



SUBJECTIVE ASSESSMENT OF SPORTS SUCCESS IN WHEELCHAIR RUGBY – PROPOSAL OF A NEW RESEARCH TOOL

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ABSTRACT

Purpose. The main purpose of this study was to design and perform a preliminary psychometric analysis of a measure in the subjective assessment of sports success in wheelchair rugby (WR). An additional objective of this study was to assess potential differences in the subjective assessment of sports success between rugby players who play in the first and second Polish Wheelchair Rugby League (PWRL). **Methods.** Thirty WR players who played in the first ($n = 11$) and second PWRL ($n = 19$) completed the newly-created Subjective Assessment of Sports Success in Wheelchair Rugby (SASS-WR) scale and a questionnaire collecting demographic, career, and sports training data. **Results.** The SASS-WR scale was found to be a valid and reliable measure of sports success in WR. The final version consists of 12 items defining four dimensions of sports success: (1) Individual Sports Success of the Player, (2) National Sports Success of the Team, (3) International Sports Success of the Team, (4) Social and Personal Success of the Player. The players in the first league were significantly more focused on achieving individual sports success as well as having their team achieve national and international sports success when compared with the players in the second league. Social and personal success (the fourth dimension of the SASS-WR) was more important for the second league players than first league players, although this difference was not significant. **Conclusions.** The findings suggest that the SASS-WR scale can serve as a valuable diagnostic tool in assessing sports success among WR players.

Key words: wheelchair rugby, subjective sports success assessment, spinal cord injury

Introduction

Success in team sports is determined by many factors, of which the most commonly mentioned are technical and tactical training as well as physical and mental preparation [1–3]. Research in this area on able-bodied athletes has been undertaken, however, little is known about the determinants of sports success among athletes with disabilities. This is especially so with regards to the psychological aspects that play a role here, which include the subjective perception of sports success by athletes with disabilities.

Currently, the fastest growing team sport for individuals with disabilities in Poland is wheelchair rugby (WR), with the Polish Wheelchair Rugby League (PWRL) having grown to include already 20 official teams [4]. WR is intended mainly for individuals with cervical spinal cord injuries (SCI), although it is open to those who feature other locomotor disabilities as long as they have at least three limbs with functional deficits. However, WR is still a relatively new sport for individuals with disabilities; hence research on this discipline and its players is quite limited. Until now, most of the published scientific work has concentrated on testing strength levels and classifying players [5–8] or analyzing the impact of training on the functional abilities of WR players [9–13].

Defining sports success in WR can begin by under-

standing what motivations guide individuals with disabilities, especially those with SCI who decide to take up physical activity. Previous research found that, first of all, men differ from women with regards to their motivation for participating in sports [14]. Men with disabilities stressed the importance of achieving athletic status, while women claimed that developing friendships was much more important. Studies focused on individuals with SCI found that the main reason for engaging in physical activity was to maintain physical fitness levels and to improve upper-body strength [15, 16]. Among those individuals with SCI who participate in sports, men valued the opportunity to compete against one another higher than women, while women rated the possibility to control body weight higher than men [17]. In turn, those with SCI who were intensively involved in sports stressed that their main motivation was the pleasure derived from playing sports, with health and other social motivations less relevant [18, 19]. However, the motivations that guide professional athletes with disabilities, as is the case for those playing in the PWRL, are particularly important as it is teamwork that allows them to achieve sports success. Previous research found a significant relationship between team cohesion and sports success [20, 21]. In the case of individual sports, however, such a relationship was not found, with sports success even having a negative impact on team cohesion [22–24]. Therefore, it seems that athletes focused on sports success would be motivated more by sports-related goals than factors such as improving health.

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Within this context, the main aim of the present study was to design and perform a preliminary psychometric analysis of a research tool that could be used in the subjective assessment of sports success in WR. An additional goal of the study was to assess potential differences in the subjective assessment of sports success between rugby players who play in the first and second PWRL. It was assumed that players in the first league would be more motivated in having their team achieve sports success than players in the second league.

Material and methods

Creating a scale

In order to choose what phrasing would be most suitable in assessing players' subjective perception of sports success in WR, an interview was conducted with 25 randomly selected players from both the first and second WR leagues in Poland. During the interview the players were asked to specify a maximum of 20 responses to the question: "How would you define sports success in WR?" After collecting the replies, a five-person expert panel was assembled consisting of a WR player, coach, and referee and the two authors of the present study to critically analyze the collected data. A consensus was reached on deleting responses that were either identical or closely related to each other, leading to the creation of a 14-item scale that was then tested in a pilot study.

Participants in the pilot study

For the pilot study, 30 additional players were recruited (29 men and 1 woman) from the first ($n = 11$) and second ($n = 19$) WR league (Tab. 1). The majority of the players were individuals with SCI ($n = 26$), while the remaining four were disabled due to other limb impairments. The mean age of the first league players was 34 years ($SD = 4.51$) while the mean for the second league players was 39 years ($SD = 9.69$); the difference between both groups for age was not statistically significant ($t = -1.529$; $p = 0.137$).

In terms of the functional abilities of the players, among the first league group there were three athletes who were low-pointers (point values from 0.5 to 1.5,

based on the classification system by the International Wheelchair Rugby Federation) and eight who were high-pointers (2.0–3.5 points). In the group of second league players, fourteen were low-pointers and five were high-pointers. The difference between the groups in terms of the players' functional capacity was significant ($\chi^2 = 6.111$, $p = 0.013$). No significant differences were noted between the first and second league players in terms of basic data on the players' experience and career, such as the number of years spent playing WR, the number of days per week spent training WR, and the number of minutes per day spent training WR (Tab. 2).

Reliability of the scale

The participating players ($n = 30$) completed the newly-created *Subjective Assessment of Sports Success in Wheelchair Rugby* (SASS-WR) scale, subjectively rating the 14 items that were previously selected to describe the perception of sports success. The participants responded to the statement "Sport success in WR means to me..." by choosing their responses to each item on a 5-point Likert scale (1 = completely unimportant, 5 = extremely important). The reliability of the 14-point SASS-WR scale was found to be good (Cronbach's alpha = 0.728), although after removing statements No. 12 and No. 14 the reliability of the scale increased to Cronbach's alpha = 0.753 and Cronbach's alpha = 0.747, respectively (Tab. 3). As a result, these statements were removed to increase the reliability of the scale, leaving 12 items.

Results

Extracting the SASS-WR scale's factors

Factor analysis was performed in order to extract the SASS-WR's underlying dimensions. A scree plot pointed to four dimensions, which were extracted by Principal Component Analysis (Promax rotation with Kaiser normalization). Four of the scale's items had a value greater than one, which accounted for 85% of the total explained variance. Each of the scale's four dimensions consisted of three components (Tab. 4).

Each of the four dimensions of the SASS-WR scale were named according to their semantic content, and their reliability was found to be satisfactory: 1) Individual Sports Success of the Player (Cronbach's alpha = 0.775), 2) National Sports Success of the Team (Cronbach's alpha = 0.861), 3) International Sports Success of the Team (Cronbach's alpha = 0.979), and 4) Social and Personal Success of the Player (Cronbach's alpha = 0.617). The responses of the participants for each statement were summed separately for each of the scale's four dimensions (range: 3–15 points). A higher score indicated the greater importance of the component (dimension) for a player in their subjective assessment of sports success in WR (see Appendix).

Table 1. Participants of the pilot study

Team name	Number of participants n	PWRL	Ranking in 2012
Balian Poznań	5	I	1
Flying Wings Rzeszów	3	I	3
Jokers Bydgoszcz	3	I	9
Brave Snails Lublin	5	II	12
Piecobiogaz Poznań	8	II	13
TetraGryf Szczecin	6	II	15

Table 2. Sports career and training frequency of the first and second WR league players

Sports experience	I league ($n = 11$) $\bar{x} \pm SD$	II league ($n = 19$) $\bar{x} \pm SD$	t test (p)
Years playing WR	7.36 \pm 4.56	8.39 \pm 4.63	0.559
Days spent training WR per week	2.50 \pm 1.07	2.03 \pm 1.08	0.257
Daily WR workout (min)	106.36 \pm 61.64	93.95 \pm 40.88	0.512

* $p \leq 0.05$; ** $p \leq 0.01$

Table 3. Reliability of the SASS-WR scale after removing individual items

No.	SASS-WR items	Cronbach's alpha after removing the item
1.	Qualifying to be a player on my WR team's roster	0.699
2.	Selected by the coach to play in a game	0.693
3.	Qualifying to be a player on the national WR team	0.720
4.	Team being highly ranked in a PWRL tournament	0.722
5.	Team being highly ranked in PWRL overall classification	0.713
6.	Team advancing to a higher group in PWRL	0.689
7.	Team winning first place in the European Championships	0.694
8.	Team qualifying for the World Championships	0.699
9.	Team winning first place in the World Championships	0.701
10.	Achieving social prestige	0.705
11.	Developing social contacts	0.724
12.	Pleasure derived from playing sports	0.753
13.	Improving my fitness level	0.718
14.	Overcoming my own weaknesses	0.747

Values in bold denote those items, when removed, improved the scale's reliability

Table 4. Matrix model of the SASS-WR scale

No.	SASS-WR items	Components			
		1	2	3	4
1.	Qualifying to be a player on my WR team's roster	0.960			
2.	Selected by the coach to play in a game	0.935			
3.	Qualifying to be a player on the national WR team	0.753			
4.	Team being highly ranked in a PWRL tournament		0.858		
5.	Team being highly ranked in PWRL overall classification		1.021		
6.	Team advancing to a higher group in PWRL		0.769		
7.	Team winning first place in the European Championships			1.002	
8.	Team qualifying for the World Championships			1.012	
9.	Team winning first place in the World Championships			0.904	
10.	Achieving social prestige				0.833
11.	Developing social contacts				0.894
12.	Improving my fitness level				0.478

Extraction method: Principal Component Analysis; rotation method: Promax with Kaiser normalization

Sport success based on the opinions of WR players

First league players, compared against second league players, placed more importance on achieving sports success in three of the SASS-WR scale's dimensions (individual sports success and their team's national and international success), with the differences between the two groups statistically significant (Tab. 4).

This result confirmed the initial assumption that higher classified players in the PWRL (first league) are more motivated in achieving team success than players at a lower classification (second league). In turn, social and personal success (the fourth dimension of the SASS-WR) was more important for second league players than first league players, although this difference was not significant (Tab. 5).

Table 5. Sports success based on the opinions of the first and second league players

SASS-WR dimensions	I league ($n = 11$) $\bar{x} \pm SD$	II league ($n = 19$) $\bar{x} \pm SD$	t test (p)
Individual Sports Success of the Player	14.36 \pm 1.43	10.89 \pm 2.55	0.001**
National Sports Success of the Team	14.45 \pm 1.03	13.05 \pm 1.84	0.028*
International Sports Success of the Team	14.73 \pm 0.91	12.26 \pm 3.78	0.044*
Social and Personal Success of the Player	11.27 \pm 2.32	12.84 \pm 2.19	0.075

* $p \leq 0.05$; ** $p \leq 0.01$

Discussion

Preliminary psychometric analysis of the proposed SASS-WR scale suggests that it can serve as a both relevant and reliable tool in assessing the motivations behind sports success in WR. The final scale consists of 12 items measuring four dimensions of sports success: 1) Individual Sports Success of the Player, 2) National Sports Success of the Team, 3) International Sports Success of the Team, and 4) Social and Personal Success of the Player. Noteworthy is the fact that the WR players, despite being clearly asked to indicate what sports success means to them (when initially creating the SASS-WR scale), pointed to a number of non-sports-related factors such as developing social contacts and improving their own fitness level. This implies that for individuals with a disability, even for those who are professionally involved in sports, the motivation behind taking up a sport is not only based on typical sports-related factors, such as qualifying to be a player of the national team or having their team in high standing. These results are consistent with the findings of other authors. The participants in Wu and William's study [18] – individuals with SCI intensively practicing sports – placed “fun in doing sports” as their main motivation, followed by goals such as “physical fitness”, “health”, “competition” and “social aspects”. Similarly, research conducted by Furst, Ferr, and Megginson [19] on athletes with SCI (triathlon competitors) found that the main reason for them engaging in sports was “fun” and then mentioned “physical development and improving health”, “enjoying competition”, and “social aspects”.

The participants of the present study, specifically the players in the first league, were found to be significantly more focused on achieving sports success than the players in the second league. The first league players obtained results at the upper limit of the scale, i.e., 14.4–14.7 points (out of a maximum of 15 points) in three of the scale's dimensions, signifying their focus on both individual sports success as well as their team's success, with these results being significantly higher than those of the second league players. This outcome can be interpreted in different two ways. On the one hand, it seems quite obvious that players playing at a higher level (first league) would be more focused on individual and team success than players who were not as successfully competitive (second league). On the other hand, the results

may have been influenced by the differences between the first and second league teams in terms of the functional abilities the players possess. Among those playing in the first league, the percentage of high-pointers to low-pointers was 73% to 27%, while in the second league this was the opposite, i.e. 26% to 74%, respectively. High-pointers (who primarily play on offense) may be more strongly motivated in achieving success in sports because they are mainly responsible for scoring points, while low-pointers (playing on defense) rarely leave the rear of the court and have a much smaller opportunity to score any points. The differences between the groups' focus on different aspects of sports success should be verified in future research on groups of first and second league players although with a similar ratio of high-pointers and low-pointers.

The results of the present study suggest a relationship between team cohesion (understood as players being focused on the same goal) and sports success (understood as a team's ranking in the PWRL). Carron et al. [20] demonstrated a very strong relationship between the success of a sports team and team cohesion when analyzing eighteen basketball and nine soccer teams (154 women and 140 men). Similar results were obtained by Mullen and Copper [21]. Generally speaking, the present study confirmed the positive relationship between sports success and team cohesion in team sports. In disciplines such as volleyball or soccer, each player provides a different skill set that is effective only when working together as a team. On the other hand, individual sports such as golf or bowling are entirely dependent on a player's own skills and abilities, where the success of a team depends more on each individual's performance. In such sports, team cohesion does not significantly affect sports success, and can even have a negative impact on sports success [22–24].

Certain limitations of the present study could have influenced the final results. Firstly, the obtained results were based on a relatively small sample of athletes ($n = 30$), and the two sub-groups were not equinumerous. Almost two-thirds of the surveyed players competed in the second league with the remaining one-third belonged in the first league. In addition, as was already mentioned earlier, the different ratio of high-pointers to low-pointers in both groups (first and second league) could have affected the final results of this study.

Conclusions

The findings suggest that the SASS-WR scale can serve as a valuable diagnostic tool in assessing sports success among WR players. The present-day process of professionalizing sports for athletes with disabilities in Poland, in particular WR, requires reliable tools to assess not only the physiological, motor, and technical parameters of its players but also assess their psychological make-up, as all of these factors constitute the ability of team to achieve sports success. Future research should confirm the SASS-WR scale's psychometric properties on a larger group of athletes and verify its sensitivity with regard to differences in the competitive level of both the participants and their teams. It would also be useful to assess whether the SASS-WR scale can serve as a reliable tool for assessing WR players from other European countries.

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Appendix: SASS-WR scale**SUBJECTIVE ASSESSMENT OF SPORTS SUCCESS IN WHEELCHAIR RUGBY (SASS-WR)**

This questionnaire is designed to assess how wheelchair rugby players perceive sports success. Please rate how important the following statements are to you on a scale of 1 (completely unimportant) to 5 (extremely important).

Sports success in wheelchair rugby means to me... (please circle your answer):

1. Qualifying to be a player on my wheelchair rugby team's roster	1	2	3	4	5
2. Selected by the coach to play in a game	1	2	3	4	5
3. Qualifying to be a player on the wheelchair rugby national team	1	2	3	4	5
4. Team being highly ranked in a PWRL tournament	1	2	3	4	5
5. Team being highly ranked in PWRL overall classification	1	2	3	4	5
6. Team advancing to a higher group in PWRL	1	2	3	4	5
7. Team winning first place in the European Championships	1	2	3	4	5
8. Team qualifying for the World Championships	1	2	3	4	5
9. Team winning first place in the World Championships	1	2	3	4	5
10. Achieving social prestige	1	2	3	4	5
11. Developing social contacts	1	2	3	4	5
12. Improving my fitness level	1	2	3	4	5

* PWRL – Polish Wheelchair Rugby League

INSTRUCTIONS FOR RESEARCHERS

The SASS-WR has four dimensions, measuring:

- I. INDIVIDUAL SPORTS SUCCESS OF THE PLAYER (Statements No. 1–3)
- II. NATIONAL SPORTS SUCCESS OF THE TEAM (Statements No. 4–6)
- III. INTERNATIONAL SPORTS SUCCESS OF THE TEAM (Statements No. 7–9)
- IV. SOCIAL AND PERSONAL SUCCESS OF THE PLAYER (Statements No. 10–12)

The responses that fall under each dimension need to be summed up (their numerical value).

A higher score (range: 3–15 points) indicates the greater importance of this component (dimension) for a player's subjective perception of sports success in wheelchair rugby.