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IMAGERY, PERSONALITY AND INJURY PERCEPTION IN SPORT – MEDIATING THE EFFECT OF INJURY PERCEPTION AND IMAGERY

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SUMMARY

Background: Imagery is an often used technique in psychological mental training and here also during rehabilitation. Imagery ability enhances imagery use. The perception of injury but also individual differences themselves influence the rehabilitation outcome. The first purpose of the study was to examine the mediation effect of injury perception between general imagery and rehabilitation imagery. Our second aim was to examine the mediating effects of the general tendency to employ imagery within the relationship between personality and the imagery of rehabilitation itself.

Material/ Methods: The studyinvolved 56 athletes (37 men and 19 women) suffered a physical injury. The respondents were asked to provide demographic information and then to complete following questionnaires:The Athletic Injury ImageryQuestionnaire-AIIQ-2, (Sordoni et al., 2002), The Imagination in Sport Questionnaire (Budnik-Przybylska, 2014) – short version, and Blecharz's Scale of Perception of Injury in Sport (SPUwS) (Blecharz, 2008). Series of mediation analyses were performed to estimate the strength of the indirect relationship between the general tendency to use imagery and the use of imagery in rehabilitation.

Results: It was fund that the general tendency to use imagery turned out to have a strong direct effect on rehabilitation imagery. Reflection and seeking positive sides turned out to be a mediator between general tendency to use imagery and all rehabilitation imagery dimensions. Reflection has the strongest effect between the general tendency to use imagery and cognitive specific imagery. General tendency to use imagery mediates the relationship between personality and imagery of rehabilitation. Some personality traits also influence directly imagery of rehabilitation.

Conclusions: Our findings have revealed that the general tendency to use imagery may strengthen the relationship between personality and rehabilitation imagery. It may help to adjust the methods which might positively influence the rehabilitation process.

Key words: sport psychology, imagery training, rehabilitation, injury perception, personality

BACKGROUND

Psychological training is a process consisting of the systematic performance of tasks that serve to improve the athlete's motor, cognitive and perceptual skills and persist as an adaptation of the body for a certain period of time (Weinberg & Gould, 2018). While preparing for a competition, both physical and mental training play an important role for athletes. One of the key aspects of mental training is imagery training.

Imagery is an often used technique in psychological mental training (Cumming & Ramsey, 2009; Morris, Spittle, &Watt, 2005; Murphy, Nordin & Cumming, 2008). It is often defined as the "creation or re-creation of an experience generated from memorial information, involving quasi-sensorial, quasi-perceptual, and quasi-affective characteristics, that is under the volitional control of the imager, and which may occur in the absence of the real stimulus antecedents normally associated with the actual experience." (Morris et al., 2005, p. 19)

Athletes who used imagery training on skills, action plans and strategies during the rehabilitation process, they returned to the pre-trauma sport level faster, were more confident and reported less somatic anxiety (Monsma, Mensch, & Farroll, 2009).There is evidence that motor imagery has a beneficial role in rehabilitation (Christakou, Zervas, & Lavallee, 2007; Cupal & Brewer, 2001; Lebon, Guillot & Collet, 2012; Madisson, Prapavessis, Clatworthy et al., 2011; Moukarzel, Di Rienzo, Lahoud, Hoyek, Collet, Guillot, & Hoyek 2019; Stenekes, Geertzen, Nicolai, et al., 2009). Perry and Morris (1995) describe a mechanism that emphasizes the role of imagery during the rehabilitation process of an injury. When imaging, more blood flows into the injured area, the heat in the damaged tissue increases, which accelerates the healing process of damaged tissues and improving recovery (Morris et al., 2005, Perry, Morris, 1995).

According to Hall, Mack, Paivio & Hausenblas (1998) model imagery serves cognitive (Cognitive specific imagery (CS), cognitive general imagery (CG)) and motivation functions (motivational specific (MS), motivational general (MG): motivational general arousal imagery (MG-A), motivational general mastery imagery (MG-M)) also in rehabilitation.

In the study by Sordoni et al. (2002) in which the AIIQ-2 (the Athletic Injury Imagery Questionnairy-2) was used participants (n=217) employed three types of imagery (motivational, cognitive and healing) to almost the same extent, but competitive athletes used more cognitive imagery than their recreational counterparts. Cognitive, motivational, pain management and healing imagery is most often used by adults and adolescent athletes in the rehabilitation process (Arvinen-Barrow, Clement & Hemmings, 2013; Driediger, Hall, & Callow, 2006, Miller; 2017).

Athletes used CS imagery for learning and strengthening the ability of well-known exercises in rehabilitation. CG imagery was used to imagine situations connected with their sport as the opposition to elements linked with their rehabilitation. MS imagery was used to enhance the process of setting rehabilitation goals and future goals after fully recovery. Athletes used MG-A for controlling the

anxiety, helping in relaxation, but also for strengthening the energy to continue the rehabilitation program. Furthermore MG-M imagery helped athletes through a difficult and painful situation with being fully focused (Driediger, Hall, & Callow, 2006).

In White and Hardy (1998) research injured gymnasts used CS imagery to maintain their skills. But in Evans, Hardy & Fleming's (2000) study CS imagery was used at the end of the rehabilitation process as the preparation for a game situation. It should be also stressed that athletes' use of imagery changed from early to late in the competitive season, with a significant increase in the use of CS, CG and MS imagery (Munroe, Hall, Simms, & Weinberg, 1998); while a similar situation could be observed in the rehabilitation process.

In order to have any benefits from mental practice, athletes have to be able to use imagery adequately. Individual ability is a primary aspect during checking the effect of mental practice (Guillot & Collet, 2008, Cumming & Williams, 2013). Good imagers are more likely to engage in imagery use (Hall, 1998). Furthermore various other psychological features of the athletes could be taken into account e.g. personality (Budnik-Przybylska, Przybylski & Karasiewicz, 2018; Budnik-Przybylska, Kaźmierczak, Przybylski & Bertollo, 2019).

Individual differences, specific roles for imagery in rehabilitation and the role of environmental factors are included in the Motor Imagery Integrative Model in Sports (MIIMS). Similarly in the Williams & Andersen (1998) stress – injury model apart from factors (like individual features) which facilitate injury there are also interventions which could prevent or diminish the risk of injury occurring. From other psychological techniques imagery interventions could positively influence the rehabilitation process, help in preventing injury, reduce tension and help in coping with stress. The model of imagery use applied (AMIUS; Martin, Moritz, & Hall, 1999) stressed that the various types of imagery (cognitive and motivational) and possible outcomes, are moderated by one's ability to image.

In the previously mentioned models the athlete's attitude to the injury was not mentioned. However, in Wiese-Bjornstal, Smith, Shaffer, & Morrey's (1998) Integrated Model of Response change is a central aspect of athletes' psychological responses to injury. A cyclical framework reflecting the ongoing influence that various factors have upon an athlete's responses explained the account for change, cognitions, emotions, and behavior. As a result of injury, the first group of psychological reactions is cognitive assessment, during which the athlete must face a difficult situation. Another reaction that occurs in a physical injury situation is an emotional response that can result in a variety of emotions. The last reaction to injury presented in the model is behavioral response, which is associated with the functioning of athletes after injury.

Wiese-Bjornstal et al. (1998) have stressed the need to examine both individual and situational changes during rehabilitation because they influence the imagery in the context of specific rehabilitation goals and a readiness to changing types of imagery. As reported by Evans, Hare & Mullen (2006) in the early stages of injury the athlete may feel strong emotional trauma which in turn could affect the utilization of any imagery training. After a time they could focus on achieving

rehabilitation goals and coping with the slowness of their rehabilitation progress.

The perception of injury is extremely important, i.e. the assessment and interpretation of the event by the athlete. Blecharz (2008) indicates the primary and secondary perception of physical trauma in sport, which requires the mobilization of available personal and social resources. The perception of injury as a loss, challenge or threat determines the further behavior of the individual and the undertaking of specific actions.

How athletes perceive injury, the rehabilitation process and what they do is closely related to personality traits. The most popular concept reflecting the structure of personality is the Five Factor Personality Model (Big Five) (Costa & McCrae, 1992). In this model personality is divided into five basic dimensions with bipolar characteristics: neuroticism, extraversion, conscientiousness, agreeableness and openness to experience. A high score on the scale of neuroticism may be associated with athletes' low ability to cope with stress, tension and the feeling of negative emotions connected with the injury. In contrast, athletes with a high extraversion score adapt well to different situations (like rehabilitation), and tend to seek stimulation and other people. High conscientiousness among athletes is associated with motivation, discipline and perseverance in the rehabilitation process. The Big Five also includes agreeableness, which describes a positive attitude towards others and honesty. The last factor is openness to experience, related to cognitive curiosity and a positive attitude to new experiences like new approaches to rehabilitation.

In Blecharz's research (2008) there is the relationship between injury perception and personality traits. Perceiving injury as a reflection and seeking positive sides is positively associated with extraversion and openness to experience (from the Big Five model), with activity as readiness to new challenges with high stimulus action (as a temperamental feature), general self-efficacy (GSES) and task orientation from Coping Stress Styles (CISS) and the sense of manageability (SOC29).

A person with a high score in the "reflection and seeking positive sides" factor has personal resources to deal with the difficult situation of injury. "Negative emotions" and "downplaying" can hinder the use of personal resources, proper rehabilitation and a return to sports activities. Perceiving an injury as an obstacle in the course of a sports career correlates negatively with agreeableness (Blecharz, 2008).

As was mentioned above there is quite a lot of research concerning imagery in sport and using imagery during rehabilitation, however there is a lack of such a study in relation to perceived injury. Equally the aspect of individual differences such as personality in relation to imagery is also neglected.

Aim of the study

Therefore, we have two aims for our study:

The first purpose of the study is to examine the mediation effect of injury perception between general imagery and the rehabilitation imagery.

The second is to examine the mediating effects of a general tendency to use imagery on the relationship between personality and imagery of rehabilitation.

We expect that the relationship between the general tendency to use imagery in sport and rehabilitation imagery would be mediated by components of perceived injury. We also expected based on previous studies that the general tendency to use imagery would directly influence all the components in the use of rehabilitation imagery. Those who are good imagers used imagery more often.

We also expect that the relationship between personality and the use of imagery in rehabilitation would be mediated by the general tendency to use imagery. We also expect a direct influence of extraversion, emotional stability and openness to experience on imagery in rehabilitation.

MATERIAL AND METHODS

The study involved 56 injured athletes (37 men and 19 women) at the professional (35) and recreational (21) level who were undergoing rehabilitation. Respondents represented the following sports disciplines: football (19), track and field (8), volleyball (7), basketball (4), rugby (3), dance (2), triathlon (2), Brazilian jiu jitsu (BJJ) (2), judo (2), fencing (1), motocross (1), mountain biking (1), tennis (1), power lifting (1), hockey (1), grappling (1). The average age of the athletes was 22.71 years (*SD* = 6.74), while the average sports experience of the respondents was 9.63 (*SD* = 5.74).

Respondents completed questionnaires in paper form. Participants were informed about anonymity and the procedure of the research. The athletes gave their written consent to participate in the research. The study was conducted in accordance with the Declaration of Helsinki, while the Ethics Committee of the University of Gdansk approved the protocol (11/2015) before study commencement.

At the beginning, the respondents were asked to provide information about age, gender, sport discipline, apprenticeship and sports level and were asked to complete the questionnaires

Measures

In the study we used the following questionnaires:

The Athletic Injury Imagery Questionnaire (AIIQ-2). The Athletic Injury Imagery Questionnaire-2 (Sordoni et al., 2002) was used to assess the participant's use of imagery at the three phases of rehabilitation (early, mid and end). The AIIQ-2 contains 16-items with an equal number of items representative of the motivational, cognitive and healing functions of imagery, plus questions relating to the use of imagery in the management of pain. The participant rated the frequency of their imagery use on a 7-point Likert scale anchored at 1 (never use) and 7 (always use). Exploratory factor analysis of the AIIQ-2 revealed that all three functions were used by athletes during injury rehabilitation. Sordoni et al. (2000) demonstrated that the AIIQ-2 had adequate psychometric properties. Internal consistency was assessed using Cronbach's alpha. Coefficients for healing

(Cronbach's alpha = .93), cognitive (Cronbach's alpha = .86), and motivational (Cronbach's alpha = .87) imagery factors were all very good.

Imagery. The Imagination in Sport Questionnaire (Budnik-Przybylska, 2014) – short version

This is multidimensional and combines both features of imagery, i.e., imaging ability and aspects of imagery use. The ISQ- the original version is 51 items, however the short version is a 21-item measure that consists of seven subscales, i.e., physiological feelings (noticeable changes in body functioning), modalities (use of senses besides the visual sense), ease/control (ease and control of imagined scene), perspective (juggling of different perspectives of the imagined scene), affirmations (positive attitude during competition), visual (visual sense) and general (general tendency to use imagery).The participants imagined a competitive situation for 60 seconds in as detailed and realistic manner as possible. After this task was completed, the participants were instructed to respond to the 21 items and rate the different aspects of the image on a scale of 1 to 5 (located next to each statement by entering the appropriate number, where 1 means "not at all" and 5 "completely so"). All subscales (except the one named "general") relate to the imagined situation. The "general" subscale consisted of six questions and was developed separately to assess the general tendency to use imagery.

All subscales were reliable: for the visual Cronbach's alpha =.89, physiological feelings Cronbach's alpha =.78, modality Cronbach's alpha =.74, ease/control Cronbach's alpha =.85, perspective Cronbach's alpha =.77, affirmations =.83 and for general Cronbach's alpha =.723.

In our study we used only the general tendency to use imagery.

Blecharz's Scale of Perception of Injury in Sport (SPUwS) (Blecharz, 2008)

The scale consists of two parts. The first part is qualitative, the subject is asked to complete the sentence: "I believe that experience related to trauma and rehabilitation ...". Five categories of responses were identified:

1. Positive (positive effects, measurable effects and the specific benefits of the injury)
2. Negative (losses, difficulties, adverse effects and the unpleasant consequences associated with injury)
3. Reflective (uncertainty about one's sports career, health and future)
4. Developmental (recognizing both the unpleasant and positive aspects related to injury and rehabilitation)
5. Neutral (injury as something normal that happens to athletes)

The second part is quantitative, it consists of 30 statements about the experience of physical injury and rehabilitation, to which the respondent is to respond. The answer is marked on a 5-point scale from "A" to "E", where "A" – I strongly disagree, "B" – I disagree, "C" – it's hard to say "D" – I agree, "E" – I strongly agree. There are three subscales in the Injury Scale in Sport:

- "Reflection and seeking positive sides" (treating injury as a challenge from which some benefits can be derived)
- "Negative emotions" (experiencing injury due to negative emotions and anxiety)
- "Underestimating" (denying the consequences of injury)

In our study only the latter three subscales were analysed. Internal consistency – Cronbach's alpha for Reflection and seeking positive sides =.803, for Negative emotions= .643 and for Underestimating=.614.

TIPI- Ten-Item Personality Inventory (TIPI; Gosling, Rentfrow & Swann, 2003; TIPI-PL; Sorokowska, *Słowińska, Zbieg & Sorokowski, 2014)*

This inventory is a short method, comprised of 10 items, which is used to measure the Big Five personality traits:

- Extraversion
- Agreeableness
- Conscientiousness
- Emotional Stability
- Openness to Experience

The participant responds to ten statements referring to the statement: "I perceive myself as a person ...", giving his answer according to a 7-point scale, where 1 is "definitely disagree", 2 "rather disagree", 3 "I disagree slightly, 4 "I neither agree nor disagree," 5 "I disagree slightly," 6 "I rather agree," 7 "I strongly agree."

As a result of its short form, this scale is increasingly used in exploratory research measuring many variables. Cronbach's alpha for all the subscales are similar to the original version (Gosling et al., 2003): Cronbach's alpha=.37; for openness to experience, Cronbach's alpha=.39;for agreeableness, Cronbach's alpha=.65;for emotional stability,Cronbach's alpha=.70; and for conscientiousness, Cronbach's alpha=.59 for extraversion.

RESULTS

Series of mediation analyses were performed to estimate the strength of the indirect relationship between the general tendency to use imagery and the use of imagery in rehabilitation. Analyses were conducted using Hayes (2009) procedure estimating indirect effects in 1000 bootstrap resampling estimations of bias-corrected percentile confidence intervals of direct and indirect effects in multiple linear regression using full an information maximum likelihood estimator (FIML)The mediation analyses indicated that the relation between general imagery and three dimensions of use imagery in rehabilitation was mediated only by reflection. Reflection turned out to be the only partial mediator – it explains why the general tendency of imagery usage could influence the use of imagery in rehabilitation, however there are other psychological valid aspects which apart from reflection could mediate this relationship. The general tendency to use imagery also influence directly all the subscales of imagery in rehabilitation.

Table 1. Summary of the mediating effects of Reflection and seeking positive sides, Negative emotions and the Underestimating of physical injury on the relationship between the General and Imagery of Rehabilitation

Outcome Variable	*Direct effects*			*Indirect effects*			*Indirect effect 95% C.I.*		*Effect size R^2 mediated*
	B	*s.e.*	*P*	*b*	*s.e.*	*P*	*Lower Bound*	*Upper Bound*	
Mediator: Reflection and seeking positive sides									
MI	.446	.155	.004	.127	.072	.078	.011	.289	.08
CI	.367	.138	.008	.227	.091	.013	.080	.432	.28
HI	.461	.142	.001	.183	.081	.024	.052	.366	.14
Mediator: Negative emotions									
MI	.524	.154	<.001	.048	.046	.297	-.026	.152	.01
CI	.518	.150	<.001	.076	.054	.159	-.011	.198	.02
HI	.624	.150	<.001	.020	.042	.634	-.048	.115	.00
Mediator: Underestimating									
MI	.563	.149	<.001	.009	.029	.756	-.038	.074	.00
CI	.579	.145	<.001	.015	.035	.668	-.042	.094	.00
HI	.634	.143	<.001	.010	.024	.677	-.029	.064	.00

Notes: MI- Motivational imagery, CI – Cognitive imagery, HI – Healing imagery

Reflection influences most the relationship between General and Cognitive Imagery (CI) and the leastthat between General and Healing Imagery (HI).

The other aspects of injury perception did not mediate the previously mentioned relation.

The second aim of the study was to explain the mediating effects of the general tendency to use imagery on the relationship between personality and the imagery of rehabilitation.

The outcome variables were dimensions of rehabilitation imagery. The mediator variable was the general usage of imagery. The predictor variables were personality traits. The indirect effects of the General tendency to use imagery between Agreeableness and two subscales of rehabilitation imagery (CI and HI) were found to be statistically significant and on MI marginally significant.

The analysis of the direct effect of Agreeableness on all the subscales of imagery in rehabilitation revealed only one marginally significant influence on MI and an insignificant one on CI and HI. From this it results that the general tendency is a significant and complete mediator between Agreeableness and HI and CI but only a partial mediator between Agreeableness and MI explaining over 53% of the relationship between Agreeableness and CI and HI and over 20% of MI.

The indirect effects of the general tendency to use imagery between Consciousness and all the subscales of rehabilitation imagery were found to be marginally significant and the direct effects of consciousness on all the subscales of rehabilitation imagery is not significant. It suggests that general imagery is marginally significant but a complete mediator in relation between consciousness and imagery rehabilitation, explaining between 38 and 69%.

Table 2. Summary of the mediating effects of the General on the relationship between Personality and the Imagery of Rehabilitation

Outcome Variable	*Direct effects*			*Indirect effects*			*Indirect effect 95% C.I.*		*Effect size R^2 mediated*
	b	*s.e.*	*P*	*b*	*s.e.*	*p*	*Lower Bound*	*Upper Bound*	
Exogenous variable: Extraversion									
MI	.267	.062	<.001	.047	.030	.117	-.002	.115	.03
CI	.146	.068	<.001	.055	.035	.116	-.002	.134	.12
HI	.114	.068	<.001	.062	.039	.112	-.001	.150	.23
Exogenous variable: Agreeableness									
MI	.112	.061	.066	.058	.031	.061	.008	.128	.21
CI	.062	.061	.309	.066	.033	.046	.013	.140	.53
HI	-.018	.060	.764	.079	.038	.038	.018	.165	.95
Exogenous variable: Conscientiousness									
MI	.056	.049	.253	.044	.025	.078	.004	.100	.38
CI	.041	.049	.403	.047	.026	.071	.005	.106	.57
HI	.035	.048	.466	.052	.028	.063	.007	.115	.69
Exogenous variable: Emotional Stability									
MI	.110	.040	.006	.015	.020	.453	-.017	.060	.02
CI	.093	.040	.020	.016	.021	.446	-.018	.063	.03
HI	.070	.040	.080	.017	.024	.479	-.022	.071	.06
Exogenous variable: Openness to Experience									
MI	.010	.061	.870	.030	.068	.659	-.080	.183	.90
CI	.043	.050	.390	.031	.067	.644	-.077	.182	.34
HI	.158	.055	.004	.032	.063	.611	-.070	.174	.04

Notes: MI- Motivational imagery, CI – Cognitive imagery, HI – Healing imagery

Extraversion and Emotional Stability directly influence all the dimensions of imagery in rehabilitation (direct influence of Emotional Stability on HI turned out to be marginally significant), Openness to Experience significantly influences HI. Analysis of the direct effects of Extraversion and Emotional Stability, Openness to Experience on imagery in rehabilitation revealed no significant effects of mediation through general imagery. Although there are significant direct effects of those personality traits on imagery in rehabilitation. Extraversion and Emotional Stability, Openness to Experience revealed a positive relation with imagery in rehabilitation.

DISCUSSION

Regarding our first aim the general tendency to use imagery turned out to have a strong direct effect on rehabilitation imagery. This is consistent with previous studies where more skilled imagers use imagery more often (Hall, 1998). Apart from all kind of injury, the perception reflection turned out to be a mediator between the general tendency to use imagery and all the rehabilitation of imagery

dimensions, however only as a partial mediator. This kind of injury perception characterises athletes who are responsible for their rehabilitation process and treat injury as a challenge from which some benefits can be derived. In our study we discovered that people with a high general tendency to use imagery and present positive reflection to their injury use rehabilitation imagery in a more effective way. Reflection has the strongest effect between the general tendency to use imagery and CS.

Cognitive specific imagery improves skill performance, but also should facilitate the execution of rehabilitation skills (exercises) and furthermore should enhance the recovery from injury. As for CG imagery during rehabilitation Sordoni et al. (2000, 2002) notes that adult athletes use it to rehearse rehabilitation strategies, whereas Driediger et al. (2006) reports adult athletes only use CG imagery to rehearse sport specific strategies during the rehabilitative process. The use of CG imagery for rehabilitation strategies should be included not only in completing exercises and adhering to the rehabilitative program, but also in overcoming any setbacks and maintaining a positive attitude and staying focused (Miller & Munroe-Chandler, 2019).Therefore a reflective perception of injury influences the relationship between the general tendency to use imagery and the cognitive function of imagery in rehabilitation.

Reflective perception also influences the relationship between the general tendency to use imagery and motivational imagery. MI is related to the athlete's goals and mastery in the rehabilitation domain but also the stress linked with the injury. Process goals should focus on successfully executing the rehabilitation exercises or working toward rehabilitative stages, with the outcome of being fully recovered (Miller & Munroe-Chandler, 2019). Motivational Imagery also increases mental toughness within athletes and facilitates the coping with potentially uncomfortable or painful situations in rehabilitation (Driediger et al., 2006). Furthermore it helps control anxiety and stress, helps participants to relax, and motivate them to execute their rehabilitation program (Driediger et al., 2006; Miller, 2017). Therefore the perception of the injury in a reflective way and looking for positive sides strengthens the relationship between the general ability to use imagery and the motivational aspects of imagery.

Reflection turned out to be a mediator between the general ability to use imagery and Healing Imagery. Healing Imagery is defined as imagining the injured body part healing (e.g., tissue mending, strengthening, or mobilizing). Healing Imagery enhances the rate of physiological recovery, increase perceptions of control and empowers the athlete (Sordoni et al., 2002). On the other hand reflection has the weakest effect between the general tendency to use imagery and healing imagery. It could be explained that healing imagery is on the first part of rehabilitation. Sometimes emotions are too strong to imagine the healing process and it is difficult for athletes to have a reflective perception of injury at this phase. However, reflective perception strengthens this relationship.

Our second aim was to examine the mediating effects of the general tendency to use imagery on the relationship between personality and the imagery of reha-

bilitation. Blecharz in his research (2008) has reported that there is the relationship between injury perception and personality traits. In our study we discovered indirect effects of the general tendency to use imagery between agreeableness on two subscales of rehabilitation imagery (CI and HI) as being statistically significant and on MI marginally significant. Agreeableness links with trust and friendliness, which are very meaningful in situations where athletes should cooperate with medical staff and those who support them. In our study Agreeableness facilitates not only social functioning but also the use of imagery in rehabilitation through the general usage of imagery. Agreeableness as itself also influences directly MI, though in a marginally significant way. This may be explained by the fact that trust in supporting people helps the use of motivational imagery connected with coping with potentially uncomfortable or painful situations in rehabilitation and the motivation to execute their rehabilitation program.

We also discovered that the general tendency to use imagery is the mediator between consciousness and all the subscales of rehabilitation imagery, however this is only marginally significant. Consciousness means the tendency to be organized, and links with self-discipline, aims for achievement. People characterized by a high score on this scale prefer rather planned than spontaneous behavior. All those features are very helpful with the rehabilitation process. Our findings are noticeable because the general tendency to use imagery strengthens the relationship between this tendency and the use of the rehabilitation imagery. Extraversion and Emotional Stability directly influence all the dimensions of imagery in rehabilitation. Energy, positive emotions, sociability and the tendency to seek stimulation in the company of others but also a stable and calm personality help athletes use rehabilitation imagery.

Openness to Experience significantly influence HI. People who are open to experience are intellectually curious, those open to emotion are more creative and more prone to use imagery (Budnik- Przybylska et al. 2019). That feature helps in imagining the injured body part healed probably in more creative way.

Personality is the construct developing in the interaction between inborn features and the surrounding environment. It is defined as a system of rather stable features which reflect on many aspects of personal life (Costa &McCrae, 1992) even injury perception. Our findings have revealed that the general tendency to use imagery may strengthen the relationship between personality and rehabilitation imagery. The general tendency to use imagery may be defined as an inborn trait – when some people are better in imagery. On the other side this tendency could be developed by exercises. The novelty of our findings is that it is worth encouraging to develop the general tendency to imagery in everyday life because it may help to enhance the use of imagery – in our study rehabilitation imagery.

How can we interpret our results from the neuropsychological perspective?

It is in the cortex that perception and action reach the level of a conscious decision. The brain forms articulated pictures or representations of what is out there

in the world, and of what has been out there in the world, and the play of these images constitutes conscious perception. What is more – and this has only recently begun to be a subject of interest for neuropsychology (Pąchalska, MacQueen & Cielebąk 2018) – the cortex is capable of forming pictures and/or images (see: Fig. 1) of what might be or could be out there, or could have been, or should have been, and was not.

It is not that hard to form a coherent theory of how the brain forms an image of something the eyes are seeing or have seen, but it is quite another thing to explain how the "mind's eye" works in terms of brain structure and function.

For the present purposes, however, the most important fact about the cerebral cortex is that both perception and action at this stage are characterized by detail, discrimination, and analysis. The reptilian brain sees a large moving object, to be avoided, or seized, or ignored; the paleomammalian brain sees a human figure, producing an effect, positive or negative; the cortex sees features, details, a face, and can put a name to it, or not. The complexity of perception results from the fact that these three images come into existence independently and sequentially, though there is only one perceiver and one object, and the entire process takes milliseconds to complete. The conscious mind, then, typically experiences its perception as a single, simple act of seeing. According to microgenetic theory, however, this single act is a multi-layered actualization, the tip of

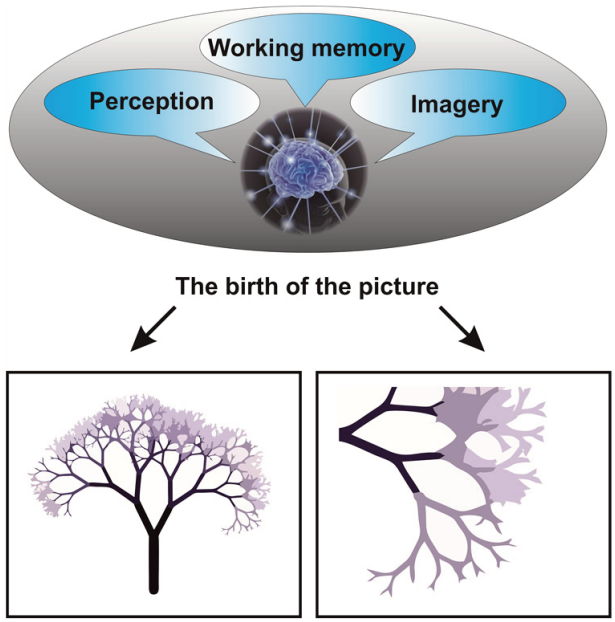

Fig. 1. The direction of brain and organism evolution, in full exteriorization, detachment and modulation of the process of perception.
Source: Pachalska, MacQueen, Cielebąk 2018

an iceberg that floats to the surface and then subsides, containing within itself the traces of all that has gone before, in phylogeny, ontogeny, and microgeny.

It should be pointed out, that the results described above are important for sport practice because they can be helpful in predicting and describing the behavior of athletes according to their injury perception and imagery ability and use during rehabilitation and to forecast future achievements in rehabilitation process. Cooperation with the injured athlete should be holistic. Each athlete interprets their injury in their own manner, and all specialists and those close should be aware of this. Our findings may help to adjust methods which positively influence the rehabilitation process.

As a limitation of this study is the lack of information concerning the rehabilitation phase. We failed to monitor that. In the future it should be controlled. Our next limitation is the quite small group of respondents, however it was very difficult to get access to injured athletes who were undergoing rehabilitation. We also used only the general tendency to use imagery – in the future it would be worth examining the mediating effects of other subscales of the Imagination in Sport Questionnaire on the the relationship between personality and the imagery of rehabilitation.

In the future it should be worth monitoring emotion dynamics during rehabilitation and the imagery used in each rehabilitation phase with respect to personality traits. The issues of the above work should be continued in further research into the presented variables, but also expanded to include additional variables, such as coping with stress, a sense of coherence, support provided to athletes or individual differences in the volitional properties of the individual. The athlete treats physical injury and the rehabilitation process in terms of struggles, both defeats and victories, and the selection of psychological interventions will depend on the development and proper recovery of athletes, which in turn may contribute to presenting a higher sports level after treatment (Blecharz, 2008).

Thanks to the diversity and adaptation of psychological training to the individual needs of the athlete, taking into account the specificity of a given sport discipline, it is possible to increase the effectiveness of specialist training, and in the event of an injury, optimize the return to full physical activity.

CONCLUSION

Our findings revealed that the general tendency to use imagery has a strong direct effect on rehabilitation imagery. Injury perception mediates the relationship between the general tendency to use imagery and all rehabilitation subscales. We also discovered that the general tendency to use imagery may strengthen the relationship between personality and rehabilitation imagery. We encourage the development of the general tendency to imagery in everyday life because it may help to enhance the use of imagery – in our study that of rehabilitation imagery.

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