part of the second hypothesis could not be confirmed. It was assumed that a constellation of variables such as Sense of Control, Goal Orientation, Self-Efficacy, Emotional Control will be likely to differentiate between the five levels in which the gymnasts perform – the higher scores they have on these scales, the more likely that they are competing on a higher level. Unfortunately none of the PISI scales seemed to have a predicting force in Level of Performance, which means that the objective measure of an athlete's performance is not affected by any of the assessed psychological variables. With other words, the type of coping resources or potentials one possesses does not seem to affect how well she performs in gymnastics. Considering the extensive amount of research done on the psychological attendants of high performance (e.g. self-efficacy (Daroglou, 2011), positive thinking (Gordon, 2008), emotional control (Taylor, Gould & Rolo, 2008), persistence / goal orientation (Gould & Maynard, 2009) and so forth)., this result might seem surprising, however, it is still explicable. The first reason derives from the nature of these psychological variables assessed and the specific questionnaire applied. It is possible that these coping resources or personality potentials simply do not play any role in how effectively and successfully an athlete in this sample performs. From a different aspect, it is also possible that the PISI is not the right method to assess these potentials in athletes for a reason that should be further explored. Either is the case, further research is recommended with athletes in different ages, genders and sports to find out more about the relevance of this assessment method in sport setting.

Another reason for this result boils down to the ambiguous role of personality traits and characteristics in high performance, which provides an omnipresent ground for debate in sport psychology research (Morris & Summer, 1995). Results regarding personality traits that predict success or high performance have been controversial since the earliest attempts, as some studies claimed to have found certain characteristics associated with peak performance (e.g. Cox, 1994) while others found no association whatsoever (e.g. Vealey, 1992). Even though the strengths and resources represented in the PISI are considered as malleable potentials rather than stable personality traits and are strongly associated with higher levels of well-being, it is still possible that they do not have the potential to predict high performance in sports. The implication of this finding is that while the PISI is an appropriate method to assess well-being capacities of people in various populations (e.g. Gombor, 2011; Dubey & Shahi, 2011), it might not be suitable for assessing capacities that contribute to high performance.

Finally, a third reason for this result is the issue of phrasing and composition of the questionnaire. As the items neither imply, neither refer to sport-related thoughts or behaviors but are rather general in their wording, it is possible that the answers do not represent the participants' resources expressed in their attitude and behavior in their sport. Self-efficacy, for instance, is known to represent a rather domain-specific evaluation of the self (Gist & Mitchell, 1992). Further research is proposed in order to find out whether the potentials comprised in the PISI are general characteristics of an individual or show differences among various situations (e.g. in school, work, sports, personal life, etc.).

Satisfaction

The second part of the second hypothesis assumed that a constellation of psychological immunity scales will be associated with higher satisfaction in gymnasts – with other words, that it could be predicted by a constellation that includes Positive Thinking, Sense of Coherence, Sense of Self-Growth, Creative Self-Concept, and one or more of the scales of the Self-Regulating Subsystem. The reason for this was that high scores on these scales represent an overall optimistic, balanced view of experiences; a more coherent and resourceful view of the personality that is likely to be associated with high levels of satisfaction. In order to test this assumption the sixteen scales of the PISI were entered into a linear regression model. The results revealed that the scales overall have a

quite strong and significant predicting force in the gymnasts' level of satisfaction as they explain more than 65% of the variance. The coefficients of the variables show that it is only the effect of Sense of Coherence on the overall model that reaches significance – however, none of the other variables weaken this effect either. Hence, it seems valid to conclude that the maturity of an individual's Psychological Immune System is a significant predictor in their level of satisfaction with her performance, and therefore has the potential to influence their overall experience attached to their sport. The importance of this finding cannot be stressed enough. According to this result, an athlete's satisfaction with her own performance can be enhanced and facilitated by the development of her psychological potentials and coping resources represented in the Psychological Immune System. This result is in line with previous findings regarding the PIS as it has been confirmed that a high level of psychological immunity lowers the likelihood of burnout (Gombor, 2009) and promotes well-being in various populations (Voitkāne, 2004; Dubey & Shahi, 2011; Móró et al., 2011).

Each and every one of these potentials – whether they concern the ability to effectively monitor and utilize relevant information in the environment (MAS); or to successfully manage intra- and interpersonal resources (CES); or to regulate the affective life in a constructive manner (SRS) – has the ability to increase the person's positive experiences about their sport. However, one of these variables proved to exert an even higher effect on Satisfaction, namely Sense of Coherence, as its effect size reached significance in the overall model. This latter result means that the extent to which a person feels that her life is coherent, meaningful and valuable determines how she feels about her past achievements. It is also underlined by the fact that the variables Level of Performance and Satisfaction proved to be independent from each other – which means that it is not so much as the person's actual performance that determines how she feels about it, but her overall evaluation about her experiences as being meaningful in her life. Having high scores on Sense of Coherence means that regardless of the success of the performance (in any area of life) the person finds a way to interpret it as useful and important. This is, without a question, an extremely useful asset in an athlete's hand, as one of the most important things in competitive sport is to learn from mistakes and interpret them as successes, improvements or victories from other points of view (e.g. instead of focusing solely on winning, one can focus on the improvement of a technique; beating a personal record; learning valuable lessons from mistakes; enjoying

the competition or the game itself, etc) (Potgieter & Steyn, 2010). Furthermore, Sense of Coherence has also been found to be essential in maintained participation in sports (Jakobsson, 2014). Therefore, it is an essential implication for both coaches, sport psychologists, but also the athletes themselves to improve their feelings of coherence by finding meaning in their experiences related to their sport, and consequently, enhance their feelings of satisfaction. Improving Sense of Coherence seems to be the most important area based on these results, nonetheless all the other fifteen scales of the PISI have the potential to beneficially effect the athletes' satisfaction, therefore should not be overlooked in intervention programs.

Individual variables on Satisfaction

It is also important to note here that the scales of the PISI are weakly or moderately correlated with each other (Oláh, 2005) as it was also found in current study. Considering these inter-correlations their effects were also tested individually in order to find out more about their relevance in Satisfaction. Other than Sense of Coherence, the variables Creative Self-Concept, Self-Efficacy and Goal Orientation had a low to moderate significant individual effect on Satisfaction, while Social Monitoring Capacity had a significant negative one. This latter result suggests that those gymnasts who are not as opened and sympathetic towards their social environment, report higher satisfaction in their sport – which is probably due to their increased focus on themselves as reported by Oláh and colleagues (2012) in talented adolescent athletes. Social Monitoring Capacity therefore requires a careful consideration and improvement as it seem to affect Satisfaction negatively, however, empathy and openness is an essential social skill and tool for building meaningful social relationships (Cole & Cole, 2001/2006).

The importance of Creative Self-Concept in Satisfaction has been stressed earlier. Moreover, Self-Efficacy also seems to have an individual effect on Satisfaction, which implies that the greater belief an athlete has in herself, the more positive she feels about her performance, regardless of its actual quality. The essential role that self-efficacy plays in the athletes' satisfaction has been reported by Blecharz, Luszczynska, Scholz, Schwarzer, Siekanska and Cieslak (2014) as well. This confirms the suggestions made earlier about praising effort instead of achievement (Mueller & Dweck, 1998) – coaches can make a difference in their athletes' experiences by helping the athletes believe in

themselves, more specifically, increasing their task-related self-efficacy (Blecharz et al., 2014). Goal Orientation has also found to affect Satisfaction positively when tested individually, which highlights the importance of its improvement in gymnasts again (as it also found to be significantly lower than in the general population). Specific recommendations were made regarding this issue in earlier sections.

To summarize the findings regarding the Satisfaction of the gymnasts, it is fair to conclude that even though some scales have a significant individual effect on this variable, when tested together, these individual effects do not reach significance any more due to the inter-correlations of the scales. In the overall model, all scales of the Psychological Immune System have a predicting force in the level of satisfaction of a gymnast, with Sense of Coherence having the highest influence. This confirms the necessity of providing meaningful and personally important experiences in sport as recommended by Jakobsson (2014).

6.3 The role of the coach-evaluated Physical and Mental Talent

The third hypothesis of the study was that the coaches' evaluation about the gymnasts' Physical and Mental Talent will play an additional role in predicting their Level of Performance and Satisfaction. The purpose of this was to find out whether the regression equation changes when the coaches' evaluations are added, and in what ways – with other words, whether the gymnasts' Physical and Mental Talent, evaluated by their coaches, have a significant effect in predicting their Level of Performance and Satisfaction, and whether they change the effects of the PISI scales.

Level of Performance

In order to test the 3A hypothesis, the variables Physical and Mental Talent were added to the linear regression model in a second block (the first being the sixteen scales of the PISI) to predict Level of Performance. As described above, the PISI variables did not have any significant effect on the outcome variable, but adding the Physical and Mental Talent caused a significant change in the model, explaining 77% of the variance in Level of Performance. However, the coefficients of the variables reveal that the effect of Mental Talent is close to zero and therefore does not reach significance as opposed to Physical Talent. The final conclusion about the gymnasts' Level of Performance

therefore, is that it is only predicted by their coaches' evaluation about their physical skills. This finding can be interpreted from two aspects. The first and more simple one is that coaches have great abilities to make judgements about their athletes' physical talent since the ones they evaluate better tend to perform better as well – which is understandable. However, the finding can be interpreted as a result of a circular process – as coaches tend to focus and spend more time with athletes initially considered as talented, and by doing so increase the effectiveness of their training and ultimately their chances for success as well. This aspect of teachers' behaviour was described initially by Rosenthal and Jacobson (1968) as the 'Pygmalion-effect': teachers' attention itself can bring out great achievements from children, whereas lack of attention results in poorer performance. Consequently, this distinction can have a detrimental effect to the athletes who were initially considered as less talented, as it was confirmed for example by Solomon, Golden, Ciapponi and Martin (1998), and Siekanska, Blecharz and Wojtowicz (2013). Special attention is recommended to pay on the way coaches make evaluations about their athletes – while it is important to expend time, effort and attention to athletes with outstanding skills, it is also of high importance to nurture the skills of the less talented as attention itself has the potential to bring out great achievements from an individual.

The coach-evaluated Mental Talent, however, did not seem to play a role in predicting the gymnasts' Level of Performance. This means that the coaches' evaluation about an athlete as being hard-working, mentally tough and focused did not have any effects in their performance measured by objective indicators. Considering the extensive and reputable research that have revealed the role of various mental skills in high performance (e.g. Gould & Maynard, 2009; Haberl, 2007; Taylor, et al., 2008), this result is probably due to some flaws in the methodology. It is most likely to be a result of the unclear nature of the question, as 'mental skills' were not specified further – and as a consequence, each coach had the possibility to interpret it differently. This is clearly a limitation of the study that has to be kept in mind in further research.

Satisfaction

Physical and Mental Talent were also added to the other regression model to test their contribution to the Satisfaction of the gymnasts (hypothesis 3B). When added to the equation in a second block after the PISI subscales, the explained variance in

Satisfaction has grown slightly, but the overall effect of the model was not significant any more. With other words, these two variables seemed to weaken the effect of the PISI scales in the gymnasts' Satisfaction. However, when examining the coefficients of the individual variables, besides the aforementioned Sense of Coherence, the effect of the coach-evaluated Physical Talent also reached significance. This latter result means that the more talented an athlete is evaluated by her coach, the more satisfied will she feel about her performance.

This result is especially interesting since the other outcome variable Level of Performance (which was based on objective rankings of the athletes) did not correlate with the level of Satisfaction at all. Since this objective evaluation of performance was correlated with the coaches' evaluation on Physical Talent, but was not associated with Satisfaction, it becomes apparent that the coaches' evaluation measured a somewhat different construct – that, apparently, is related to the gymnasts' satisfaction with their own performance.

The explanation for this phenomenon again resides in the fact that a coach's evaluation of her athlete can be recognized in her verbal and non-verbal behavior. A coach might behaves differently with a highly talented athlete, for example in her encouragements, time, priorities, etc. which naturally affects how an athlete thinks about herself, and consequently, her satisfaction. Research in both academic (Rosenthal & Jacobson, 1968; Smith, Jussim, Eccles, VanNoy, Madon, & Palumbo, 1998) and sport context (Solomon, et al., 1998; Siekanska et al., 2013) show that if a teacher or coach treats a child with the firm belief that he is talented, the child will start improving and perform better in the near future – and on the other hand if he treats a talented child with the belief that he has poorer capabilities, the child will consequently perform at a lower level. Hence, this result raises attention again on what an important role a coach's behavior plays in the satisfaction of her athletes. Even though they might think they do not show their negative evaluation that clearly or expressively, the athletes probably still read from their behavior, and this, as the results revealed, affects their satisfaction with themselves.

The PISI scales and Mental Talent

As a last part of the third hypothesis (3C), it was assumed that the coach-evaluated Mental Talent will show correlations with some of the coping potentials represented in

the Psychological Immune System Inventory, as the mental skills of an athlete are most likely to relate to potentials as Positive Thinking, Self-Efficacy and Emotional Control for instance. However, the initial correlation analysis of the variables showed that Mental Talent was not correlated with any of the PISI scales – with other words, the coaches' evaluations did not seem to imply any of these psychological characteristics. As pointed out earlier, this is probably due to the poor phrasing of the variable Mental Talent – as the coaches probably interpreted the question according to their own ideas. This is probably also part of the reason why this variable did not seem to have a significant effect in either Level of Performance or Satisfaction – if using a more specific, more carefully worded question, the results might had been different.

To summarize the results of the third hypothesis, the coach-evaluated Physical Talent has proved to play a significant role in predicting the gymnasts' Level of Performance as well as it has a considerable effect on their Satisfaction. Both results emphasize the importance of coaches' judgments about their athletes' skills as they have the potential to affect the gymnasts' vital experiences about their sport (Siekanska, et al., 2013). Unfortunately, the variable Mental Talent did not seem to have any effect on either of the outcome variables, neither was it associated with any of the PISI scales. The variable is suspected to be unreliable as it was probably worded too broadly and vaguely.

6.4 Limitations and further research

The methodology and proceeding of the study can be considered quite reliable and comprehensive, however, as every research, it has its own limitations. First of all, even though most of the PISI scales showed acceptable reliability in this sample, the scale Sense of Control reported a very low level of Cronbach's alpha. Further research is suggested to explore whether one of the items was particularly difficult to understand, or it did not represent the participants' feelings of control, or the low reliability is only due to a coincidence of some sort.

As mentioned before, the age of the athletes in the sample probably have considerable influences in the results. The development of the examined psychological resources and potentials takes time, therefore the obvious conclusion is that adolescents in general use

less effective coping strategies than adults. This is supported by Dugdale, Eklund and Gordon (2002) who studied the automaticity of coping responses during competitions, and found that those who have had more practice in deploying coping strategies rated their coping as more automatic. Naturally, the amount of practice is affected by the age of the athlete and the length of their participation in elite sport as well, therefore it is understandable why adolescents show lower scores in several dimensions of the PISI than the general population. As a consequence, further research should aim this issue by comparing the gymnasts' results to both a non-athletic and an athletic sample representing other sports in the same age-group. By doing so, developmental differences would not affect the results, and consequently more reliable data could be obtained about the substantive strengths and weaknesses of this sample.

The differences among the gymnasts' Social Mobilizing Capacities – more specifically, the apparent drop in this ability when a gymnast moves to the national team – carries an important warning that should be explored further. It seems of prior importance to find out whether it represents simply a natural withdrawal from the peer group due to the time-consuming and demanding training regime (Wiersma, 2000), or a substantial lack in the gymnasts' psychological resources, which would require to be aimed with specific interventions.

Further research should also target the reasons behind the gymnasts' significantly lower Goal Orientations and self-regulating skills compared to the average population. As unfolded earlier, several possible reasons are conceivable behind these phenomena, and as these abilities are particularly important characteristics of a competitive athlete (Gould & Maynard, 2009), specifically tailored interventions should aim these issues.

A particularly interesting finding was that the competitive level on which the gymnasts perform on is completely independent from their feelings of satisfaction about their past achievements, and they were also determined by different psychological variables. This result suggests that coaches, sport psychologists and the athletes themselves have to treat these as separate outcomes of the athletic life – and therefore consciously pay attention on the development and facilitation of both, since it seems to be evident that performing on a high level will not necessarily make an athlete happier, as well as being satisfied with her performance will not drive her to aim higher levels of performance.

Further research is proposed in order to find out more about the relationship of these two variables as well as about possible interventions that take aim at both aspects.

Moreover, the variable Level of Performance did not seem to be affected by any of the psychological variables assessed in this study, therefore it would be still worth of interest to find out more about its situational, environmental, social or behavioral (e.g. use of mental skills) determinants in this particular sample.

A serious limitation of the study concerns the Mental Talent of the gymnasts, evaluated by their coaches. Because of the vague and broad nature of this variable the results cannot be considered as reliable, and therefore do not reveal any valuable information about the coaches' view on the gymnasts' mental skills and talents. The most important implication of this issue is that questions and evaluations regarding mental skills need to be phrased more carefully and specifically, in order to measure the same construct.

Finally, it has to be noted that even though the outcome variables (Level of Performance and Satisfaction) concerned the athletic realm of the gymnasts' lives, the assessment, i.e. the Psychological Immune System Inventory is not a sport-specific measure. The coping resources and protective capacities of the personality that can be assessed by its help describe general traits of a person – however, some of these capacities (e.g Self-Efficacy, Bandura, 1977) may be domain-specific. Lundqvist (2011) proposed a clear distinction between the global and contextual levels of athletes' well-being, which implies that the indicators of these two areas might be better assessed separately as well. Further investigation should aim this issue in order to find out about the sport-specific nature of the Psychological Immune System variables and to contribute to a more accurate assessment of these protective capacities, and eventually to help athletes in flourishing by using their full potential.

6.5 Conclusions

The overall aim of this study was to assess the coping resources and capacities of a young Hungarian rhythmic gymnast sample under the theoretical umbrella of the Psychological Immune System. This multidimensional unit of personality resources utilizes the theoretical background of coping effectiveness as described by Oláh (1996). The potentials this system comprises act as psychological antibodies and therefore

provide a protective function for the individual against the detrimental consequences of stress (Oláh, 2005). As competitive sport in general, but more specifically, rhythmic gymnastics has a highly demanding, exacting and oftentimes sacrifice-requiring nature (Gagné, 2003), assessing the psychological potentials that can provide protection against the associated stress seemed highly appropriate.

The purpose of the study was, therefore, to assess the psychological immunity of young Hungarian athletes; compare them to the standard scores of the Psychological Immune System Inventory; explore the relationship between the psychological resources and the gymnasts' level of performance and satisfaction; and finally to assess how the coach-evaluated mental and physical talent play a role when predicting the two outcome variables.

The study is considered to be explorative as the mapping of athletes' psychological immunity has only been started recently (Oláh et al., 2012), and there was still lack of data regarding the sport of rhythmic gymnastics. However, some specific assumptions were still made based on previous research regarding each hypothesis – and even though some of them were confirmed, some in parts and some not, it is fair to say that the results revealed information about this particular sample that is not only intriguing and inspiring for further research, but also reserve important theoretical and practical implications.

It was proven that the gymnasts possess a similar level of psychological immunity as the general population, hence, it seems evident that these young athletes are equipped with useful and effective resources to cope with stress. Nevertheless, significant differences exist regarding some specific scales that are probably due to the unique characteristics of this sample. The gymnasts reported higher scores on the Creative Self-Concept and Social Mobilizing Capacity scales as well as on the Creating-Executing Subsystem that comprises both. It was concluded that these young gymnasts have greater abilities to utilize both their own personal resources (Creative Self-Concept, Problem Solving, Self-Efficacy) and the help and support of their environment (Social Mobilizing and Social Creating Capacity) in stressful situations. The differences in Social Mobilizing Capacity were explained as a combined result of the participants' young age (as they naturally require a great deal of instrumental and emotional support from their social environment, Cole & Cole, 2001/2006) and the demanding nature of

the sport (Kolt & Kirkby, 1994). The importance of this capacity were highlighted by the relatively low scores of the gymnasts competing on the highest levels – and an important warning was pointed out about this issue as they experience social withdrawal besides the extensive training (Wiersma, 2000). On the other hand, the differences in Creative Self-Concept were interpreted as a result of the aesthetic, skill-oriented nature of the sport which has the potential to enrich an individual's self-image (Synder & Spreitzer, 1976). This result was refined by the fact that Creative Self-Concept was strongly and positively related to the satisfaction of the athletes, which was explained by a circular, interconnected influence of these two variables, and carries important implications for the facilitation of these positive experiences in the athletes' lives.

Besides having advances in these aforementioned potentials, the gymnast sample also reported lower levels of other resources, which, as a consequence, were suggested to be treated with special attention as they may indicate serious lacks in the psychological immunity of gymnasts, but may as well result in improved coping capacities if taken special care of. A lower Sense of Self-Growth, Goal Orientation, and the self-regulating skills Synchronicity and Emotional Control are all potentials that, at least partly, may be a result of the gymnasts' young age. However, they are also particularly important aspects of a competitive athlete's life (Durand-Bush & Salmela, 2002; Gould & Maynard, 2009; Tamminen & Crocker, 2013), and therefore special recommendations were pointed out for coaches and sport psychologists in order to facilitate the development of these personal resources. Goal Orientation, similarly to Creative Self-Concept, seemed to be growing with higher levels of satisfaction, which emphasized the inter-connected nature and of these psychological constructs again, as well as the need for a complex, multidimensional intervention for their development.

In the second part of the study it was confirmed that the gymnasts' satisfaction with their own performance and the actual level of their performance are not in a linear relationship, which proves that it is not enough to be concerned about the determinants of either high quality performance or high feelings of satisfaction of an athlete, as these two outcomes are most likely to be determined by different personal and situational variables. When examining their determinants in the Psychological Immune System, the gymnasts' satisfaction seemed to be affected by their overall psychological immunity (Creative Self-Concept being of accentuated interest), while their level of performance was not seemed to be influenced by any of these personality resources. When

interpreting the results, the role of the Psychological Immune System as an indicator of satisfaction and well-being in sport setting was pointed out, while its apparent irrelevance in peak performance calls for further research.

Finally, in the third part of the study the coaches' evaluations about the physical talent of their gymnasts found to be in a strong relationship with the objective indicators of their performance. This finding, from one hand, warrants the coaches' high professional competence in identifying skills and talents in their athletes, but from the other hand it also draws attention to the behavioral implications of their judgments (i.e. that those might discriminate among the more and less talented individuals, which in turn affect their development and performance) (Solomon, et al., 1998; Siekanska, et al., 2013). The coaches' evaluations about the gymnasts' mental talent was not associated with any of the PISI, or the outcome variables, therefore a possible methodological issue was suggested when interpreting the results.

To sum up, rich and interesting empirical data were obtained with regard of the young gymnasts' coping resources. The relationship of these potentials to high performance and satisfaction were explored and as a consequence, the results indicate essential implications for the improvement of two important outcomes of participation in competitive sport: the athletes' high quality performance and their improved levels of satisfaction.

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APPENDICES

Appendix 1 – Consent form

Information Sheet and Consent Form for Master's Thesis Study

Psychological Immune System and Well-being Among Athletes

Introduction

My name is Krisztina Bóna, I am a student at the Masters Degree Program in Sport and Exercise Psychology in the University of Jyväskylä in Finland. I am interested in the Psychological Immune System and well-being of athletes. I believe that in high-achievement sport as well as in recreational sport, psychological skills and well-being are just as important as performance itself.

What is the study about?

The purpose of this study is to explore the Psychological Immune System of Hungarian rhythmic gymnasts. The PIS is a frequently used psychological measurement tool in Hungary, which shows the coping capacities and personal strengths of individuals. An additional aim of the study is to investigate the concept of athletic well-being. Just as in other areas of life, feeling good about ourselves and gaining meaningful, valuable experiences are essential in the realm of sports too. Mature, developed psychological skills and successful coping strategies represent the mental side of sport, and therefore contribute to higher achievement as well.

What will your participation involve?

If you agree to participate in the study, you will be asked to fill in two questionnaires. Completing the questionnaires should take approximately 20-30 minutes of your time. All your responses will be kept confidential. You may choose not to participate, refuse to answer any questions, or withdraw from the study at any time with no further consequences. By participating in this study, you also agree that your results may be used for scientific purposes, including class presentations or publication in scientific journals, with your anonymity maintained. There are no known risks associated with participation in this research.

If you would like to have any more information concerning this study, please do not hesitate to contact us.

Krisztina Bóna	Dr. Montse Ruiz	Dr. Mary Chasandra
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This letter is yours to keep.

Consent Form

UNIVERSITY OF JYVÄSKYLÄ

Psychological Immune System and Well-being Among Athletes

Participant's Agreement:

I,_____(name), have read and understood the accompanying information sheet and discussed the study with the researcher Krisztina Bóna. I agree to take part in the investigation with the knowledge that I can withdraw at any time without giving a reason. The data gathered in this study are confidential and anonymous with respect to my personal identity. All questions have been answered to my satisfaction.

Participant's (or legal representative's) signature_____

Date / Place_____

Appendix 2 – Demographic Questionnaire

Demographic Questionnaire

Name:

Date of birth:

Category:

Sport Club:

City:

How long have you been competing in rhythmic gymnastics?

What is your best result so far?

What places did you achieve in the national competitions of the past 3 years (Hungarian Cup, National Championship, etc.)?

Have you participated in international competitions? If yes, how many times? What places did you achieve in each competition?

How satisfied are you with your achievements so far? Please circle the appropriate number.

1 – Not satisfied at all

2 – Rather not satisfied

3 – Average

4 – Rather satisfied

5 – Very satisfied

Date:

Appendix 3 – Psychological Immune System Inventory

Psychological Immune System Inventory

You can read a number of statements below about how people usually evaluate themselves and the world surrounding them. Please read the statements and mark your answers according to the scale below:

Please select one number on the 4-point scale following every statement that fits you. Think about how you normally see yourself. There are no right or wrong answers.

1 – Completely does not describe me

2 – Usually does not describe me

3 – Somewhat describes me

4 – Completely describes me

Age: Sex: Education:

1.	People describe me as a very optimistic person.	1	2	3	4
2.	According to my experience, success is a result of good planning.	1	2	3	4
3.	When I look to my past and to my future, I view my life as valuable.	1	2	3	4
4.	I am very happy about myself and what I have accomplished in life.	1	2	3	4
5.	I think that I have become less effective.	1	2	3	4
6.	I do not particularly like different and new situations.	1	2	3	4
7.	I am very good at "reading" other people's thoughts and motives.	1	2	3	4
8.	I am more creative than most people.	1	2	3	4
9.	I often know what should be done but usually lack the ability to do it.	1	2	3	4
10.	I can usually find someone that can help me to solve my problems when I need to.	1	2	3	4
11.	I see myself as a driving force in cooperating others to develop and influence whatever happens to us.	1	2	3	4
12.	It often happens that I am physically present but my thoughts are some place else.	1	2	3	4
13.	Even if a job is difficult and I bump into a problem, I often work further until it is finished.	1	2	3	4
14.	I am the type of person that says the first thing that comes to my mind.	1	2	3	4
15.	I often feel nervous.	1	2	3	4
16.	I lose my temper if someone interrupts me when Iam concentrating on something important.	1	2	3	4
17.	I am convinced, that most of the things that happen around me are positive in the long run.	1	2	3	4

18.	I am convinced that everything that happens to me depends on myself rather than fate or unlucky circumstances.	1	2	3	4
19.	I think that many things that happen to me are confusing and not understandable.	1	2	3	4
20.	I have strong self-esteem and have values that are worth fighting for.	1	2	3	4
21.	I think that I succeed more and more in different areas of my life.	1	2	3	4
22.	I am open to changes in my life and I believe they give me new and interesting possibilities.	1	2	3	4
23.	I see myself as a person that is very good at judging others.	1	2	3	4
24.	Even when I am under pressure, I am very good at working out alternative solutions to problems.	1	2	3	4
25.	The feeling that I have usually accomplished what I have wanted in life is my biggest asset regarding different problems that come along.	1	2	3	4
26.	When I have been in situations where I had a problem to solve, I have found the right people to help me.	1	2	3	4
27.	I often have ideas that help others to think further.	1	2	3	4
28.	I often find myself in my own world and away from what is happening around me.	1	2	3	4
29.	If I start something, I finish it.	1	2	3	4
30.	I can listen to my feelings without they taking over me.	1	2	3	4
31.	I easily become upset when I make a mistake.	1	2	3	4
32.	I easily become impatient.	1	2	3	4
33.	Even when I find myself in a difficult situation, I am totally convinced everything will turn out fine in the end.	1	2	3	4
34.	I never trust fate or luck to solve my problems.	1	2	3	4
35.	When I look at my life, I see it as meaningful and coherent.	1	2	3	4
36.	It does not matter what others think of me, I respect myself for what I have achieved.	1	2	3	4
37.	During the last year, my personality has not changed the way I wanted it to.	1	2	3	4
38.	I consider the unexpected changes in my life as exciting challenges and hold possibilities for development.	1	2	3	4
39.	I often have correct insights about how people think and feel.	1	2	3	4
40.	Others describe me as a problem solver.	1	2	3	4
41.	I am good at meeting the goals that I set for myself.	1	2	3	4
42.	If I need help, I do not mind asking for it from others even if I do not know them well.	1	2	3	4
43.	I am good at making people in my surroundings to come up with new and creative ideas.	1	2	3	4
44.	Lately, I have felt that I cannot catch up with what is going around me.	1	2	3	4
45.	If things do not go as planned, I quickly give up.	1	2	3	4
46.	I often do things that I regret afterwards.	1	2	3	4
47.	Even small problems usually worry me.	1	2	3	4
48.	I feel irritated rarely.	1	2	3	4
49.	Thoughts about my future give me good feelings.	1	2	3	4
50.	My successes are due to hard work, not to furtunate circumstances.	1	2	3	4
51.	I seldom experience anything meaningful in everyday life.	1	2	3	4
52.	I see myself as a strongly resourceful person.	1	2	3	4
53.	There have been many situations in which I have doubted my possibilities to grow as a person.	1	2	3	4

54.	I usually search for new challenges.	1	2	3	4
55.	I often know what people will say before they say it.	1	2	3	4
56.	I am good at jobs that need new and original ideas.	1	2	3	4
57.	From earlier experience, I am confident with most of things I do.	1	2	3	4
58.	Of my acquaintances, there are many that I can totally rely on.	1	2	3	4
59.	In group situations, people often say that they are stimulated by my ideas.	1	2	3	4
60.	It often feels like the world is just passing by me.	1	2	3	4
61.	If things do not go according to the plan, I easily lose my motivation to continue working with them.	1	2	3	4
62.	I speak first and think second.	1	2	3	4
63.	I am sensitive to criticism.	1	2	3	4
64.	When I have decided on something and it does not go as I have wished, I become angry.	1	2	3	4
65.	I am a person that has a very positive view toward life.	1	2	3	4
66.	Most of the important things that happen to me, I can anticipate and control.	1	2	3	4
67.	My life lacks in distinctive goals.	1	2	3	4
68.	I am proud of myself when I think of the type of person I have become.	1	2	3	4
69.	Other people seem to change but I feel like I am walking in circles.	1	2	3	4
70.	Even in unexpected situations, I see them as exciting challenges.	1	2	3	4
71.	I can often discover the roles people have in a group, even if they are hidden from the people themselves.	1	2	3	4
72.	I have an unusually good ability to find alternative solutions when I am confronted with problems.	1	2	3	4
73.	If I see a solution to a problem, I am sure that I can do what needs to be done.	1	2	3	4
74.	I would not hesitate to call different people if I needed advice in a personal problem.	1	2	3	4
75.	In a group, my ideas are often significant.	1	2	3	4
76.	Thoughts about the past and future often bother me.	1	2	3	4
77.	I have often started a new project before I have finished an earlier one.	1	2	3	4
78.	I wish that I were not so impulsive.	1	2	3	4
79.	I am easily depressed when I encounter with unpleasant things.	1	2	3	4
80.	It takes a lot for me to lose my temper.	1	2	3	4