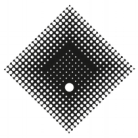

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Psicothema

Psicothema 2014, Vol. 26, No. 2, 267-272
doi: 10.7334/psicothema2013.130

ISSN 0214 - 9915 CODEN PSOTEG

www.psicothema.com

Psychometric characteristics of the Spanish version of the Sport Imagery Questionnaire

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Abstract

Background: The aim of this study was to examine the psychometric properties of the Spanish version of the Sport Imagery Questionnaire (SIQ), which assesses cognitive and motivational functions of imagery use. **Method:** Participants were 361 athletes (234 male and 127 female) with a mean of age of 24.29 ± 7.76 yrs. Athletes were recruited from 31 sports across three competitive levels (i.e., regional, national, and international). **Results:** Confirmatory factor analyses of the 30-item five factor SIQ model revealed adequate fit to the data, $\chi^2(378) = 694.6$, CFI = .91, TLI = .90, RMSEA= .05, SRMR= .05. Multivariate analyses of variance revealed that athletes of higher competitive level reported significantly higher levels of cognitive general and cognitive specific imagery. **Conclusions:** Overall, these results provide further support for the claim that the SIQ has a reproducible factor structure and internal consistency for measuring imagery use in Spanish athletes.

Keywords: Imagery, factor structure, internal consistency.

Resumen

Características psicométricas de la versión española del Cuestionario sobre la Práctica en Imaginación en el Deporte. **Antecedentes:** la presente investigación describe las características psicométricas de la versión española del cuestionario sobre la práctica en imaginación en el deporte que evalúa funciones cognitivas y motivacionales del uso de la imaginación. **Método:** el estudio se realizó en una muestra de 361 deportistas (234 hombres y 127 mujeres) con una media de edad de 24.29 ± 7.76 años. Los deportistas competían en 31 modalidades a nivel regional, nacional o internacional. **Resultados:** un análisis confirmatorio inicial representando un modelo de cinco factores mostró un buen ajuste a los datos, $\chi^2(378) = 694.6$; CFI = .91; TLI = .90; RMSEA= .05; SRMR= .05). Un análisis de varianza multivariante indicó que los deportistas de mayor nivel competitivo utilizaban de forma significativa mayores niveles de las funciones cognitiva general y cognitiva específica de la imaginación. **Conclusiones:** se demuestra evidencia empírica que indica que la versión española del cuestionario de la práctica en imaginación mantiene la estructural factorial original y una alta consistencia interna en deportistas españoles.

Palabras clave: práctica en imaginación, análisis factorial, consistencia interna.

Imagery is a technique that has received strong support both from researchers and sport psychology practitioners in the mental preparation of athletes (e.g., Hall, Mack, Paivio, & Hausenblas, 1998; Weinberg, 2008). It is also a popular tool used by athletes and coaches for skill learning and performance enhancement purposes (MacIntyre & Moran, 2007). Imagery has been 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). Morris et al. also described imagery use as the manner in which individuals employ imagery to learn and develop skills, and to facilitate performance of those skills.

Imagery researchers focusing on the examination of when and why athletes use imagery in sport have typically applied Paivio's (1985) general analytical framework (e.g., Gregg & Hall, 2005; Short, Zostautas, & Monsma, 2012). The underlying assumption of Paivio's model is that imagery can mediate behavior through either a cognitive (e.g., skill and strategy rehearsal) or motivational (e.g., self-confidence, arousal) role, which can operate at either a general or specific level. Hall et al. (1998) developed the Sport Imagery Questionnaire (SIQ) to evaluate the content of imagery in relation to the cognitive and motivational functions proposed by Paivio. A factor analysis of the SIQ revealed five types of imagery use: (a) cognitive general (CG)—imagery related to competitive strategies; (b) cognitive specific (CS)—imagery directed toward skill development or production; (c) motivational general arousal (MG-A)—imagery related to arousal, relaxation, and competitive anxiety; (d) motivational general mastery (MG-M)—imagery representative of effective coping and confidence in challenging situations; and

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(e) motivational specific (MS)—imagery that represents specific goals and goal-oriented behavior.

Acquiring an understanding of the imagery characteristics of athletes (e.g., Murphy & Martin, 2002; Morris et al., 2005) is equally important in countries where English is not the major spoken language. Consequently, an increasing number of reports regarding translation procedures, evidence of reliability and validity, or subsequent applied use of non-English versions of existing sport imagery measures appear to be available (e.g., Campos, 2011; Kafkas, 2011; Kizilda & Tiryaki, 2012; Veraksa & Gorovaya, 2011; Watt, Jaakkola, & Morris, 2006) for languages including Finnish, Russian, Turkish, and Spanish. Although psychometric evaluations of Spanish language measures of general (Campos & Pérez-Fabello, 2009) and movement imagery (Atienza, Balaguer, & García-Merita, 1994) characteristics exist, only basic research using Spanish versions of measures of sport imagery has been undertaken (Ruiz & Watt, 2012).

Beyond the standard psychometric analyses expected of reputable psychological measures, an important evaluation of the properties of a measure is its administrability within different cultures. Therefore, it is necessary for researchers in those countries to undertake validation studies in conjunction with the translation of the measure. This should provide sport psychology practitioners working with non-English speaking athletes with reliable and valid measures of sport imagery. Finally, extending the usage of a measure provides the original developer with supporting information regarding the utility of the instrument to evaluate the imagery characteristics of athletes from different first-language backgrounds.

Previous research has supported the factorial validity and reliability of the SIQ (Abma, Fry, Li, & Relyea, 2002; Hall et al., 1998, Hall, Stevens, & Paivio, 2005; Weinberg, Butt, Knight, Burke, & Jackson, 2003; Watt et al., 2006; Watt, Spittle, Jaakkola, & Morris, 2008). Watt et al. (2006) developed a Finnish version of the SIQ and used a mixed sport and age sample of 231 athletes to evaluate if the translated version of the measure was internally consistent and demonstrated adequate replication of the original factor structure. A recent Turkish study provided further support for alternative language versions of the SIQ, whereby Kizildag and Tiryaki (2012) determined that, for a sample of 151 elite level athletes, results supported a five-factor structure and that subscale reliabilities were at or above those reported previously (e.g., Hall et al., 1998; Watt et al., 2008). Research involving the English-language SIQ detailed by Gregg, Hall, McGowan, and Hall (2011) revealed strong indicators of subscale reliability for a sample of 432 athletes from a broad range of sports and age groups. Overall, these findings indicate that the SIQ constitutes a measure that can serve as a valuable indicator of the imagery use skills of athletes in both its English and non-English versions.

Research has also examined the variations in imagery use in different groups of athletes. Specifically, significant differences have been found across athletes' competitive level. Hall et al. (1998) found that cognitive functions were more likely to predict performance in lower level athletes, whereas motivational functions predicted performance in athletes competing at higher level. Previous studies examining imagery use differences among athletes participating in team and individual sports (Adegbesan, 2009; Hall, Rodgers, & Barr, 1990; Kizildag & Tiryaki, 2012; Weinberg et al., 2003) have produced inconsistent results regarding emphases on either motivational or cognitive functions. A subsequent investigation based on skill type that compared the imagery use of individuals competing in open- and closed-skill sports revealed that athletes involved in open-skilled sports used more MG-A imagery whereas MG-M imagery was most used by athletes regardless of their skill-type (Arvinen-Barrow, Weigand, Thomas, Hemmings, & Walley, 2007). Adegbesan (2009) reported that athletes in team sports and in individual closed-skill sports use more MG-M imagery when compared to athletes in individual open-skill sports. Generally, the examination of imagery use differences in relation to athlete and sport type classifications remains a research area that requires on-going clarification.

The main aim of this study was to examine the factor structure and internal consistency of the Spanish version of the SIQ. In addition, differences in athletes imagery use were examined across competitive level, categorizations corresponding to skills involving a perceptual target and tasks without a perceptual target, and team and individual classifications.

Method

Participants

The questionnaire was administered to 361 (234 male and 127 female) athletes drawn from 31 sports (22 individual and 9 team modalities). Participants' age ranged from 14 to 50 years (M = 24.09, SD = 7.28). The group comprised 164 regional level, 144 national level, and 47 international level athletes. Six athletes did not specify their competitive level. Table 1 presents the distribution of sports practiced.

Instrument

The Sport Imagery Questionnaire (SIQ; Hall et al., 1998) is a 30-item self-report questionnaire that measures five different types of imagery associated with cognitive and motivational functions. The questionnaire consists of five subscales (CS, CG, MS, MG-M, and MG-A imagery) with 6 items each assessed on a 7-point Likert type scale ranging from 1 (*never/rarely*) to 7 (*often*).

Back translation procedures and expert review were utilized to develop the Spanish version of the SIQ questionnaire. First, there was direct translation by a professional translator who was not familiar with the instrument. Second, the translated version was

Table 1
Sports classified according to task type

Type of task			
No target (n = 144)	**n**	**Perceptual target (n = 217)**	**n**
Athletics	67	Soccer	45
Swimming	47	Martial arts	36
Cycling	22	Volleyball	34
Mountaineering	4	Futsal	24
Skiing	2	Rugby	24
Trampolining	1	Basketball	19
Sport aerobics	1	Water polo	16
		Baseball	13
		Racquet sports	3
		Handball	2
		Floorball	1

then examined by a panel of five academics whose first language was Spanish, competent in both written and spoken English, and familiar with the SIQ. Third, the panel evaluated the items using the rankings of 1 (*No change*), 2 (*Minor change required*), 3 (Major change required), and 4 (*Reject and retranslate*). Panel members shared their rankings and the panel chair compiled an overall score for each item. Discrepancies between items were discussed with efforts made to ensure that the underlying meaning remained unchanged. Fourth, the modified Spanish version was then back translated into English. Fifth, the back-translated English version was compared to the original version to ensure that the meaning and intent of the original item was maintained. The preliminary version of the Spanish SIQ demonstrated adequate internal consistency with values ranging from .66 to .83 (Ruiz & Watt, 2012).

Procedure

The participants were recruited via sport organizations, clubs, and coaches. The lead investigator and a research assistant contacted the individuals directly and provided them a letter of information indicating the study purpose, voluntary participation, and confidentiality of the results. 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. Each participant completed the SIQ and provided their demographic information in a quiet environment, usually at their training facilities. The participants completed the materials individually or in small groups and then returned them to the investigators. Data collection took approximately 15 min.

Data analysis

Descriptive and inferential analyses were conducted using SPSS version 20. Confirmatory factor analyses (CFA) were performed with the M*plus* statistical package (Version 6.12; Muthén & Muthén, 1998-2011). We adjusted for non-normality by using the robust maximum likelihood estimator (MLR) for standard errors. To determine the fit of the model, we considered different indices of fit that included chi-square (χ^2), the comparative fit index (CFI), the Tucker-Lewis Index (TLI), standardized root mean square residual (SRMR) and the root mean square error of approximation (RMSEA). A good model fit is inferred when values of CFI, and TLI are higher than .90; the SRMR is close to .05; and the RMSEA is close to .06 (Hu & Bentler, 1999). Analyses of invariance were conducted to test for multigroup measurement and structural equivalence across gender and sport type (individual vs. team sports) using a sequential approach (see Byrne, 2008). Differences in overall χ^2 values and related degrees of freedom for the nested models were calculated using the Satorra Bentler chi-square difference ($\Delta\chi^2$) adjusting for scaling correction factor for MLR. Statistically non-significant $\Delta\chi^2$ values in the comparison of two nested models are indicative of invariance. Multivariate analyses of variance (MANOVA) were performed to examine differences in athletes' imagery use across competitive level and sport type classifications.

Results

Descriptive statistics and internal consistencies for each of the SIQ subscales are presented in Table 2. All items showed a normal distribution with skewness and kurtosis values less than 2.00, except for Item 3, "I image giving 100% during an event/game," which had a positive kurtosis. Results showed that the SIQ MG-M subscale had the highest and MS subscale the lowest mean score values. Cronbach's alpha coefficients of the Spanish version ranged from .72 (CG) to .86 (MS), demonstrating that the scale has sound internal consistency. Only one of the 30 items had an alpha-if-item-deleted value (i.e., Item 6 =.75) that was minimally higher than the subscale Cronbach's alpha (i.e., MG-A = .73).

The CFA representing the 30-item five factor SIQ model revealed minimally acceptable fit to the data, $\chi^2(395) = 885.65$; CFI = .85; TLI = .84; RMSEA = .06; SRMR = .06). A review of the modification indices (i.e., indices of model misfit) suggested several correlations between item residuals. As the specific items were similar in content, these parameters were added to the model in a step-by-step fashion. These respecifications revealed improvement in model fit, χ^2 (378) = 694.60; CFI = .91; TLI = .90; RMSEA = .05; SRMR = .05). An examination of the standardized factor loadings indicated that all items loaded on their appropriate factor (see Table 3).

Significant correlations between scores and latent factors were found. The highest correlation was found for cognitive specific and cognitive general imagery (see Table 4).

Results from invariance testing across gender and sport type are presented in Table 5. Goodness-of-fit statistics related to the baseline model yielded a minimally acceptably fitting model. In regards to measurement equivalence, goodness-of-fit statistics related to the constrained models (M2) revealed a small decrement in overall fit compared with the baseline models (M1). In regards to structural equivalence (M3 and M4), goodness-of-fit statistics related to these models were similar to the previous two models. Chi-square differences between nested models were nonsignificant, thus, indicating invariance.

Differences in athletes' imagery use were examined across competitive level (i.e., regional, national and international) for 346 athletes. Fifteen participants were not included in these analyses as they practiced non-competitive sports (e.g., mountaineering), or had not specified their competitive level. A MANOVA revealed significant differences in imagery use, $F(10, 678) = 2.61$, $p = .004$; Wilks' $\Lambda = .927$, $\eta_p^2 = .037$, Power = .96. Further analysis of variance (ANOVA) indicated that athletes of higher competitive level used more CG imagery, $F(2, 343) = 5.312$, $p = .005$, $\eta_p^2 = .030$, Power = .84, and also more CS imagery, $F(2, 343) = 7.346$, $p = .001$, $\eta_p^2 = .041$, Power = .94, than athletes of lower competitive level.

Table 2
Means (SD) and Cronbach alphas for imagery subscales by competitive level

Imagery subscale	Total (n = 361)	α	Competitive level		
			Regional (n = 164)	National (n = 144)	International (n = 47)
CS	4.68 (1.14)	.81	4.42 (1.26)	4.82 (1.03)	5.07 (.88)
CG	4.65 (1.05)	.72	4.47 (1.12)	4.74 (.97)	5.06 (.95)
MS	4.05 (1.49)	.86	4.06 (1.50)	4.07 (1.43)	3.90 (1.57)
MG-A	4.81 (1.08)	.73	4.78 (1.06)	4.83 (1.06)	4.93 (1.16)
MG-M	5.26 (1.14)	.83	5.20 (1.13)	5.23 (1.18)	5.59 (.93)

Note: CS = cognitive specific; CG = cognitive general; MS = motivational specific; MG-A = motivational general arousal; MG-M = motivational general mastery

Table 3
SIQ items and factor loadings for a five-factor solution

Item	CS	CG	MS	MG-A	MG-M
Puedo controlar sistemáticamente la imagen de una destreza física [I can consistently control the image of physical skill]	.59				
Cambio fácilmente de una imagen de una técnica a otra [I easily change an image of skill]	.63				
Cuando imagino una determinada técnica, la ejecuto mentalmente a la perfección de forma sistemática [When imaging a particular skill, I consistently perform it perfectly in my mind]	.69				
Puedo corregir mentalmente mis destrezas físicas [I can mentally make corrections to physical skills]	.65				
Antes de intentar una técnica específica, me imagino a mí mismo/a ejecutándola perfectamente [Before attempting a particular skill, I imagine myself performing it perfectly]	.65				
Cuando aprendo una técnica nueva, me imagino a mí mismo/a ejecutándola perfectamente [When learning a new skill, I imagine myself performing it perfectly]	.71				
Me invento mentalmente nuevas estrategias [I make up new strategies in my head]		.41			
Me imagino estrategias alternativas en caso de que fallara mi plan de competición [I image alternative strategies in case my event/game plan fails]		.49			
Me imagino cada parte de una competición/partido (p. ej. ataque vs. defensa, transiciones) [I image each section of an event/game (e.g., offense vs. defence, fast vs. slow)]		.57			
Me imagino continuando con el plan de competición/partidos, incluso aunque no lo esté ejecutando demasiado bien [I image myself continuing with my game/event plan, even when performing poorly]		.46			
Me imagino ejecutando jugadas/programas/partes del modo exacto en el que quisiera que ocurriesen en una competición/partido [I image executing entire plays/programs/sections just the way I want them to happen in an event/game]		.65			
Me imagino siguiendo bien mi plan de competición [I imagine myself successfully following my game/event plan]		.69			
Me imagino el ambiente en el supuesto de ganar un campeonato (p. ej. el entusiasmo que genera el hecho de haber ganado un campeonato) [I image the atmosphere of winning a championship (e.g., the excitement that follows winning a championship]			.59		
Me imagino a otros deportistas felicitándome por lo bien que lo he hecho [I image other athletes congratulating me on a good performance]			.67		
Me imagino el ambiente de recibir una medalla (p. ej. el orgullo, el entusiasmo, etc.) [I image the atmosphere of receiving a medal (e.g., the pride, the excitement, etc.)]			.83		
Me imagino al público aplaudiendo mi actuación [I image the audience applauding my performance]			.75		
Me imagino ganando una medalla [I image myself winning a medal]			.76		
Me imagino siendo entrevistado/a como campeón/a [I image myself being interviewed as a champion]			.69		
Puedo recrear mentalmente las emociones que siento antes de competir [I can re-create in my head the emotions I feel before I compete]				.65	
Me imagino manejando el estrés y la excitación de las competiciones y manteniéndome tranquilo [I image myself handling the stress and excitement of competitions and remaining calm]				.41	
Me imagino el estrés y la ansiedad asociados a la competición [I image the stress and anxiety associated with competing]				.50	
Cuando imagino una competición, noto cómo me voy entusiasmando [When I image a competition, I feel myself getting emotionally excited]				.75	
Cuando imagino una competición/partido en la que voy a participar, me siento ansioso/a [When I image an event/game that I am to participate in, I feel anxious]				.47	
Me imagino el entusiasmo que genera una competición [I imagine the excitement associated with competing]				.71	
Me imagino dando el 100% en una competición/partido [I image giving 100% during an event/game]					.58
Me imagino siendo mentalmente fuerte [I imagine myself being mentally tough]					.62
Me imagino mostrándome ante mis oponentes como una persona con confianza en sí misma [I imagine myself appearing self-confident in front of my opponents]					.66
Me imagino estando concentrado/a durante una situación desafiante [I image myself to be focused during a challenging situation]					.72
Me imagino a mí mismo/a capaz de controlar las situaciones difíciles [I imagine myself being in control of difficult situations]					.75
Me imagino a mí mismo/a trabajando bien en situaciones difíciles (p. ej. un partido difícil, tobillo dolorido, etc.) [I image myself working successfully through tough situations (e.g., a power play, sore ankle, etc.)]					.52

Table 4
Correlation matrix and inter-factor correlations (in brackets) of the SIQ

SIQ subscales	1	2	3	4	5
1. Cognitive specific	–	(.90)	(.47)	(.66)	(.71)
2. Cognitive general	.70	–	(.50)	(.81)	(.85)
3. Motivational specific	.41	.40	–	(.59)	(.45)
4. Motivational general-arousal	.57	.61	.51	–	(.72)
5. Motivational general-mastery	.59	.63	.41	.60	–

Note: All correlations significant (p<.001)

Table 5
SIQ fit indices for gender and sport type (individual vs. team) invariance

Model	χ^2	df	CFI	TLI	RMSEA	SRMR	$\Delta\chi^2$	p	Δdf
Gender invariance									
M1	1227.042	760	.874	.855	.058	.066	–	–	–
M2	1252.285	785	.873	.860	.057	.071	23.92	.52	25
M3	1262.928	790	.872	.859	.058	.086	10.64	.06	5
M4	1269.033	800	.873	.862	.057	.086	6.75	.75	10
Sport type invariance									
M1	1277.801	760	.865	.845	.061	.066	–	–	–
M2	1299.660	785	.866	.851	.060	.071	21.09	.74	25
M3	1301.558	790	.866	.853	.060	.073	1.90	.86	5
M4	1308.706	800	.867	.855	.059	.073	7.76	.65	10

Note: M1 = baseline model; M2 = factor loadings constrained; M3 = factor variances constrained; M4 = factor covariances constrained; Δχ2 = Satorra-Bentler chi-square difference; Δdf = difference in degrees of freedom

Interestingly, non-significant differences were found in athletes' imagery across team vs. individual sports, open-skills vs. closed-skills sports, nor perceptual target vs. no target. Further MANOVA analyses examined imagery differences according to a researcher-generated classification of sports as athletics (n = 29), combat sports (n = 35), aquatics (n = 47), transition sports (n = 34), cycling (n = 22), invasion contact ballgames (n = 40), invasion non-contact ballgames (n = 90), and non-invasion ballgames (n = 49). A significant main effect was found. Post hoc analyses revealed significantly higher CS imagery use in combat sports athletes compared to athletes in athletics (p = .015), aquatics (p = .002), invasion non-contact ballgames (p = .003) and non-invasion ballgames (p = .003). Moreover, combat sport athletes also used significantly more CG than athletes in aquatics (p = .013) and non-invasion ballgames (p = .016). Finally, athletes in invasion contact ballgames used significantly more MS imagery than cyclists (p = .028).

Discussion

This study examined internal consistency and factor structure of the Spanish version of the SIQ in sport settings. In addition, differences in imagery use were examined across competitive level, and two other sport categorizations. The results provided support for the psychometric properties of the Spanish version of the SIQ and extended the available information regarding athletes' imagery use within a broader international context.

Subscale descriptives for the Spanish SIQ were in line with those reported for a Finnish version (Watt et al., 2006) and a Turkish version (Kizildag & Tiryaki, 2012), whereby MG-M had the highest value and MS the lowest. Contrasting this with other international studies highlighted that SIQ response patterns can vary substantially. Subscale scores for a Malaysian sample (Heng, Fauzee, & Soh, 2011) ranged from a high score for MS to a low score for MG-A, and for a Nigerian sample (Adegbesan, 2009) from MS as the highest value, to CS as the lowest subscale score. When the response patterns are considered across international studies, an initial possibility is that, within different ethnic groups, the aims and goals or innate predispositions to using imagery may be influenced by cultural characteristics that mediate an athlete's imagery processing. Secondly, the process of translation may also impact on the capacity to ensure that the exact meaning of the initial English language version of the SIQ items is being maintained within other language versions of the measure.

Overall, these findings indicate that the SIQ has a reproducible factor structure and satisfactory internal consistency for measuring imagery use in athletes. Comparison of psychometric data from the Spanish SIQ with similar results reported for other non-English versions is also supportive of reliability and factor structure. Specifically, the findings pertaining to the Spanish version clearly matched the results of Watt et al. (2006) and Kizildag and Tiryaki (2012) that indicated that the subscales of the SIQ had internal consistencies of close to or above .7, and the five-factor structure of the original version was viable when examined using CFA.

Consideration of modification indices prompted allowing residuals associated with some items to correlate. Invariance testing results indicated a decrement in the goodness-of-fit statistics for the nested models. Moreover, nonsignificant chi-square differences suggest equivalence of the SIQ across gender and sport type. These results support the proposition that researchers may need to reconsider or modify some items included in the original scale for its use with Spanish athletes. Future research should also examine the influence of demographic variables (e.g., age, years of participation in sport) on SIQ scores and possible measurement invariance using new samples of athletes.

The findings also indicated that athletes' competitive level was associated with significantly higher levels of cognitive (i.e., CG and CS) imagery. These results are in line with previous studies (Cumming & Hall, 2002; Short et al., 2012). However, significant differences were not found for motivational imagery use. In contrast to previous research, our findings did not reveal significant differences in imagery use when comparing athletes in team and individual sports, or when comparing types of tasks involved in the sports (i.e., perceptual target versus no target). Further analyses comparing imagery use according to a sports classification developed by the researchers revealed limited significant contrasts. Specifically, athletes in combat sports used significantly more cognitive imagery than athletes in other sport modalities (e.g., athletics, aquatics). On the other hand, athletes in invasion contact ballgames used more motivational specific imagery than cyclists. Many investigations of athletes' imagery use have been conducted using cross-sectional designs involving participants from single sports. However, this study attempted to extend the imagery literature by examining variability in imagery use across several new sport classifications. Overall, the current findings reinforce that continued work is required in determining frameworks around which to consider differences in

the performance requirements of athletes upon which we currently create sport classifications. For example, further studies may consider examining variation in imagery use taking into account the presence of an opponent, scoring characteristics, type of task, or performance requirements of the sport. An understanding of the use of imagery by athletes involved in different sports can benefit coaches, and sport psychology practitioners when developing effective interventions.

A limitation of this study is related to the recruitment of participants. Although attempts were made to recruit athletes from a wide variety of sports, the number of participants in some of the groups was too small, thus limiting the comparisons. Thus, researchers interested in continuing this line of research should aim at recruiting balanced groups of participants involved in the sport categories presented here. In addition, longitudinal studies examining the practical utility of the SIQ in the assessment of frequency of imagery use in different situations (i.e., practice vs. competition) are warranted. Moreover, further research is necessary to examine the test-retest reliability, predictive and concurrent validity of the Spanish SIQ.

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