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RELIABILITY AND VALIDITY OF THE POLISH VERSION OF THE SPORT IMAGERY ABILITY QUESTIONNAIRE (SIAQ)
PSYCHOMETRIC CHARACTERISTICS OF THE SIAQ*

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Summary. This study examined the factor structure, reliability, and concurrent validity of a Polish adaptation of the Sport Imagery Ability Questionnaire (SIAQ) consisting of 15 items measuring five dimensions – skill, strategy, goals, mastery, emotions. Study participants were 391 athletes (152 women, 239 men) aged 14–62 years (M = 22.7; SD = 6.1). They were recruited from Polish sport clubs. An exploratory factor analysis (EFA) revealed a five-factor structure with good fit to the data, χ^2 (40) = 77.92; p < .001; RMSEA = .051; CFI = .937. A confirmatory factor analysis (CFA) supported the five-factor structure, χ^2 (80) = 201.650; p < .001; CFI = .931; RMSEA = .062. Internal reliability was confirmed for all subscales with CR values ranging from .594 to .776. The SIAQ was equally reliable and valid among athletes of both genders. We established good temporal (test-retest) stability over a two month period and demonstrated acceptable concurrent validity. The Polish adaptation of the SIAQ has good psychometric support.
Key words: adapted questionnaires, tests/questionnaires, mental imagery, sport psychology

Introduction

The use of mental imagery to rehearse sports skills is a popular strategy for improving performance, and it is often incorporated into athletic training (Morris, Spittle, Watt, 2005; Murphy, Nordin, Cumming, 2008; Cumming, Ramsey, 2009;

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Williams, Cumming, 2012). Imagery 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, Spittle, Watt, 2005, p. 19).

Researchers have previously assessed athletes' imagery abilities primarily through self-report inventories (Morris, Spittle, Watt, 2005; Williams, Cumming, 2011). Of particular interest to the present study is the Williams and Cumming (2011) SIAQ, a widely used measure of an athlete's ability to image various content frequently used in his/her sport. Its structure consists of the original five factors of the SIQ (Hall et al., 1998) (skills, strategies, goals, feelings and emotions, and mastery of difficult situations). The SIAQ assesses an athlete's imagery ability with sport specific content. It can be used as a one-off assessment, or it can monitor changes in imagery ability over time. It measures both cognitive imagery of a particular skill and motivational imagery of emotions related to a sport competition. Thus, the SIAQ allows for direct comparisons of the different types of imagery content.

The SIAQ items were first drawn from the Sport Imagery Questionnaire (SIQ; Hall et al., 1998) and then modified and revised to a set of 35 items designed to assess the five imagery functions (cognitive specific – CS, cognitive general – CG, motivational specific, motivational specific – MS, motivational general arousal – MGA, motivational general mastery – MGM (Paivio, 1985; Hall et al., 1998; Martin, Moritz, Hall, 1999)). Following an initial pilot study to trim these items to a smaller set, these authors engaged in a four-part test development process. In Study 1, 375 athletes completed a 20-item SIAQ. An exploratory factor analysis revealed a four-factor model assessing skill, strategy, goal, and affect imagery ability. In Study 2, confirmatory factor analysis (CFA) supported this four-factor structure among a separate sample of 363 athletes. The item loading scores in Study 1 suggested a need to decrease the number of items in the final inventory to 12. In Study 3, a fifth mastery imagery subscale was created, and, using another sample of 438 athletes, a new five factor structure was created by adding three additional items. This five factor model was confirmed through CFA. The test-retest reliability coefficients of the SIAQ for skill, strategy, goal, affect, and mastery images were all higher than .75. Thus, the model was determined to be an adequate fit to the data established for a final five-factor model, χ^2 (80) = 204.53, $p < .05$, CFI = .96, TLI = .95, SRMR = .04, RMSEA = .06 (90% CI = .05–.07). All factor loadings (.62 to .88) of the 15 final items, the modification indices, and the standardized residuals were within the range of acceptable fit. Concurrent validity was confirmed in Study 4, which assessed 220 athletes, by comparing the SIAQ with the Movement Imagery Questionnaire-3. The relationship between the SIAQ and MIQ-3 demonstrated differences in imagery ability with different contents.

There remains a need for cross-cultural research on the SIAQ to demonstrate its general utilization and psychometric characteristics in different cultures (Howell,

2012). To date, apart from the original English version, there have been published adaptations in to four languages: Persian (Ashrafi, Hemayat Talab, Shojaei, 2015), Thai (Singnoy, Vongjaturapat, Fonseca, 2015), German (Simonsmeier, Hannemann, 2017) and Spanish (Alcaraz-Ibanez et al., 2017). We opted to develop a Polish version of the SIAQ since there are now only three available Polish version imagery ability questionnaires – the Sport Imagery Ability Measure (SIAM) (Budnik-Przybylska et al., 2014), the Movement Imagery Questionnaire (MIQ-3) (Budnik-Przybylska, Szczypińska, Karasiewicz, 2016) and the Imagination in Sport Questionnaire (Budnik-Przybylska, 2014) (pol. Kwestionariusz Wyobraźni w Sporcie – KWS) and since adapting the SIAQ in Polish will permit further cross-cultural comparisons of sport imagery assessments.

Thus, the aim of the study was to examine the psychometric properties of a Polish language version of the SIAQ to determine whether its five-factor structure endures in a Polish translated version and to evaluate its internal consistency with respect to respondents' gender, competitive level, and type of sport (individual or group). Additionally, we sought to evaluate its test-retest reliability and evaluate its concurrent validity. We sought to use a sample of Polish athletes to examine differences in athletes' imagery ability across competitive level and gender as an indication of the tool's construct validity, and we examined whether ease of imaging varied according to gender.

Method

Participants

This study involved 391 athlete participants (152 women and 239 men) aged 14–62 years (M = 22.7; SD = 6.1), recruited from Polish sport clubs where they participated in a variety of sports (e.g., football, basketball, volleyball, swimming, track and field, judo etc. that we grouped into either individual or group sports). They represented various levels of experience (recreational, n = 103; regional, n = 255; and international, n = 33). Participation in a personal survey and completion of two measures of mental imagery ability (see below) was anonymous and voluntary. The study was approved by the University of Gdansk Human Research Ethics Committee. Written consent was obtained from athletes over 18 years, and a parent or person with care responsibilities in case of minors. The treatment of athletes was in accordance with APA ethical guidelines.

Measures

We used the following two self-report measures of mental imagery ability:

(a) The Sport Imagery Ability Questionnaire (SIAQ, Williams, Cumming, 2011) contains 15 items divided among five subscales of skill, strategy, goals, mastery,

and emotions related to sport imagery. The questionnaire instructed athletes to image each item and then rate the degree of ease with which they were able to image each scenario in relation to their sport. Athletes gave ratings on a 7-point Likert-type scale ranging from 1 (*very difficult to image*) to 7 (*very easy to image*).

(b) The Imagination in Sport Questionnaire (ISQ) (Budnik-Przybylska, 2014) is a 51-item measure consisting of seven subscales: (a) physiological feelings (noticeable changes in body functioning); (b) modalities (use of senses other than the visual sense); (c) ease/control (ease and control of imagined scene); (d) perspective (balancing different perspectives of the imagined scene); (e) affirmations (positive attitude during competition); (f) visual (visual sense); and (g) general (general tendency to use imagery). The participants were asked to imagine a competitive situation for 60 seconds in as detailed and realistic a manner as possible. They then responded to the 51 items and rated how well they achieved mental imagery for different aspects of the imagined situation on a scale ranging from 1 (*not at all*) to 5 (*completely*). All subscales except that of general, related to the imagined situation. The subscale general consisted of six questions and was developed separately to assess the individual's general tendency to use imagery. Budnik-Przybylska (2014) found that the ISQ had sound internal consistency, Cronbach's α ranged from .64 to .79. A confirmatory factor analysis (CFA) indicated acceptable model fit indices for the ISQ's 7-factor structure, NC = 2416.63, df = 1203, GFI = .944, AGFI = .944, RMSEA = .056.

Procedure

Our first step in adapting the SIAQ for Polish use was to directly translate the instrument with a professional translator who was not familiar with the tool. That version was then examined by a person familiar with the original measure (first author), and only small corrections to the translated version were necessary. The Polish version was then back-translated into English by another translator, and after further minor adjustments, the final version of the questionnaire in Polish was approved and implemented for the study.

Prior to completing the test measures, participants completed a short researcher-designed survey to gather information about their gender, age, discipline, and training experience. The survey and inventory measures were administered to participants in groups. Data collection took approximately 10 to 15 minutes. For the test-retest reliability procedure, we used a separate group of 26 athletes who also agreed to participate completed the SIAQ under the same conditions on two occasions separated by a two-month interval.

Data analyses

Statistical analyses were conducted using R-project (R Core Team, 2017). Exploratory factor analysis was calculated using maximum likelihood estimator and vari-

max rotation of factors. The internal consistency of each of the SIAQ subscales was examined using Cronbach's α coefficient and McDonald's ω. A confirmatory factor analysis (CFA) to test the structure of internal relations of the SIAQ in the model proposed by the authors (Williams, Cumming, 2011) was calculated using the maximum likelihood estimator. To assess the internal consistency of the factorial validity and reliability an analysis of composite was conducted. The temporal stability (test-retest reliability) of the SIAQ and its concurrent validity were assessed using Pearson's correlation coefficient. Gender, sport level and type of sport invariance of the five-factor model of the SIAQ was conducted by multiple group CFA using the MLR (Maximum Likelihood Ratio) estimator. A series of one-way multivariate analyses of variance (MANOVA) were conducted to test whether gender and level of sport experience were related to SIAQ results among Polish athletes. Since a common average of items (versus a weighted average) is regularly used to estimate a subscale score of the SIAQ, we used factor analysis to examine the SIAQ's factor structure in terms of equality of loadings, residuals and general fit; and we used a MANOVA to examine differences in the manifest (versus latent) mean scores of the SIAQ subscales. Comparing latent variables, as is a common practice in factor analysis, might have led to conclusions that differ from the instrument's common practical use.

Results

Exploratory factor analysis

A *very simple structure* (VSS) analysis using the maximum likelihood estimator and varimax rotation of factors suggested $k = 5$, based on BIC (Bayesian Informative Criterion), or $k = 6$, based on SABIC (Sample Adjusted Bayesian Informative Criterion), factors as optimal to explain the structure of the SIAQ.

Table 1. Results of VSS analysis: Global indices of structure fit

Number of factors	vss1	vss2	map	*df*	χ^2	RFI	RMSEA	BIC	SABIC	SRMR
1	.75	.00	.021	90	529	.75	.113	−8.3	277	.079
2	.59	.79	.023	76	357	.79	.099	−96.5	145	.064
3	.48	.74	.028	63	241	.83	.086	−135.3	65	.048
4	.48	.69	.037	51	163	.85	.076	−141.8	20	.037
5	.40	.64	.045	40	78	.87	.051	−160.5	-34	.026
6	.41	.63	.056	30	44	.89	.037	−134.6	-39	.018
7	.42	.57	.074	21	27	.90	.029	−98.4	-32	.013
8	.43	.60	.093	13	12	.92	.000	−65.3	-24	.007

The results of the principal factor analysis using the maximum likelihood estimator with orthogonal factor rotation (varimax) revealed that the five-factor structure is a good fit with the real data, χ^2 (40) = 77.92; $p < .001$; RMSEA = .051; CFI = .937; TLI = .904; SRMR = .032. A detailed inspection of the five-factor loadings revealed a strong relationship among items and their factors and a weak relationship among items and any other factors, with a nearly orthogonal five-factor structure explaining over 99% of the variance. Factor loadings of the SIAQ items were all above .60, except for item 2 ("Giving 100% effort even when things are not going well") which had a loading value of only .48. Thus, the original SIAQ factors were clearly represented in our population of Polish athletes.

We calculated the reliability of SIAQ subscales with Cronbach α and McDonald's ω and found good internal consistency of all SIAQ subscales, except mastery, for which the Cronbach α was slightly lower than .70 (considered the minimal scientifically acceptable coefficient). While the Cronbach α of the affect subscale was also lower than .70, 95% confidence interval bounds for this value (ranging from .59 to .71) suggest that this lower coefficient was not significantly different from the acceptable .70 criterion. McDonald's ω was sufficient (over .90) for all scales.

Confirmatory factor analysis (CFA)

To test the structure of the internal relations in the SIAQ model proposed by the authors (Williams, Cumming, 2011), we next conducted a confirmatory factor analysis (CFA) using a maximum likelihood estimator. The estimated model was generally well-fitted with respect to the global fit indices, χ^2 (80) = 201.650; $p < .001$; CFI = .931; TLI = .910; RMSEA = .062; CI^{95} = (.052; .073); p(RMSEA < .05) = .023, suggesting that the model sufficiently described the actual structure of the SIAQ. The only insufficient factor loading estimated in this analysis was that of item 10 ("Staying positive after a setback") on the mastery subscale (λ = .376). All other factor loading coefficients achieved values above .50. Furthermore, as estimates of factor covariances obtained in the model suggest strong and significant interrelations among the SIAQ's latent factors, Williams and Cummings (2011) total score is statistically supported as a combination of their five SIAQ subscales.

Internal consistency and inter-factor correlations

To further test the instrument's internal consistency, an analysis of composite was conducted, revealing that all five factors exhibited sufficient composite reliability, ranging from .59 for mastery to .78 for goal. However, only the first three factors (skill, strategy and goal) demonstrated sufficient variance as explained by the latent structure (AVE > .50). Regarding the structure of affect and mastery, the average variance these factors shared (ASV) with other factors was greater than the average variance they explained individually (AVE), suggesting that these factors were

highly related to one another and that their separate contributions were unclear. Thus, the first three factors of skill, strategy and goal could be treated as diagnostic scales, while affect and mastery should be carefully interpreted within the context of other SIAQ subscales and the SIAQ total score.

Table 2. Internal consistency and inter-factor correlations

Subscale	Reliability	Variance explained	Variance shared		Intercorrelations				
	CR	AVE	ASV	MSV	Skill	Strategy	Goal	Affect	Mastery
Skill	.762	.517	.392	.548					
Strategy	.740	.489	.361	.429	.62				
Goal	.776	.540	.309	.341	.51	.57			
Affect	.659	.396	.386	.548	.74	.55	.58		
Mastery	.594	.341	.365	.429	.61	.66	.55	.59	

Sex invariance

To verify the hypothesis that the five-factor model of the SIAQ is an equivalent measure for both male and female athletes, we conducted a multiple group CFA using an MLR estimator. In the analysis, four models were compared. In the first, the model was unconstrained and according to the hypothesis, the factor loadings, factor variances and covariances were freely estimated for both genders. The second model represented the assumption that latent factor variances were the same across genders, and thus, the factor variances were equally constrained. The third model represented both equal constraints of latent factor variances and factor loadings across both gender groups and assumed that the SIAQ latent factors were equally reliable and valid for both gender groups. The last model represented constraints of equal latent factor variances, factor loadings and factor covariances across gender, assuming equal validity, reliability and factor structure of the SIAQ for both gender groups.

The results of these analyses suggest that the SIAQ structure, when adapted for Polish use, was equivalent for both gender groups under different considerations of latent factor variances, covariances and factor loadings. The model that was constrained to meet these assumptions was slightly less well-fitted than the model that was completely unconstrained, but the difference between constrained and unconstrained models was not statistically significant [$\Delta\chi^2$ (15) = 33.787; p = .113; ΔTLI = .009; ΔCFI = .004]. We concluded that the five-factor SIAQ model was equally valid and reliable for both gender groups and that the SIAQ structure remained the same across gender, suggesting gender invariance of the SIAQ.

Table 3. Summary of global model fit indices of nested models assuming different structures of the SIAQ across genders

Tested model	Model fit		Comparison to baseline model		Akaike and Beyesian comparative indices			RMSEA			SRMR
	χ^2	*df*	CFI	TLI	AIC	BIC	SABIC	Estimate	Lower bound	Upper bound	
Unconstrained model freely fitted across sex	311.832	160	.917	.892	18506.6	18943.2	18594.2	.070	.058	.081	.050
Equal latent factor variances	318.861	165	.916	.894	18503.7	18920.4	18587.2	.069	.058	.080	.059
Equal latent factor variances and factor loadings	327.423	175	.917	.901	18492.2	18869.2	18567.8	.067	.055	.078	.059
Equal latent factor variances, factor loadings and covariances	345.619	185	.913	.901	18490.4	18827.8	18558.1	.067	.056	.077	.065

SIAQ test-retest reliability and concurrent validity

We conducted SIAQ test-retest reliability after two months on a group of 26 athletes and found acceptable temporal stability with the highest correlation observed for the global scale (r = .75) and the lowest correlation for the skill scale (r = .52). To verify the concurrent validity of the SIAQ, we used a separate convenience subsample of consisting of 190 athletes (39 females and 151 males) and analysed the correlation between their responses to the SIAQ and the Imagination in Sport Questionnaire (ISQ, Budnik-Przybylska, 2014). Concurrent validity was assessed using Pearson's linear estimates of the SIAQ with the ISQ. The significance of estimates was assessed using the Bonfferroni-Holm sequential probability adjustment, which controls, to some degree, the family-wise type I error rate.

Table 4. Summary of correlations among subscales and total scores of the SIAQ and ISQ (n = 190)

SIAQ	ISQ						
	Physiological feelings	Modalities	Ease/ Control	Perspective	Visual	Affirmations	General
Skill	.244 (< .001)	.241 (< .001)	.460 (< .001)	.313 (< .001)	.281 (< .001)	.341 (< .001)	.427 (< .001)
Strategy	.257 (< .001)	.272 (< .001)	.514 (< .001)	.359 (< .001)	.247 (< .001)	.365 (< .001)	.363 (< .001)
Goal	.278 (< .001)	.198 (.007)	.395 (< .001)	.269 (< .001)	.210 (.004)	.360 (< .001)	.333 (< .001)
Affect	.314 (< .001)	.120 (.098)	.402 (< .001)	.226 (.002)	.275 (< .001)	.347 (< .001)	.415 (< .001)
Mastery	.235 (.001)	.246 (< .001)	.342 (< .001)	.244 (< .001)	.194 (.007)	.331 (< .001)	.334 (< .001)
Global	.357 (< .001)	.288 (< .001)	.564 (< .001)	.377 (< .001)	.321 (< .001)	.469 (< .001)	.498 (< .001)

Note. Values in parentheses represent the Bonferroni-Holm adjusted probabilities for the test of the null hypothesis, where the population parameter of the current correlation is equal to zero (H0: $\vartheta = 0$).

There was a moderate and significant correlation between the SIAQ global score and the ISQ general score (r = .50; p < .001). Correlations among other SIAQ and ISQ subscales were all in the positive direction (over r = .20), except for low

correlations between the goal (SIAQ) and modalities (ISQ) scales (r = .198; p = .007) and the visual and mastery scales (r = .194; p = .007) and a non-significant correlation between the affect and modalities scales (r = .120, p = .098). All five SIAQ subscales correlated most strongly with ease/control on the ISQ (from r = .34 on mastery with ease/control to r = .56 on global with ease/control). The subscale for visual was weakly correlated with goal (r = .21; p = .004) and mastery (r = .20; p = .007), and the subscale modalities was weakly correlated with skill (r = .24; p < .001) and goal (r = .20; p = .007). Thus, relative to the ISQ, the SIAQ generally represents the ability to ease and control the imaged scene; and it is less-related to the use of the senses.

Additionally, a canonical correlation analysis on a correlation matrix between the SIAQ and ISQ subscales was conducted to estimate the latent axis (or axes) and explain the relation between both measures of imagery in sport. This approach revealed two significant canonical roots that collectively explained 93.9% of the total variance of all five possible canonical roots, with the first root explaining approximately 40% ($R^2_{canonical}$ = .403) of the variance and the second root explaining approximately 10% ($R^2_{canonical}$ = .092) of the variance in correlations between SIAQ and ISQ subscales. A detailed examination of these canonical coefficients revealed that the first canonical root related to low results for strategy (λ = −.45) and skill (λ = −.26) on the SIAQ and low results for ease/control (λ = −.10) and affirmations (λ = −.05) on the ISQ. The second canonical root related to low affect (λ = −.88), high strategy (λ = .62) and mastery (λ = .26) on the SIAQ and high modalities (λ = .15) and visual sense (λ = .09) and low physiological feelings (λ = −.14) on the ISQ. These results can be interpreted as indications of converged validity in that the SIAQ and the ISQ share two commonalities: (a) uncontrolled experiences in imagery (the first root); and (b) task oriented imagery, mastered, controlled and logical imagery with no affect/emotion and physiological experiences.

Sex and sport level differences in SIAQ

To verify the hypothesis that gender and level of sport experience are related to the results of SIAQ with respect to Polish athletes, a series of one-way multivariate analyses of variance (MANOVA) were conducted. In these analysis, a vector of the results of the SIAQ subscales was the dependent variable, and gender (in one MANOVA) and sport level (in the other) were the independent variables. After determining a significant Pillai's trace multivariate statistic, a series of univariate ANOVA tests were conducted to verify the difference between males and females and among recreational, regional, and international sport levels.

The results of the MANOVA revealed that both factors, gender and sport level, were significantly related to SIAQ scores. Specifically, gender explained approximately 12% of the total variance in the SIAQ scores [F(5;385) = 5.270; p < .001; η^2 = .12], and sport level explained approximately 6% of the total variance of the SIAQ scores [F(10.778) = 2.689; p = .003; η^2 = .06].

A detailed univariate analysis revealed that gender was significantly related to the mastery subscale [$F(1;389) = 11.712$; $p = .001$; $\eta^2 = .03$], where females were characterized by lower scores ($M = 4.58$; $SD = 1.13$) than were males ($M = 4.97$; $SD = 1.12$) and that it was marginally significant [$F(1;389) = 3.178$; $p = .075$; $\eta^2 < .01$] to goal, where females were also characterized by lower mean scores ($M = 5.31$; $SD = 1.20$) than were males ($M = 5.53$; $SD = 1.21$).

Analogously, the results of the MANOVA testing relationship between sport level and SIAQ results revealed a significant Pillai's trace [$F(10.778) = 2.689$; $p = .003$; $\eta^2 = .06$], and a detailed examination of the univariate ANOVA tests revealed that skills [$F(2;388) = 3.562$; $p = .029$; $\eta^2 = .02$], strategy [$F(2;388) = 10.130$; $p < .001$; $\eta^2 = .05$] and goal [$F(2;388) = 5.606$; $p = .004$; $\eta^2 = .03$] were univariately related to sport level. The results further revealed a similar pattern of differences among sport levels, where differences between international and regional sport levels and between international and recreational sport levels were not significant, and the only significant difference was between regional and recreational, where results were higher for those at the regional sport level.

Discussion and conclusions

The results of this study confirmed the psychometric properties of the SIAQ among a group of Polish athletes, and the five-factor model sufficiently described real relations through the structure of the SIAQ results as confirmed by the high scores of the model fit indices.

Internal consistency was high. The only insufficient factor loading estimated in this analysis was for item 10 ("Staying positive after a setback") in the mastery subscale ($\lambda = .376$). Other factor loadings were above .50. Respondents often reported difficulty in understanding situations where they were expected to remain positive in a negative situation. Such result could be achieved due to the group characteristics, in which only small amount of participants were elite athletes familiar with functional emotional states (Hanin, 2007).

The internal consistency analysis determined that all five factors were characterized by sufficient composite reliability. However, a detailed examination revealed that because affect and mastery are highly connected with each other, those scales should be carefully interpreted. This may be explained by the Polish attitude regarding mental preparation, which links cognitive and emotional behaviours in time. For example, it is believed that athletes anticipate different situations connected with their sport, remain confident given those situations and enjoy various situations. That said, these types of discrepancies may be the result of cultural differences. For example, in the Persian version, skill and strategy were identified as one factor (Ashrafi, Hemayat Talab, Shojaei, 2015). The authors of the Persian version explained that Iranian athletes considered the items of these two subscales, skill and strategy, to be similar because "planning a new program or strategy for

competitions and games, which is the subject of strategy subscale, needs different skills, similar to the way Williams and Cumming (2011) have defined strategy imagery and procedure of a competitive event, which is a combination of a number of skills" (Ashrafi, Hemayat Talab, Shojaei, 2015, p. 628).

The Polish version of the SIAQ presented acceptable stability over the two-month period. The SIAQ was equally valid and reliable among athletes of both genders, and the structure was the same across genders, thus supporting the hypothesis of sex invariance. This is consistent with Williams and Cumming (2011).

The concurrent validity of the SIAQ was confirmed by significant correlations with the Imagination in Sport Questionnaire (ISQ, Budnik-Przybylska, 2014). Weak correlations were observed among subscales measuring the senses, i.e., visual and modalities, on the ISQ and other subscales on the SIAQ. These results support the finding that a person's ability to create an image scenario of one content will not necessarily transfer to or predict his/her ability to create a visual image with different content.

The SIAQ measures ease and clearness of imagery ability. Thus, as a result of the high correlation with the ease/control dimension of the Imagination in Sport Questionnaire, the reliability of the SIAQ with respect to ease and clearness of imagery ability was confirmed. Other correlations (low or moderate) between the scales of the ISQ and the corresponding scales of the SIAQ were also found to be in the expected directions. These findings further support the hypothesis that both questionnaires measure different variables, and the achieved results confirm Paivio's (1985) suggestion to identify the method that most directly relates to the specific task when assessing an individual's imagery ability.

Accordingly, the ISQ would be a good tool to use for assessing the appearance of the image from the imager's perspective, the feelings experienced by the imagers, the behaviour of the imager in the imaged scene, as well as the general aspects of the imagery. In contrast, the SIAQ measures the contents of the images.

Concurrent validity was confirmed through a detailed inspection of the canonical coefficients in which an analysis revealed two canonical roots that linked two questionnaires, one concerning uncontrolled experiences in imagery and a second that was oriented without emotion imagery. These canonical roots suggest that the two specific questionnaires provide more detailed information regarding athletes' imagery.

With regard to gender differences, the results were consistent with the original version (Williams, Cumming, 2011), which revealed a significant mean difference in mastery images whereby males exhibited higher results than females. However, in contrast to the original sample, in the Polish sample, while males exhibited higher scores than did females on the goal subscale, the difference was only marginal. While these results are contrary to previous studies that have indicated gender invariance with respect to imagery ability (Richardson, 1994; Richardson, 1999;

Hall, 2001; Bhasavanija et al., 2011; Williams et al., 2012; Budnik-Przybylska et al., 2014; Campos, 2014; Budnik-Przybylska, Szczypińska, Karasiewicz, 2016), they are consistent with some previous studies that have identified gender differences in imagery ability (e.g., Campos, Pérez-Fabello, Gómez-Juncal, 2004; Budnik-Przybylska, 2014). Furthermore, as the SIAQ was developed to measure imagery content, higher scores on the mastery and goal subscales achieved by males may support the evolutionary male nature of rivalry and dominance (Buss, 2015).

With respect to sport level, the only significant difference was between regional and recreational levels, where the results related to skills, strategy and goals were significantly higher among the more sophisticated athletes as indicated by their regional sport level. This result was consistent with the original version (Williams, Cumming, 2011) and with previous research (Watt, Morris, 2001; Cumming, Hall, 2002; Oishi, Maeshima, 2004; Gregg, Hall, 2006; Arvinen-Barrow et al., 2007; Roberts et al., 2008; Bhasavanija et al., 2011; Budnik-Przybylska, 2014). Surprisingly, athletes at the international level did not achieve the highest results. This may be explained by the small and heterogeneous sample of athletes declaring international athletic status given that some respondents declaring international status were young athletes who had just started their careers at the international level.

A limitation of this study was the discrepancy in the number of participants representing the various sport levels. For example, the elite level group was the smallest, and it was not homogeneous. Additionally, as the recruitment of participants according to age and sport type was not systematic, certain groups were over- or under-represented in the sample. Hence, in the future, the analysed groups should be more balanced.

Future research should consider further validation of the Polish version of the SIAQ, for example, by administering it to a specific group of athletes. The SIAQ, could also be used in studies examining athletes' individual differences, such as personality and temperament.

To conclude, the Polish version of SIAQ, similar to the original version, measures sport imagery in Polish-speaking cultural environments. The SIAQ measures the athlete's imagery ability by assessing five types of imagery content associated with the five functions of athlete imagery use. The Polish adaptation of the SIAQ (either separately or with other imagery questionnaires) assists sport psychologists in Poland in the development of the most appropriate imagery-training programs or interventions designed to best fit the individual athlete. Furthermore, the Polish version of the SIAQ contributes to the research regarding the broad range of the sport imagery field in Poland. Additionally, the instrument will enable the comparison of results from cross-cultural studies and will also facilitate the design of other cross-cultural studies regarding the different aspects of imagery in sport. Moreover the SIAQ will enable the organisation new research in sport psychology field.

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Załącznik

Kwestionariusz umiejętności wyobraźni w sporcie
(pol. adaptacja D. Budnik-Przybylska, K. Karasiewicz)

Płeć…… Wiek…… Dyscyplina sportowa…… Staż treningowy……

Poziom sportowy (proszę podkreślić):

rekreacyjny zawodniczy w kraju zawodniczy za granicą (kadra narodowa, olimpijska)

Instrukcje: Celem niniejszego kwestionariusza jest uzyskanie informacji dotyczącej twojej zdolności do generowania szeregu wyobrażeń używanych przez sportowców w związku z ich sportem.

Do każdej pozycji przywołaj w głowie wyobrażenie, mając zamknięte oczy. Następnie oceń, jak łatwe jest dla Ciebie tworzenie tego wyobrażenia (1 = bardzo trudne, 4 = nie jest łatwe lub trudne do 7 = bardzo łatwe). Zakreśl kółkiem odpowiednią ocenę na podstawie powyżej skali. Na przykład, niektórzy sportowcy uznają wyobrażenie sobie siebie jako kopiących piłkę nożną jako ani łatwe, ani trudne i dlatego wybierają 4.

Proszę bądź tak dokładny jak to możliwe i podejmuj decyzję tak długo jak to konieczne, aby właściwie ocenić każdy obraz. Nie ma dobrych lub złych odpowiedzi, ponieważ jesteśmy po prostu zainteresowani Twoją odpowiedzią.

W stosunku do mojego sportu jak łatwo jest mi wyobrazić sobie	Bardzo trudne do wyobrażenia	Trudne do wyobrażenia	Trochę trudne do wyobrażenia	Neutralnie (ani łatwe, ani trudne)	Trochę łatwe do wyobrażenia	Łatwe do wyobrażenia	Bardzo łatwe do wyobrażenia
1. Tworzenie nowych planów / strategii w głowie	1	2	3	4	5	6	7
2. Dawanie 100% wysiłku, nawet wtedy, gdy sprawy nie idą dobrze	1	2	3	4	5	6	7
3. Doskonalenie konkretnej umiejętności	1	2	3	4	5	6	7
4. Pozytywne emocje, które odczuwam, uprawiając mój sport	1	2	3	4	5	6	7
5. Ja, jak zdobywam medal	1	2	3	4	5	6	7
6. Alternatywne plany / strategie	1	2	3	4	5	6	7
7. Oczekiwanie i podekscytowanie związane z moim sportem	1	2	3	4	5	6	7

8. Poprawa konkretnej umiejętności	1	2	3	4	5	6	7
9. Udzielanie wywiadu jako z mistrzem	1	2	3	4	5	6	7
10. Pozostawanie w pozytywnym nastawieniu po porażce	1	2	3	4	5	6	7
11. Podekscytowanie związane z występem	1	2	3	4	5	6	7
12. Poprawianie fizycznych umiejętności	1	2	3	4	5	6	7
13. Tworzenie nowego zdarzenia / planu gry	1	2	3	4	5	6	7
14. Ja, jak wygrywam	1	2	3	4	5	6	7
15. Pozostawanie pewnym siebie w trudnej sytuacji	1	2	3	4	5	6	7

RZETELNOŚĆ I TRAFNOŚĆ POLSKIEJ WERSJI
KWESTIONARIUSZA UMIEJĘTNOŚCI WYOBRAŹNI W SPORCIE (SIAQ)
CHARAKTERYSTYKA PSYCHOMETRYCZNA SIAQ

Streszczenie. W badaniu przeanalizowano strukturę czynnikową, rzetelność oraz trafność zbieżną polskiej adaptacji Kwestionariusza Umiejętności Wyobraźni w Sporcie (SIAQ) składającego się z 15 stwierdzeń, mierzącego 5 wymiarów: umiejętność, strategia, cel, mistrzostwo, emocje. W badaniu uczestniczyło 391 sportowców (152 kobiety oraz 239 mężczyzn) w wieku 14–62 lat (M = 22,7; SD = 6,1). Zostali zrekrutowani z polskich klubów sportowych. Eksploracyjna analiza czynnikowa (CFA) ujawniła, że struktura pięcioczynnikowa jest dobrze dopasowana do danych χ^2 (40) = 77,92; p < ,001; RMSEA = ,051; CFI = ,937. Konfirmacyjna analiza czynnikowa (CFA) potwierdziła pięcioczynnikową strukturę χ^2 (80) = 201,650; p < ,001; CFI = ,931; RMSEA = ,062. Spójność wewnętrzna została potwierdzona dla wszystkich podskal z wartościami CR w granicach od ,594 do ,776. SIAQ jest rzetelne i trafne dla obu płci. Prezentuje dobrą stabiliność czasową (test-retest) w okresie dwóch miesięcy oraz ujawnia akceptowalną trafność zbieżną. Polska adaptacja SIAQ ma dobre wsparcie psychometryczne.
Słowa kluczowe: adaptacje testów, testy/kwestionariusze, wyobrażenia, psychologia sportu

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