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Jan Blecharz *
Karolina Horodyska **
Karolina Zarychta **
Aleksandra Adamiec *
Aleksandra Luszczynska ***

Intrinsic Motivation Predicting Performance Satisfaction in Athletes: Further Psychometric Evaluations of the Sport Motivation Scale-6

Abstract: *The study investigated psychometric properties of the Sport Motivation Scale-6 (SMS-6), assessing intrinsic regulation, four extrinsic regulation constructs, and amotivation among athletes competing at a regional and national level. In particular, we tested the factorial structure of SMS-6, its short-term stability, and the associations of SMS-6 constructs with self-efficacy, self-esteem, motivational climate, and satisfaction with sport performance. Participants were 197 athletes (57.4% women), representing team (54.7%) and individual disciplines. The measurement was repeated at the three-week follow-up (n = 107). Results yielded support for the six first-order factor structure (three second-order factors). More autonomous forms of motivation were related to higher levels of self-efficacy, performance satisfaction, and task-oriented motivational climate in sport organizations. Sequential multiple mediation analysis showed that the association between general self-efficacy and performance satisfaction at a follow-up was mediated by introjected regulation and personal-barrier self-efficacy.*

Key words: *sport, intrinsic motivation, self-determination theory, self-efficacy, satisfaction, psychometric characteristics*

Introduction

Self-determination theory (SDT) offers a framework explaining human motivation to undertake a specific task through qualitatively different types of motives (Ryan & Deci, 2000). The theory assumes that human behavior is undermined by the fulfillment of needs, sell-actualization, and full realization of one's own potential, hence leading to the satisfaction with tasks at hand (Ryan & Deci, 2000). SDT proposes two layers of constructs, which guide human actions. The first layer refers to a distinction between *amotivation*, *extrinsic*, and *intrinsic* motivation. When referring to physical activity or sport participation, amotivation represents a lack of willingness to engage in sport. Amotivation results from low self-efficacy and expectations of unsatisfactory outcomes (Ryan & Deci, 2000). Extrinsic motivation refers to acting for instrumental reasons or to obtain outcomes which are distinct from sport activity itself (e.g., gaining social recognition). Intrinsic motivation refers to engaging in an activity because of the inherent enjoyment and inherent satisfaction of the activity itself (Ryan & Deci, 2000). SDT assumes a second layer of motivation constructs, which is characteristic for extrinsic motivation only (Ryan & Deci, 2000). In particular, extrinsic motivation includes four distinct motivation constructs, which differ in terms of autonomous motives of regulation. *External regulation* represents motivation which is the least autonomous form; behaviors guided by external regulation are performed to satisfy purely external demands or are reward-contingent (Ryan & Deci, 2000). *Introjected regulation* is another form of extrinsic regulation which is guided by limited autonomous motives. Actions fuelled by introjected regulation are undertaken to attain ego enhancement. Thus, introjected motivation represents regulation which is self-esteem-contingent (Ryan & Deci, 2000). *Identified regulation* is a form of motivation which is more autonomous; actions dependent on identified regulation are considered personally important and valued. Finally, the last form of extrinsic motivation is called *integrated regulation*; it occurs when actions are in congruence with one's values and needs. Still, the actions are undertaken because separate outcomes are expected (Ryan & Deci, 2000).

*** University School of Physical Education in Cracow**
**** University of Social Sciences and Humanities**
***** Trauma, Health, and Hazards Center, University of Colorado at Colorado Springs, 1861 Austin Bluffs Pkwy, Colorado Springs, CO, 80918, USA; aluszczy@uccs.edu**

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SDT-Based Sport Motivation and Sport-Related Outcomes

SDT is frequently used in sport and exercise research to explain or predict sport/physical activity performance. Recent systematic reviews showed consistent positive associations between more autonomous forms of motivation and exercise participation (Teixiera, Carraca, Markland, Silva, & Ryan, 2012). Further, intrinsic motivation turned out to be the best predictor of a long-term engagement in physical activity (Teixiera et al., 2012). Meta-analyses of research conducted in exercise and sport context confirmed the existence of a self-determination continuum, ranging from external regulation to introjection and identification (Chatzisarantis, Hagger, Biddle, Smith, & Wang, 2003).

Research conducted in the context of sport and physical activity points to associations between intrinsic motivation and motivational climate in sport organization, sport-related behaviors (such as training participation), emotions, sport performance, and satisfaction. Longitudinal and cross-sectional research conducted in sport contexts shows that intrinsic motivation of team athletes is related to task-oriented motivational climate in sport organization (Alvarez, Balaguer, Castillo, & Duda, 2012; Iwasaki & Fry, 2013; Joesaar, Vello, & Hagger, 2011). Task-involving motivational climate emphasizes personal improvement and satisfaction from individual development (Newton et al., 2000). Furthermore, ego-involving climate (which focuses on external incentives in sport) is negatively related to intrinsic motivation (Iwasaki & Fry, 2013). Athletes with higher intrinsic motivation are more persistent in training (Joesaar et al., 2011). Intrinsic motivation is a strong predictor of sport-related outcomes such as subjective vitality (Alvarez et al., 2012), future intention to play respective sports (Alvarez et al., 2012; Iwasaki & Fry, 2013), interest and enjoyment (Iwasaki & Fry, 2013), sense of freedom, euphoria, and satisfaction (Seifert & Hedderson, 2010), lower levels of tension and pressure (Iwasaki & Fry, 2013). Intrinsic motivation is also related to objectively measured all-year performance among major league baseball and basketball players (White & Sheldon, 2014). Further, more autonomous forms of sport motivation (intrinsic, identified, and integrated regulation) are related to better performance under pressure (Mouratidis & Michou, 2011). Intrinsic forms of motivation have been proven to predict the quality of performance (for meta-analysis, see: Cerasoli, Nicklin & Ford, 2014). Extrinsic motives are weaker, but also significant predictors of performance (Cerasoli et al., 2014). Finally, intrinsic motivation may predict satisfaction-related outcomes (Martin-Albo, Nunez, Domingues, Leon, & Tomas, 2012).

Sport Motivation and Self-Efficacy Beliefs

In general, more autonomous forms of sport motivation (intrinsic, identified, and integrated regulation) are related to higher self-confidence (Mouratidis & Michou, 2011). Perceived competence or beliefs in athlete's own efficacy are assumed to act as *predictors* of intrinsic motivation (Matosic, Cox, & Amorose, 2014). This approach is in line with SDT which suggests that perceived competence and self-efficacy beliefs are foundations of intrinsic motivation. This approach, however, is based on the assumption that self-efficacy is a trait-like, stable characteristic (e.g., Prabhu, Sutton, & Sauser, 2008). Trait-like general self-efficacy (GSE) represents beliefs about their ability to cope across taxing situations (Luszczynska, Scholz, & Schwarzer, 2005). It may be assumed that this type of self-efficacy beliefs may constitute a self-regulatory resource of autonomous motivation constructs.

On the other hand, Social Cognitive Theory (SCT; Bandura, 1997) suggests that self-efficacy beliefs are the most proximal determinants of behavior and well-being-related outcomes. Self-efficacy beliefs, which are specific for the outcome (e.g., performance-related variables) and barriers hindering performance in sport, are assumed to extend their effects on sport outcomes beyond the effects of motivational variables (Blecharz, Luszczynska, Scholz, et al., 2014; Blecharz, Luszczynska, Tenenbaum, Scholz, & Cieslak, 2014). Thus, in line with SCT, sport-specific self-efficacy is proximal to sport outcomes. Those type of efficacy beliefs should operate as mediators between intrinsic motivation and performance in sport. Indeed, research found that self-efficacy mediates between intrinsic motivation and performance outcomes (Liang & Chang, 2014). Concluding, the associations between self-efficacy and intrinsic motivation may be twofold. More general beliefs (e.g., GSE) may predict intrinsic motivation. Intrinsic motivation, in turn, may predict more specific self-efficacy which reflects athlete's confidence in their ability to deal with barriers in sport environment and relationships.

Measurement of Motivation in Sport: Sport Motivation Scale-6

The six motivation constructs are widely used in the sport and exercise research and they have been measured by the Sport Motivation Scale (SMS) for two decades (Li & Harmer, 1996; Pelletier et al., 1995). The original version of SMS distinguished intrinsic motivation to know, to accomplish, and to experience stimulation, but it did not measure integrated regulation in sport (Pelletier et al., 1995). The newer versions of SMS, called Sport Motivation Scale-6 (Mallet, Kawabata, Newcombe, Otero-Forero, & Jackson, 2007), assesses six motivation constructs; the six-construct structure is in line with SCT (Ryan & Deci, 2000). The factorial structure of SMS-6 was found to be in line with SDT (Kawabata & Mallet, 2013; Mallet et al., 2007).

The psychometric evaluations of SMS-6 have some limitations. They were conducted among people with a wide range of sport participation, but dominated by recreational athletes or individuals competing at the state level or club/school levels (Kawabata & Mallet, 2013; Mallet et al., 2007). The evaluations of SMS-6 properties among athletes competing at the regional (or higher) level are pending. The stability of the SMS-6 was not tested. Besides confirmations of its factorial structure, the validity of SMS-6 is unclear. The present study aims at filling this void.

Study Aims

This study aimed at evaluating psychometric properties of SMS-6 among athletes competing at the regional and national level. The factorial structure of the scale, the stability, and validity of SMS-6 would be investigated. The validity of SMS-6 would be tested in the context of self-efficacy, self-esteem, perceived motivational climate, and performance satisfaction. In particular, as suggested in SDT (Ryan & Deci, 2000) it was assumed that (1) as the autonomous aspect of the motivation increases, the associations between the motivation variables and validation variables (performance satisfaction and task-oriented motivational climate) would increase; (2) ego-involving motivational climate (focusing on external incentives in sport) would be associated with external regulation; (3) high self-esteem would relate to introjected regulation, because introjected regulation is contingent with self-esteem.

Finally, it was hypothesized that performance satisfaction at the three-week follow-up would be predicted by general self-efficacy, with intrinsic motivation and personal-barrier self-efficacy (specific for athletes' daily functioning) operating as the sequential mediators.

Method

Participants and Procedures

The sample consisted of 197 professional athletes, with 113 women (57.4%). Participants were 16 to 43 years old (M = 21.77, SD = 3.71). All of the participants were competing at the national level. They were representing team disciplines, including basketball (45.4%), volleyball (8.8%), soccer (5.2%), and hockey (0.5%); combat sports, such as karate or Taekwon-do (7.7%); track and field (17.5%); other individual disciplines such as swimming (5.7%), gymnastics (2%); and winter individual sports, including biathlon, speed skating, and snowboard (7.2%). They were in training between 2 and 29 years (M = 9.42, SD = 4.50). Hours of training weekly in the week prior to the assessment varied from 7 to 54 (M = 11.81, SD = 7.11). Among those engaged in team sports, 53% were playing in the first and 46.5% in the second league.

The study was approved by the Institutional Review Board. Data were collected individually, in professional clubs, sports clubs and organizations in central and southern Poland. Both waves of data collection took place at the beginning of the season. The experimenters sought for potential respondents from individual and team disciplines, Olympic and non-Olympic sports, winter and other types of sports. After obtaining permissions and support from the club or organization representatives, experimenters approached athletes without current contusion. Sport psychologists invited potential participants and presented the study aims and conditions. Informed consents were obtained. Those who agreed filled out the questionnaires. The procedures were repeated 3 weeks later (Time 2; T2). A total of 197 athletes participated at Time 1 (T1), whereas 106 (53.8%) took part at T2.

Measures

Sport Motivation. Sport Motivation Scale- 6 (SMS-6; Mallet et al., 2007), a six-factor measure was translated using decentering technique (Triandis & Brislin, 1984). With 24 items (4 items per construct) SMS-6 is a parsimonious measure, consistent with SDT (Mallet et al., 2007). The six scales, included in SMS-6, assess six constructs: amotivation, external regulation, introjected regulation, identified regulation, integrated regulation, and intrinsic motivation. The items (the original and Polish versions) for each scale are displayed in Table 1.

At Time 1 and Time 2 respondents were asked to indicate to what extent each of the following items corresponds to one of the reasons for which they were practicing their sport. Responses are given on 7-point scale, ranging from 1 (does not correspond at all) to 7 (corresponds exactly). Reliability and descriptive statistics are displayed in Table 1.

General self-efficacy. General self-efficacy was assessed at T1 with the General Self-Efficacy Scale (Luszczynska et al., 2005). This 10-item scale evaluates general beliefs about ability to cope with various barriers (e.g., "I can always manage to solve difficult problems if I try hard enough"). The responses range from 1 (definitely not) to 4 (exactly true). The scale had good reliability, α = .85; the mean item response was 3.11 (SD = 0.40).

Personal barriers self-efficacy. The 4-item personal-barriers self-efficacy scale assesses athletes' ability to deal with personal barriers (Blecharz, Luszczynska, Tenenbaum et al., 2014). The scale was used at T1. The stem "I am able to improve my sport performance and invest more effort during training and competition even if" is followed by the items: (a) "I have problems at home"; (b) "I am stressed due to personal problems"; (c) "I have difficulties with focusing my attention at tasks"; and (d) "I feel criticized by friends/family". The responses are given on a 5-point rating scale (1- definitely not, 5 - completely true). The scale had satisfactory reliability, α = .71, with the mean item response of 3.32 (SD = 0.77).

Self-esteem. Self-esteem scale (Rosenberg, 1986) was applied at T1. The scale has 10 items ("I wish I could have more respect for myself"), with responses ranging from 1 (definitely not) to 4 (exactly true). In the present study the scale had good reliability, α = .82. The mean item response was 3.11 (SD = 0.40).

Satisfaction with performance. Satisfaction with sports performance was measured at T1 and T2 with a 5-item scale developed by Balaguer, Duda, Atienza, & Mayo (2002). The scale assesses perceptions of improvement in technical, tactical, physical, psychological, and overall athlete's performance within two weeks prior to the measurement. Responses are given on a 7-point scale, ranging from 1 (completely dissatisfied) to 7 (very satisfied). The scale had high reliability (T1: α = .91, T2, α = .93). The mean item response was similar at both measurement point, with T1 mean of 4.24 (SD = 1.04) and T2 mean of 4.26 (SD = 0.96).

Motivational climate. Task- and ego-involving motivational climate in the organization (Newton

Table 1. The SMS-6 Subscales, Items, Factor Loadings in Confirmatory Factor Analysis (CFA) and Exploratory Factor Analysis (EFA), Reliability Coefficients and Descriptive Statistics.

Number of item in original measure, item content (English and Polish), and hypothesized subscales	Factor loading in CFA (T1)	Factor loading EFA (T1)	α T1/T2	T1: M (*SD*)	T2: M (*SD*)
Intrinsic Motivation				5.11 (1.08)	5.18 (1.14)
1. For the excitement I feel when I am really involved in the activity (Dla podniecenia jakie czuję, kiedy jestem w pełni zaangażowany w sport)	.43	.67			
6. Because I feel a lot of personal satisfaction while mastering certain difficult training techniques (Ponieważ odczuwam dużą satysfakcję , kiedy doskonalę trudne techniki treningowe)	.68	.72			
14. For the satisfaction I experience while I am perfecting my abilities (Dla satysfakcji jaką odczuwam, kiedy doskonalę swoje umiejętności)	.81	.75			
18. For the pleasure of discovering new performance strategies (Dla przyjemności z odkrywania nowych strategii wykonania)	.62	.47			
Integrated Regulation			.69/.80	5.52 (1.03)	5.50 (1.05)
2. Because it's part of the way in which I've chosen to live my life (Ponieważ to część wybranej przeze mnie drogi życiowej)	.43	.64			
9. Because it is an extension of me (Ponieważ sport pozwala mi się rozwijać)	.77	.35			
13. Because participation in my sport is consistent with my deepest principles (Ponieważ uprawianie sportu jest zgodne z moimi zasadami życiowymi)	.59	.41			
21. Because participation in my sport is an integral part of my life (Ponieważ uprawianie sportu jest/ stanowi nieodłączną częścią mojego życia)	.55	.52			
Identified Regulation			.61/.65	4.97 (1.00)	5.11 (0.95)
3. Because it is a good way to learn lots of things which could be useful to me in other areas of my life (Ponieważ to dobry sposób na nauczenie się rzeczy, które mogą być przydatne w innych sferach mojego życia)	.48	.69			
8. Because it is one of the best ways I have chosen to develop other aspects of my life (Ponieważ to jeden z najlepszych sposobów, by się rozwijać i doskonalić siebie)	.79	.66			
15. Because it is one of the best ways to maintain good relationships with my friends (Ponieważ to jeden z najlepszych sposobów na utrzymanie dobrych relacji z przyjaciółmi)	.48	.43			
20. Because training hard will improve my performance (Ponieważ ciężki trening poprawi moje wyniki)	.49	.39			
Introjected Regulation			.81/.82	5.24 (1.25)	5.20 (1.19)
7. Because it is absolutely necessary to do sports if one wants to be in shape (Ponieważ jest to absolutnie niezbędne, by utrzymać dobrą formę fizyczną)	.71	.66			
10. Because I must do sports to feel good about myself (Ponieważ muszę ćwiczyć, aby czuć się dobrze)	.75	.78			
16. Because I would feel bad if I was not taking time to do it (Ponieważ źle bym się czuł, jeśli nie poświęcałbym czasu na sport)	.72	.82			
23. Because I must do sports regularly (Ponieważ muszę uprawiać sport regularnie)	.74	.71			
External Regulation			.78/.79	3.59 (1.46)	3.88 (1.39)
4. Because it allows me to be well regarded by people that I know (Gdyż pozwala mi to być lepiej docenionym przez ludzi, których znam)	.70	.75			
11. For the prestige of being an athlete (Bo bycie sportowcem jest prestiżowe)	.73	.80			
19. For the material and/or social benefits of being an athlete (Dla celów materialnych lub/ i społecznych korzyści płynących z bycia sportowcem)	.53	.40			
24. To show others how good I am at my sport (Aby pokazać innym jak dobry jestem w mojej dyscyplinie)	.80	.77			
Amotivation			.85/ .69	2.38 (1.39)	2.64 (2.03)
5. I don't know anymore; I have the impression of being incapable of succeeding in this sport (Już nie wiem; mam wrażenie, że nie odniosę sukcesów w sporcie)	.60	.75			
12. I don't know if I want to continue to invest my time and effort as much in my sport anymore (Nie wiem czy nadal chcę wkładać tak wiele czasu i wysiłku w uprawianie sportu)	.81	.77			
17. It is not clear to me anymore; I don't really think my place is in sport (Już nie jest dla mnie jasne; nie wydaje mi się, by moje miejsce było w sporcie)	.82	.70			
22. I don't seem to be enjoying my sport as much as I previously did (Wydaje mi się, że sport nie sprawia mi już takiej radości jak dawniej)	.81	.43			

et al., 2000) was measured at T1. Because athletes were representing team and individual disciplines, the stem 'on this team' was replaced with 'in our club/sport organization'. Task-involving climate scale includes 17 items (e.g., "In our club/sport organization the coach emphasized always trying your best"). Responses are given on a scale ranging from 1 (definitely not) to 5 (exactly true). The scale had high reliability (α = .91), with mean item response of 3.70 (*SD* = 0.75). The scale assessing ego-involving climate in organization has 16 items (e.g., "In our club/sport organization players are afraid to make mistakes"). This measure had high reliability (α = .84), with the mean item response of 3.06 (*SD* = 0.74).

Data Analysis

Factorial structure of the SMS-6 was tested with confirmatory factor analysis, conducted with structural equation modelling. Evaluation of model-data fit was based on Tucker-Lewis Index (TLI), Comparative Fit Index (CFI), Root Mean Square Error of Approximation (RMSEA), and χ^2/df. The following values indicate an acceptable fit: TLI, CFI, values above .90, RMSEA values of .08 or less, and χ^2/df between 1 and 3 (Byrne, 2009).

Mediation analysis was conducted applying MacKinnon's (2008) assumptions of two essential steps in establishing mediation: (1) the independent variable should be related to the mediator(s) and (2) the mediator(s) should be associated with the outcome variable. The present study uses two measurement points. In line with suggestions by MacKinnon (2008) and previous research on multiple sequential mediators (see Shoji et al., 2014; Zarychta, Luszczynska, & Scholz, 2014) the dependent variable was measured at a different time point (i.e., at T2) than the independent and mediator variables (assessed at T1).

To test the mediation hypothesis, multiple sequential mediation analyses was performed using PROCESS (Hayes, 2012). PROCESS (Model 6) permits conducting multiple mediator regression analysis, accounting for covariates as well as for testing hypotheses, assuming that mediators are chained together in a specific sequence (e.g., general self-efficacy stress [the independent variable] predicts intrinsic motivation [the first mediator], which in turn predicts personal-barriers self-efficacy [the second mediator], which predicts performance satisfaction [the dependent variable]). Results of analyses are presented using two types of coefficients. A regression coefficient for each parameter is provided (see Figure 1). Further, PROCESS estimates the indirect effect coefficient (*B*) for each indirect pathway between the independent variable (STS at T1) and the dependent variable (performance satisfaction at T2), accounting for respective mediators and covariates. These indirect pathway coefficients are presented in Table 3. Bootstrapping method was used to test inferences about the significance of mediation effects (*B* coefficients). The bootstrap approach is considered superior to normal theory-based Sobel's test for the significance of the mediation (Hayes, 2012).

To account for data non-normality, analyses were performed with bootstrapping with 5,000 resamples. Power analysis indicated that assuming *p* levels of .05, medium effect sizes, and accounting for up to four variables in the equation the longitudinal sample should include 100 participants. Variance inflation factor (VIF) values (≤ 1.80) and tolerance level values (above .51 in all analyses), indicated that multicollinearity was not a problem in these data. Missing data for completers (1.7%) were imputed with the Expectation Maximization algorithm.

Results

Preliminary Analyses

Athletes from team and individual disciplines did not differ in age, $F(1, 195) = 1.27$, $p = 0.262$, or years of training, $F(1, 195) = 3.80$, $p = 0.130$, but these involved in individual sports trained more hours per week ($M = 14.25$, $SD = 7.09$) than athletes training team sports ($M = 10.36$, $SD = 6.74$), $F(1, 195) = 13.65$, $p < .001$, Cohen's $d = 0.57$. Men and women did not differ in terms of age $F(1, 195) = 0.12$, $p = .735$, number of years in training, $F(1, 195) = 0.01$, $p = .919$, or weekly hours of training, $F(1, 195) = 0.78$, $p = .380$. Age was unrelated to hours of training daily ($r = -.13$, $p = 0.71$) or league level ($r = -.05$, $p = .927$), but it was related to years in training ($r = .71$, $p < .001$).

Attrition analysis indicated that completers and drop-outs did not differ in socio-demographic characteristics, years of training, or weekly hours of training (all *ps* > .203). They did not differ in terms of any of the SMS-6 measures (all *ps* > .197), performance, or self-efficacy assessments (all *ps* > .512). In sum, drop-out was not systematic.

Factorial Structure of SMS-6

The factorial structure of the Polish version of SMS-6 was tested using T1 data ($N = 197$). Exploratory factor analysis (rotation Oblimin) revealed six factors with eigenvalues over 1, which explained a total of 64.3% of variance. All items loaded their respective factors (loadings from .41 to .82), except for two items (one item of integrated regulation scale and one of identified regulation scale; see Table 1). However, in those two cases the item loadings for hypothesized factors were moderate in size (> .34).

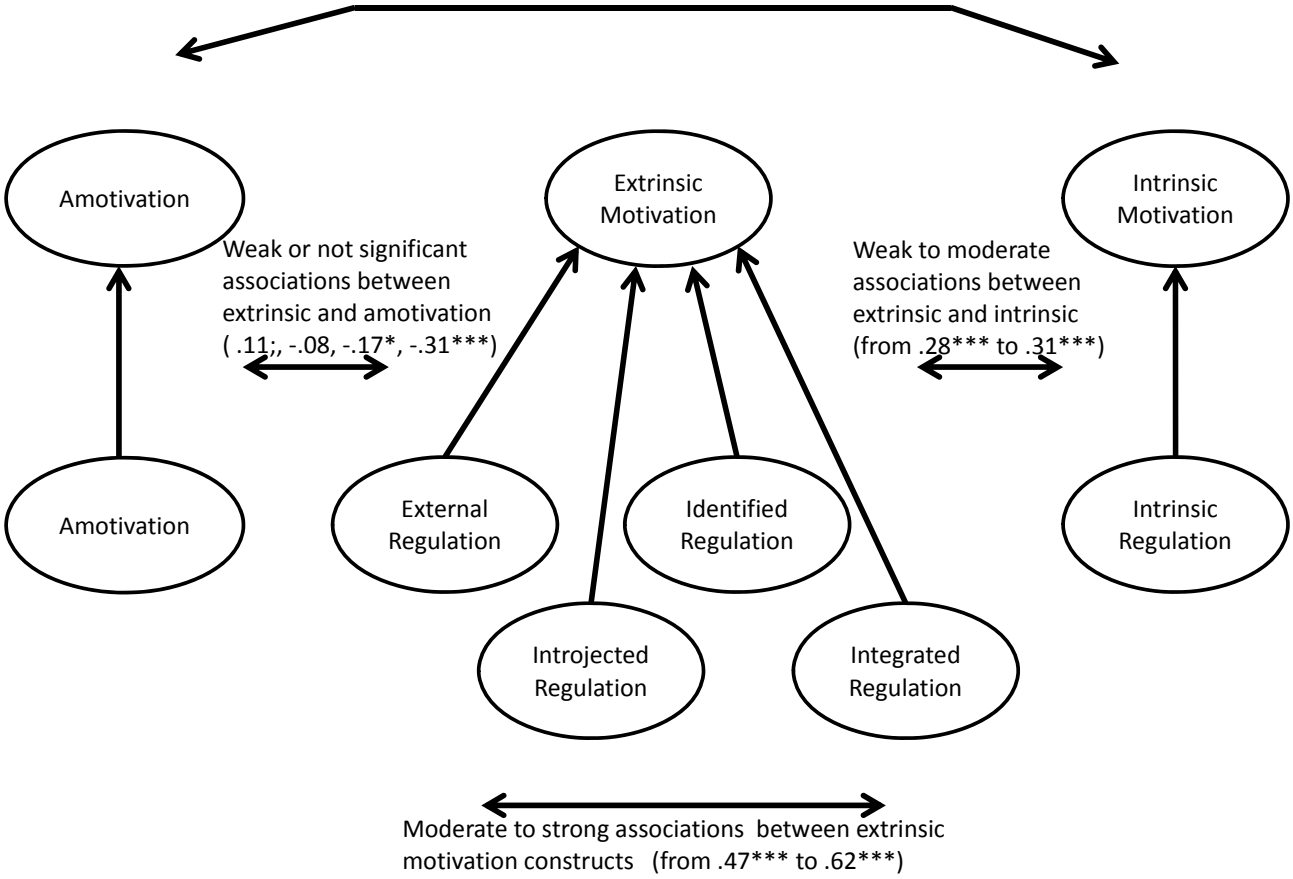
Next, we performed confirmatory factor analysis with structural equation modelling. The hypothesized model assumed six first-order latent variables. The latent variables of the first order were loaded by their respective items. The four latent variables representing extrinsic motivation (integrated regulation, identified regulation, introjected regulation, and external regulation) were assumed to form the second-order latent variable (see Ryan & Deci, 2000). The first-order latent variables were assumed to covary. Confirmatory factor analysis showed acceptable model-data fit, with $\chi 2/df = 2.11$, $p = 0.011$, CFI = 0.90, TLI = 0.91, RMSEA = 0.069. All observed variables loaded their respective latent variables, representing the six scales of SMS-6 (see Table 1). Thus, it may be concluded that the data collected with the Polish version of SMS-6 fit the hypothesized factorial structure.

Table 2. Associations Across Sport Motivation Constructs and Relationships Between SMS-6 Variables and the Validation Variables

	2	3	4	5	6	General self-efficacy (T1)	Self-esteem (T1)	Task-involving climate (T1)	Ego involving climate (T1)	Hours of training weekly (T1)	Years of training (T1)	Performance satisfaction (T1)	F test for 1st vs 2nd league (*p*)	F test for Men vs women (*p*)
Intrinsic motivation (T1)	.31***	.31 ***	.30***	.28***	-.23**	.34***	.11	.20*	.07	.01	.11	.28***	0.86 (.360)	1.16 (.283)
Integrated regulation (T1)		.62***	.58***	.46***	-.31***	.17*	.09	.18*	.07	.11	.12	.24***	0.19 (.668)	1.05 (.323)
Identified regulation (T1)			.55***	.48***	-.17*	.18*	.12	.12	.04	.11	.08	.19*	0.76 (.387)	1.66 (.1999)
Introjected regulation (T1)				.47***	-.08	.09	.19*	.07	.06	.05	.07	.11	2.32 (.135)	0.55 (.457)
External regulation (T1)					.11	.10	.02	.08	.18*	.11	.01	.11	0.64 (.430)	14.24 (< .001)[a]
Amotivation (T1)						-.21**	-.11	-.24***	.31***	.11	-.03	-.35***	3.27 (.078)	1.66 (.199)

* $p < .05$, ** $p < .01$, *** $p < .001$; a – men scored higher than women on external regulation (men: $M = 4.04$, $SD = 1.47$; women $M = 3.27$, $SD = 1.36$)

Figure 1. Six Sport Motivation Variables and the Associations Between the Variables in Professional Athletes (*N* = 191).



Note:* - significant for bias-corrected 95% CI.

Table 3. Mediating Effects of Intrinsic motivation (Mediator 1) and Personal-Barriers Self-Efficacy (Mediator 2) in the Relationship between General Self-Efficacy (Time 1) and Performance Satisfaction (Time 2)

Direct and Indirect Effects Pathways	*B*	*SE*	BC 95% CI	
			Lower	Higher
Direct effects pathway				
General Self-Efficacy (T1) → Performance Satisfaction (T2)	.229	.443	-.520	.978
Indirect effect pathways				
General Self-Efficacy (T1) → Intrinsic motivation (T1) → Performance Satisfaction (T2)	-.008	.166	-.337	.211
General Self-Efficacy (T1) → Personal-Barriers Self-Efficacy (T1) → Performance Satisfaction (T2)	-.243	.130	-.951	.128
General Self-Efficacy (T1) → Intrinsic motivation (T1) → Personal-Barriers Self-Efficacy (T1) → Performance Satisfaction (T2)	.198	.130	.051	.623

Note: Values of indirect effect coefficient (*B*) presented in bold are significant. Each bootstrap was based on 5,000 repetitions. Bias corrected (BC) confidence intervals (CI) that do not include zero indicate a significant indirect effect. T1 = Time 1; T2 = Time 2.

Associations Across the Six Sport Motivation Constructs

As proposed by Ryan and Deci (2000) it was expected that associations between intrinsic motivation and any extrinsic motivation constructs would be weaker than the associations found among the extrinsic motivation constructs (i.e., integrated regulation, identified regulation, introjected regulation, and external regulation). Next, intrinsic motivation, extrinsic motivation, and amotivation were expected to form three distinct types of constructs (see Figure 1).

Table 2 yields associations between the sport motivation constructs. We found that the associations between intrinsic motivation and four extrinsic motivation constructs were weaker (or tended to be weaker) than associations among the four extrinsic motivation constructs (all Zs > 1.68, ps < .093). Further, the associations between amotivation and five remaining motivation constructs were significantly different than the associations found among five remaining constructs measured with SMS-6 (all Zs > 1.73, ps < .083). In particular, amotivation was either negatively associated or unrelated with intrinsic and extrinsic motivation (Figure 1). In sum, a distinctive pattern of associations was found. Extrinsic motivation constructs are moderately correlated with each other; they are also weakly associated with intrinsic motivation. Amotivation, in turn, forms either negative or non-significant relationships with other sport motivation constructs.

Stability, Reliability, and Validity of SMS-6

Stability. The analyses of the stability of the sport motivation constructs were conducted in a group of 106 athletes, participating at T1 and T2 (conducted three weeks later). Following associations were found: intrinsic motivation, r = .77 (p < .001), integrated regulation, r = .67 (p < .001), identified regulation, r = .68 (p < .001), introjected regulation, r = .69 (p < .001), external regulation r = .81 (p < .001), and amotivation r = .51 (p < .001). It has to be noted that the stability of amotivation scale tended to be weaker (compared to integrated regulation and identified regulation; all Zs > 1.68, ps < .09) or it was significantly weaker than the stability of the other constructs, all Zs > 1.94, ps < .05.

Reliability. Table 1 displays reliability coefficients of the six sport motivation scales. All scales had satisfactory reliability, taking into account that every scale included only four items. Mean interim correlation (John & Benet-Martinez, 2000) for each scale was between .32 and .55 which indicates moderate to high content saturation.

The validity of SMS-6. In line with SDT, it was assumed that intrinsic motivation would be related to higher general self-efficacy and task-oriented motivational climate and to lower levels of ego-oriented motivational climate. It was expected that associations between extrinsic motivation and self-efficacy would be weaker than associations between intrinsic motivation and GSE. Amotivation, in turn, was hypothesized to form significant negative associations with self-efficacy. Further, introjected motivation was expected to relate to self-esteem; this association was expected to be stronger than associations between self-esteem and other motivation constructs. Finally, intrinsic motivation was expected to form the strongest associations with performance satisfaction, compared to the associations between extrinsic motivation/amotivation and performance satisfaction.

The associations between six sport motivation constructs and respective validation constructs are presented in Table 2. Comparing the associations between the SMS-6 constructs and constructs used in validation analyses, we found several significant differences in correlations (Table 2). First, general self-efficacy was stronger related with internal motivation than with the external motivation variables (all Zs > 1.68, ps ≤ .093). The GSE—intrinsic motivation association differed significantly (Z = 5.69, p < .001) from the association between GSE and amotivation. High self-esteem was significantly related to introjected regulation only. The association between intrinsic motivation and satisfaction tended to be stronger than associations between external motivation and satisfaction (all Zs > 1.71, ps < .088). Further, the intrinsic motivation—satisfaction association was significantly different than the amotivation—satisfaction association (Z = 6.37, p < .001).

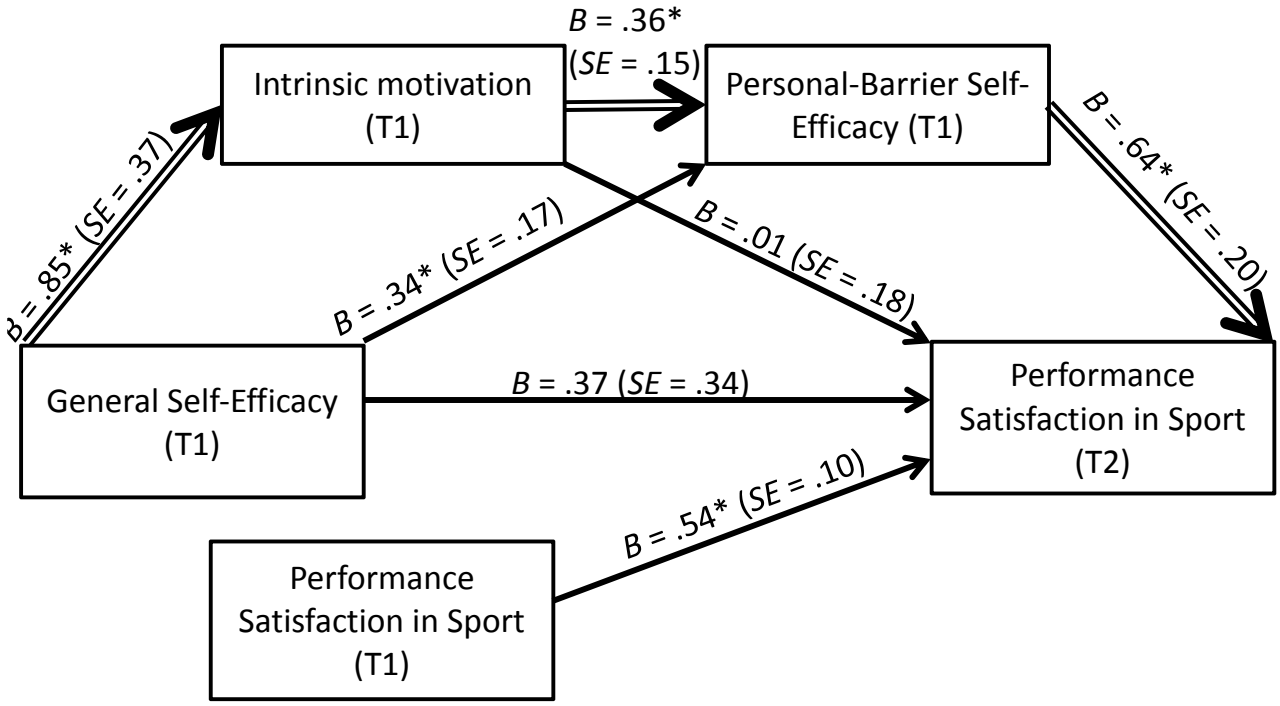
Next, we analyzed associations between athletes' sport motivation and motivational climate in their sport organizations (Table 2). Task-involving motivational climate in sport organization was related to higher levels of internal motivation variables (intrinsic motivation and integrated regulation), but it was related to lower levels of amotivation, all Zs > 4.25, ps < .001. In contrast, ego-involving motivational climate was moderately related to higher levels of amotivation and external regulation, whereas the association between ego-involving climate and internal motivation were significantly weaker, all Zs > 2.45, ps < .015.

There were few significant associations between six sport motivation constructs and sociodemographics or sport-related variables. The six sport motivation constructs were unrelated to age (all rs <.016, ps < .114) or gender, except for men scoring higher than women in external regulation (Table 2). The years of training and hours of training weekly were unrelated to the six sport motivation constructs (Table 2). Athletes from individual and team sports did not differ in sport motivation constructs, all Fs < 2.29, ps > .132. Comparisons of team athletes from the first and second leagues of their respective sports indicated no differences in five intrinsic and extrinsic motivation constructs, Fs < .230, ps > .135, but the first league athletes showed lower amotivation (M = 2.28, SD = 1.17) than those from the second league (M = 3.37, SD =1.23), F(1, 83) = 5.57, p = .001, η2 = .369.

Intrinsic Motivation as the Predictor of Satisfaction with Sport Performance

In the next analyses we investigated whether sport performance (T2) may be predicted by intrinsic motivation (T1). The multiple sequential mediator analysis was conducted with GSE (T1) representing the independent variable, which operates through two chain mediators, that is intrinsic motivation (Mediator 1; T1) and personal-barriers

Figure 2. Intrinsic Motivation (Mediator 1, T1) and Personal-Barrier Self-Efficacy (Mediator 2; T1) as Mediators in the Relationship Between General Self-Efficacy (T1) and Performance Satisfaction (T2): The Results of Mediation Analysis in a Longitudinal Sample of Professional Athletes (N = 106).



Note: T1 – Time 1, T2 – Time 2 (3-week follow up). Unstandardized coefficients and standard errors are provided. Double line represents the significant indirect effects.

self-efficacy (Mediator 2; T1), predicting performance satisfaction (T2; the dependent variable). Performance satisfaction at T1 was controlled for in the mediation analysis.

Figure 2 displays the results of mediation analysis. Higher GSE (T1) was related to higher intrinsic motivation (T1). Further, personal-barrier self-efficacy (T1) was explained by higher GSE (T1) and higher intrinsic motivation (T1). Finally, neither GSE (T1), nor intrinsic motivation (T1) predicted performance satisfaction at T2. However, higher personal-barrier self-efficacy (T1) was related to higher levels of performance satisfaction at T2.

The indirect effects coefficients are displayed in Table 3. In particular, we found that the mediation pathway, representing the single mediation of intrinsic motivation in the relationship between GSE and performance satisfaction was not significant (Table 3). Similarly, the other single-mediator pathway, with personal-barrier self-efficacy mediating the effects between GSE and satisfaction was not significant. However, we found a significant two-mediator pathway, assuming that the GSE--satisfaction association was mediated by intrinsic motivation (Mediator 1), linked to personal-barriers self-efficacy (Mediator 2) (Table 3). Overall, the variables included in the model predicting performance satisfaction (T2) explained 57% of variance, $F(4, 101) = 9.95$, $p < .001$. In sum, the analyses indicated a significant indirect effect of sequential mediators (intrinsic motivation and personal-barriers self-efficacy) in the association between GSE and performance satisfaction in athletes.

Discussion

The present study provides novel evidence confirming the structure of SMS-6, its reliability, validity, and the short-term stability among athletes. Our research used the Polish version of the scale, therefore the results offer additional corroboration of the psychometric properties of a language version. Further, the results were obtained among athletes, involved in team and individual disciplines, and competing at the regional or national level, which adds to the investigations of the SMS-6 validity in the context of professional sport involvement.

In line with previous research on factorial structure of SMS-6 (Kawabata & Mallet, 2013; Mallet et al., 2007), the findings indicated a six-factor structure, coherent with SDT (Ryan & Deci, 2000). Additionally, the analyses of the associations between the six constructs measured with SMS-6 indicated that the associations among the four extrinsic motivation constructs are significantly stronger (or tend to be stronger) than the associations between intrinsic and extrinsic motivation. These findings provide further corroboration for the assumption that intrinsic regulation is clearly distinct from extrinsic motivation. Similar results were observed for amotivation, which formed significantly weaker associations with extrinsic motivation compared to the associations found among extrinsic motivation constructs. Concluding, the findings support the notion of three discrete (i.e., moderately or weekly related) types of sport motivation, with extrinsic motivation consisting of four constructs which form moderate-to-strong associations.

The results of validity analyses are consistent with previous research investigating the associations between sport motivation (measured with other scales) and satisfaction with sport performance. It has to be noted that SDT (Ryan & Deci, 2000) assumes that only the most integrated forms of motivation guarantee satisfaction with performed actions. Thus, the majority of research conducted to date focused on associations between sport satisfaction and intrinsic motivation only (e.g., Martin-Albo et al., 2012; Seifert & Hedderson, 2010). However, research on human performance at work/school suggested that extrinsic forms of motivation are also related to some performance indices (Cerasoli et al., 2014). In line with the findings, our research indicated that autonomous forms of extrinsic regulation (integrated and identified motivation) were significantly associated with satisfaction with performance among professional athletes. Thus, future research focusing on satisfaction and well-being in sport should account not only for intrinsic motivation, but also for other autonomous forms of motivation, as their combination may better explain athletes' well-being than intrinsic regulation alone.

The introjected regulation has a distinctive feature: actions motivated by introjected regulation are undertaken to attain ego enhancement (Ryan & Deci, 2000). In line with this assumption, we found that high self-esteem was related to only one out of six sport motivation constructs, namely inrojected regulation.

Although self-efficacy and its associations with sport motivation constructs was often investigated, the present study provides novel evidence for the complexity of associations between self-efficacy beliefs and sport motivation. First, in line with previous SDT-based research (Mouratidis & Michou, 2011), we found that more autonomous forms of sport motivation (intrinsic, identified, and integrated regulation) are related to a higher level of GSE. Second, in line with research on trait-like self-efficacy beliefs (see Matosic et al., 2014) and SDT (Ryan & Deci, 2000), we found that GSE predicted intrinsic motivation. However, the results indicate that intrinsic motivation was a predictor of personal-barrier self-efficacy among athletes. Thus, intrinsic motivation may operate in a chain with efficacy beliefs: first, it is determined by more general self-confidence resources; second, its effect on performance satisfaction is indirect, mediated by beliefs about ability to deal with personal barriers. In sum, our findings confirm SDT (Ryan & Deci, 2000), assuming that self-confidence fuels intrinsic regulation, but at the same time the findings yield support to SCT (Bandura, 1997), hypothesizing that specific self-efficacy beliefs are predicted by motivational variables and proximal to the well-being outcomes. Future research should account for the potential mediating effects of specific self-efficacy beliefs in the association between intrinsic regulation and satisfaction in sport.

The present study has its limitations. Although the conducted analyses were sufficiently powered, more complex longitudinal analyses could not be undertaken, due to a relatively small size of the sample. The sample size also posed a limitation for testing competing models with confirmatory factor analyses. In particular, we did not test competing models as multiplying analyses conducted without separate hypotheses would increase the likelihood of chance findings. The selection of the variables used in validation analyses was limited. Besides performance satisfaction, future research should account for other aspects of inherent satisfaction, well-being, and sport enjoyment. The stability analysis was conducted at a very short-term follow-up. Future research need to test further for the stability of sport motivation constructs measured with SMS-6. Finally, the multiple mediation analyses were conducted using two assessment points only. In sum, all conclusions should be drawn with caution.

Regardless the limitations, the present study provides further evidence for the psychometric properties of SMS-6, obtained in a sample of athletes competing at a regional/national level. The findings showed factorial structure which is similar as the structure identified in previous research and it is coherent with SDT. Further, more autonomous forms of motivation (in particular intrinsic regulation) were related to higher levels of self-efficacy, higher performance satisfaction, and higher perceived task-involving motivational climate in sport organizations. Finally, we found that intrinsic motivation explains athletes' performance satisfaction at a short-term follow-up, over and above baseline satisfaction levels. However, the intrinsic motivation—satisfaction associations are of an indirect nature: personal-barrier self-efficacy mediates this relationship and intrinsic motivation is fuelled by general self-efficacy.

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