Vigorous, dedicated, and absorbed: Factor structure, reliability, and validity of the polish version of the sport engagement scale

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Published online: 22 January 2020

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Abstract

The concept of sport engagement, emerging from the application of major ideas of positive psychology in sport science, has become a valuable conceptual and practical addition to understanding athlete burnout. The present article reports the major results of an attempt to develop a Polish version of the Sport Engagement Scale, a brief metric created to measure athletes' engagement for both research and practical purposes. Study 1, conducted on a sample of Polish athletes ($N = 214$) supports the original three-factor structure of engagement comprising the dimensions of Vigor, Dedication, and Absorption. A single-factor model also fit the data well, suggesting that calculating a general engagement factor is also justifiable. The internal consistency of the scale, as well as its associations with athletic burnout, competition anxiety, personality traits, declared sport level, and number of hours spent in training, provide evidence for sufficient concurrent criterion validity and the reliability of the scale for both research and applied purposes. Study 2, conducted on a sample of athletes taking part in a half marathon run ($N = 135$), provides evidence for the scale's predictive criterion validity with respect to objective performance: greater engagement, particularly scores in the Vigor subscale, predicted significantly better running performance. In the discussion, we summarize the present findings, commenting on their limitations and highlighting future research paths for the phenomenon of sport engagement.

Keywords Sport engagement · Sport engagement scale · SES · Polish adaptation · Performance

Introduction

Sport psychology has a long-standing tradition of development through adapting and implementing vital constructs from other domains of psychological science and practice to facilitate optimal athletic functioning and performance, both in the context of training and competition (Jarvis 2005). The areas of inspiration naturally include social, cognitive, and developmental psychology. More recently, work psychology has also offered some vital ideas to sport psychologists. For instance, the concept of burnout is now established as an important part of sport psychology research and practice (Raedeke and Smith 2001). Another construct from work psychology has subsequently been implemented into sport

psychology: the main ideas and findings from the research on work engagement (Schaufeli et al. 2002) has inspired sport psychologists to focus on analogical phenomenon—namely, sport engagement (Guillén and Martínez-Alvarado 2014). To enable measurement of both inter- and intra-individual differences in levels of engagement in athletes, researchers have developed valid and reliable questionnaires, indicating both general sport engagement and its components (Lonsdale et al. 2007; Guillén and Martínez-Alvarado 2014). The scales have been increasingly used in sport psychology research and practice (e.g., Pedro 2018; Nelson et al. 2019), providing novel insights into antecedents of the psychological functioning of athletes. However, to date, none of the scales has been available in Polish language, preventing sport psychologists from conducting research on sport engagement and determining the effectiveness of engagement-fostering practical interventions among Polish athletes. We have attempted to fill that apparent gap by adapting the Sport Engagement Scale (SES; Guillén and Martínez-Alvarado 2014) for use in Poland.

It is important to note that, for the purpose of the present research, we used the definition of athlete provided by the Cambridge Dictionary, in which an athlete is characterized as “a person who is trained or skilled in a sport and especially one who regularly competes with others in organized events”

Electronic supplementary material The online version of this article (<https://doi.org/10.1007/s12144-020-00607-5>) contains supplementary material, which is available to authorized users.

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(Cambridge Dictionaries Online 2019). Portrayed in this way, athletes do not necessarily have to be professionals, but they do have to take part in sport activities regularly. In both studies presented in the current article, all participants were recruited in accordance with abovementioned definition.

From Burnout to Engagement: Introducing the Concepts in Sport Psychology

The interest of sport psychologists in the phenomenon of athlete burnout can be traced back to the work of Raedeke and Smith (2001) who, drawing upon classic studies of work psychologists (e.g., Maslach 1976; for a review, see also Maslach et al. 2001), have fruitfully introduced this concept to the field of sport science, defining it as a “psychological syndrome of emotional/physical exhaustion, reduced sense of accomplishment, and sport devaluation” (Raedeke and Smith 2001, p. 283). More recently, researchers and theorists of organizational behavior, inspired by major principles of the increasingly popular positive psychology movement (Seligman and Csikszentmihalyi 2000), have proposed a positive conceptual addition to burnout—work engagement—arguing that fostering engagement might be an important factor in preventing the development of burnout (e.g., Schaufeli et al. 2002). Given the usefulness and popularity of the concept of burnout in sport and the numerous similarities between being engaged into work and working hard during training to perform at the optimal level, the concept of engagement has been implemented into sport psychology. Researchers have provided evidence for its vital role in the experience of flow while performing (see Hodge et al. 2009). More frequent positive feelings and thoughts, which are characteristic of elevated engagement, are plausibly responsible for this association. Sport engagement might therefore be considered one of the antecedents of optimal performance by providing both more frequent flow experiences (for empirical evidence for the effects of flow states on performance, see e.g., Stavrou et al. 2007) and higher levels of involvement in training (Swann et al. 2017).

Sport Engagement

Sport engagement can be understood as a bond between an athlete and sport-related activities that is built on generalized and positive cognitions, attitudes, and affective states, resulting in the feeling of immersion in those sport-related activities (see also Martínez-Alvarado et al. 2016). Based on this description, the intuitive interpretation of sport engagement might be the direct opposite of athlete burnout, but this might be oversimplification, as evidence from, for example, work psychology suggests that its nature is far more complex, and these two constructs should not be seen as merely two opposite ends of the same dimension (Schaufeli et al. 2002). Moreover, in the field of sport psychology it has been

repeatedly shown that both constructs are negatively associated, regardless of which questionnaires are used to measure both work engagement and burnout (Lonsdale et al. 2007; Martínez-Alvarado et al. 2016).

According to the authors of the Sport Engagement Scale (SES; Martínez-Alvarado et al. 2016) and analogically as in organizational research (e.g., Schaufeli et al. 2002), engagement in sports comprises three components: absorption, dedication, and vigor. Absorption refers to the experience of immersion and satisfying preoccupation with one’s sport-related tasks. It supports total engrossment with the sport activity and can even take the form of having difficulties in detaching oneself from performing sport. Dedication indicates the high level of involvement, sense of purpose, enthusiasm and inspiration, as well as finding of pride and satisfaction in training and performing. Vigor refers to the eagerness and willingness to invest oneself both emotionally and energetically in sport-related activities (Guillén and Martínez-Alvarado 2014).

To date, researchers have provided evidence for vital associations between sport engagement and lower levels of burnout (DeFreese and Smith 2013), better self-regulation (Martin and Malone 2013), and more frequent flow experiences (Hodge et al. 2009), as well as greater perfectionistic strivings (Jowett et al. 2016). Furthermore, through its associations with basic psychological needs, sport engagement can be seen as an important addition to self-determination theory (Deci and Ryan 2004; Hodge et al. 2009; Martínez-Alvarado et al. 2016).

The Sport Engagement Scale

The SES (Guillén and Martínez-Alvarado 2014) is an adaptation of the Utrecht Work Engagement Scale (UWES; Schaufeli and Bakker 2003) developed for use in a sport context. This is in line with the growing tendency in sport psychology to develop and apply domain specific questionnaires due to their higher convergent validity and predictive power with respect to sport-related psychological processes and sport performance (Dunn et al. 2005; Waleriańczyk and Stolarski 2016). Development of such measures allows for a more valid measurement of vital psychological phenomena in various life areas, and thus is highly useful for both researchers attempting to develop possibly most exact empirical models, and practitioners aiming to precisely measure psychological features of individuals in order to provide them with the most adequately tailored psychological interventions. Considering the fruitful history of research on engagement in the field of work psychology, as well as its utility of both research and practical purposes, we have attempted to develop a Polish version of the SES.

The SES consists of 15 statements rated on a 7-point Likert-type scale. It was developed based on research conducted among 240 male soccer players from the Spanish

national third division aged between 15 and 38 years ($M = 23.75$; $SD = 4.29$). Participants reported an average of 8.69 h ($SD = 1.83$) of training per week. The items are distributed between three factors: absorption, dedication, and vigor. The authors advocate for using both a one-factor solution with 15 items and a three-factor solution with 12 items because three items manifested unexpectedly low factor loadings for the initial factors, simultaneously significantly loading other factors. The confirmatory factor analysis (CFA) showed a good fit for both models. Reliability indices reported by the authors are acceptable and oscillate around $\alpha = .75$ for all of the subscales and $\alpha = .90$ for the global scale (for an in-depth description, see Guillén and Martínez-Alvarado 2014). The validity of the original version of the scale was determined by correlating its scores with dimensions of athlete burnout (as measured with the Athlete Burnout Questionnaire; ABQ). The correlations were negative and significant (except for the Dedication subscale, for which no significant correlation was observed); however, their magnitude was moderate at most, ranging between $-.22$ and $-.45$.

Study 1

In the present paper, we report our findings from a research project to provide a valid and reliable psychometric tool for assessing individual differences in sport engagement for sport psychology research and practice in a Polish context. For that purpose, the SES (Guillén and Martínez-Alvarado 2014) was translated into the Polish language. The scale was administered to a sample of Polish athletes along with a set of other questionnaires measuring dimensions that could be used to determine the concurrent criterion validity of the scale including burnout, Big Five personality traits, declared sport level, and average training workload in a week.

Burnout scales have been used to determine the criterion validity of engagement measures in both organizational (e.g., Schaufeli et al. 2006) and sport contexts (Lonsdale et al. 2007) including the studies on the original version of the SES (Guillén and Martínez-Alvarado 2014), where the ABQ was applied as a validity indicator. Thus, expecting (H1) a negative association between burnout and engagement was a natural consequence of the fact that the two constructs remain both conceptually and empirically negatively associated with each other (see González-Romá et al. 2006).

Although the links between engagement and the Big Five personality traits have not yet been established in the sport context, associations between these domains are well established in the organizational context. Given that both the nature and structure of the phenomenon of engagement are similar between these two domains (Lonsdale et al. 2007; Guillén and Martínez-Alvarado 2014) it seems appropriate to reason by analogy while

seeking for personality correlates of athlete burnout. Such an assumption is further supported by the fact that basic personality/temperamental traits are formal in nature (see Strelau and Zawadzki 1993) and thus manifest in a similar way regardless of the situational context. Therefore, in light of personality theories (Matthews et al. 2003), it seems fully justifiable to expect that personality traits will prove similarly related to engagement in the two contexts mentioned.

Akhtar et al. (2015) have reported significant positive associations between general work engagement and extraversion, openness to experience, and conscientiousness, whereas an adverse relationship was observed for neuroticism. Importantly, all of these effects remained significant in a regression model controlling for age and gender. In another study, Kim et al. (2009) analyzed the Big Five as a predictor of both general work engagement and its domains. They showed that conscientiousness was positively related to all components of engagement and the general score. Moreover, the dimension of Vigor was positively related to openness and agreeableness, whereas a negative effect was reported for neuroticism. The clearest pattern of results was obtained in a study conducted by Zecca et al. (2015), where engagement (both total score and each of its three domains) was positively related to conscientiousness and extraversion and negatively related to neuroticism. Overall, conscientiousness seems to be the most stable correlate of engagement, which seems reasonable when taking into account the conceptual content of the trait that has been defined as the propensity to be goal-directed and the ability to delay gratification (Roberts et al. 2009). The effects of neuroticism on engagement were also observed in each of these studies. Taking into account that the traits depict the general tendency to experience negative emotional states (Widiger 2009) and that negative emotions (except for anger) typically result in avoidance tendencies, the effect seems fully reasonable from a theoretical standpoint. The effects of the remaining traits (extraversion, openness, and agreeableness) were less consistent across the studies conducted within the organizational context, but each could theoretically exert a positive influence on engagement in athletes. Considering the rationale and data reviewed above, we decided to use the Big Five personality traits in concurrent criterion validity analyses of the Polish version of the SES. Specifically, we hypothesized that sport engagement, as measured with the SES, is positively associated with (H2) conscientiousness, (H3) emotional stability (which reflects inverted neuroticism in the applied measure of the Big Five), (H4) intellect (an equivalent of openness), (H5) extraversion, and (H6) agreeableness.

Finally, we predicted that (H7) higher sport levels are naturally expressed in greater magnitudes of engagement and that (H8) elevated engagement is positively related to the weekly amount of time spent in training. We therefore decided to use these variables as additional concurrent validity criteria.

Method

Participants and Procedure

The sample comprised 214 Polish athletes at various sport levels (42.5% women) aged between 18 and 67 years ($M = 28.26$, $SD = 11.09$), recruited via social media or in their sport clubs. Regarding sport level, 27 participants declared their level as recreational, 110 as amateur, and 77 as semi-professional or professional. Practiced disciplines most commonly reported by the subjects included: distance running, soccer, athletics, triathlon, archery, swimming, combat sports, volleyball, cross-fit, equestrian, and tennis. The scales were administered online using the Qualtrics platform. The subjects consented to take part in a research regarding “their personality and sport engagement.” The participants were not rewarded.

Measures

Sport engagement was measured with the Polish version of the SES (Guillén and Martínez-Alvarado 2014), a tool developed by the authors of the present paper for the purpose of the present adaptation. The authors of the original version provided us with all necessary permissions to translate the questionnaire and use it for research purposes in Polish samples. While translating the metric we followed a standard translation/back-translation procedure. The scale was first translated into Polish by two members of our team. The initial translation was then verified and corrected by an uninfluenced bilingual psychological scientist. Next, an independent back-translation was performed. The back-translated scale was subsequently sent to the authors of the original SES for verification. The authors have not suggested any modifications for consideration. The psychometric properties of the Polish SES version are provided and discussed below.

Athlete burnout was measured with the ABQ (Raedeke and Smith 2001). The metric was recently adapted into Polish by Stolarski et al. (submitted). It has a three-factor structure, consistent with the original model endorsed by Raedeke and Smith (2001). The scale’s psychometric properties proved satisfactory and sufficient for research purposes.

Personality traits were measured with the IPIP-BFM-20, an operationalization of the classic Big Five model of personality (Mini-IPIP; Donnellan et al. 2006), in a Polish adaptation by Topolewska et al. (2014). Big Five domains are vital predictors of sport performance (Piedmont et al. 1999), and the nature of certain dimensions distinguished in the Big Five model (e.g., neuroticism or conscientiousness) makes them well-justified concurrent criterion validity indicators in studies of

engagement (e.g., Akhtar et al. 2015; see also the conceptual predictions provided in other parts of the present manuscript). In the Polish adaptation, the neuroticism subscale was reversed and renamed emotional stability (Topolewska et al. 2014).

Statistical Analyses

All statistical analyses described in the later parts of the present article were conducted using IBM SPSS 25.0.0.2 for Windows. CFA was performed using IBM SPSS AMOS 25.0.0 software.

Results

Preliminary Analyses

Table 1 presents the basic descriptive statistics of the 15 items of the Polish version of the SES. Indicators of skewness and kurtosis were all within the ± 2 range and thus can be classified as acceptable (see George and Mallery 2010; Gravetter and Wallnau 2014) and sufficient for conducting statistical analyses requiring normal distributions of considered variables.

Confirmatory Factor Analysis

The factor structure of the SES in the Polish population was verified using CFA with the maximum likelihood (ML) method. To enable comparisons with the original SES, we have applied the following goodness of fit indicators: the relative χ^2 (χ^2/df), the Goodness of Fit Index (GFI), the Comparative Fit Index (CFI), the Tucker-Lewis Index (TLI), and the Incremental Fit Index (IFI), as well as the Root Mean Square Error of Approximation (RMSEA; see the footnote to Table 2 for cutoff values indicating acceptable model fit). As mentioned above, Guillén and Martínez-Alvarado (2014) endorsed both three- and one-factor models, and we decided to follow their approach. Although they identified some problems with the factor loadings of three items (3, 6, and 9), we decided to begin our analysis of the three-factor model with a solution including all 15 items’ loading factors that they were initially designed to indicate.

The initial version of the three-factor model manifested a rather poor fit to the data (see Table 2). However, analysis of the modification indices (MIs) indicated that adding covariances between errors for three pairs of items (1 and 2, 4 and 12, and 13 and 14) would significantly improve the model’s fit (the MIs amounted to 45.58, 15.08, and 56.48, respectively). Each of these pairs of items belonged to the same factor, so adding the covariance was justifiable from a methodological standpoint. Moreover, an apparent similarity in wording and/or content within each of the pairs could be observed, so the

Table 1 Descriptive statistics of the items included in the Polish version of the Sport Engagement Scale

Item	M	SD	Skewness	Kurtosis
1. I am able to train for long periods of time	5.40	1.07	−0.65	−0.75
2. I am very persistent in my sport activity	5.44	1.12	−0.47	−0.03
3. My sport activity is a self challenge	5.72	1.04	−0.73	1.22
4. I am enthusiastic about my sport activity	5.79	1.06	−1.01	1.79
5. I am proud of the work I do	5.44	1.01	−0.34	0.24
6. I feel full of energy during my training and matches	5.45	1.13	−0.78	1.27
7. When I get up in the morning I look forward to going to train	4.69	1.27	−0.52	0.22
8. I am strong and vigorous in my sport activity	5.18	1.09	−0.44	0.59
9. My sport activity is full of meaning and resolve	5.24	1.15	−0.63	0.79
10. I am carried away by my sport activity	5.25	1.16	−0.49	0.56
11. I am happy when I am engrossed in my sport activity	5.71	1.10	−0.78	0.66
12. I feel inspired whilst carrying out my sport activity	5.34	1.14	−0.54	0.30
13. I am oblivious to everything going on around me when I train	4.62	1.43	−0.36	−0.04
14. I am absorbed in my sport activity	4.69	1.39	−0.31	−0.30
15. Time flies when I am training or competing	5.67	1.04	−0.48	−0.19

Presented values refer to the Polish language version of SES items. English language items are presented here for the convenience of the reader. The complete Polish version of the SES Questionnaire is provided in Appendix A

change in the models was also conceptually plain. After these two pairs of errors were correlated in the model, its fit improved robustly. The change in fit was statistically significant, $\Delta\chi^2_{diff}(3) = 124.10, p < .001$. The revised model's fit proved satisfactory across various fit indices according to Hu and Bentler's (1999) recommendations, and the indices' values are very similar to those reported by Guillén and Martínez-Alvarado (2014; however, note that in their three-factor model, three items were excluded), despite the fact that their construction sample was limited to soccer players. The modification indices of all tested models are provided in Table 2.

The factor loading of every item exceeded the .50 value, and analysis of modification indices did not indicate any problematic cross-loadings. Thus, unlike the original SES, the three-factor model including all 15 SES items seems fully justifiable. A graphical presentation of the final, revised version of the three-factors model is provided in Fig. 1.

Next, we attempted to test the one-factor solution. Again, the baseline model proved a rather poor fit to data; however, after we allowed the same three pairs of errors to freely

correlate, the model's fit significantly increased, $\Delta\chi^2_{diff}(2) = 137.53, p < .001$. Although the revised one-factor model's fit indices again proved acceptable (or at least close to the cut-off values proposed by Hu and Bentler 1999), its fit, compared to the revised three-factor model, proved poorer—the slight supremacy of the three-factor model is visible across all of the applied fit criteria. The Aikake Information Criterion (AIC) values of the revised one- and three-factor models differ by 18.47, and according to the rule of thumb endorsed by Burnham and Anderson (2004), the three-factor model should be preferred over the one-factor model (as the $\Delta_{AIC} > 10$). To sum up, although using the single factor solution and calculating a joint indicator of sport engagement seems justifiable, we endorse the three-factor solution and recommend calculating separate scores for the three basic dimensions of the SES.

Internal Consistency

The internal consistency of the SES subscales and total score was estimated using two indicators, Cronbach's α and

Table 2 Fit indices for the hypothesized one- and three-factor CFA models before and after modifications based on Modification Indices (MI)

Model	χ^2	df	χ^2/df	GFI	CFI	TLI	IFI	RMSEA
One-factor	326.43	90	3.63	.82	.88	.85	.88	.11
One-factor after MI	188.90	87	2.17	.88	.95	.94	.95	.07
Three-factor	288.53	87	3.32	.84	.89	.87	.89	.10
Three-factor after MI	164.43	84	1.96	.90	.96	.95	.96	.07

Fit indices were selected to reflect statistics reported by Guillén and Martínez-Alvarado (2014) for the original version of the SES. The following values of the provided indices are believed to represent a good fit: $\chi^2/df < 3$ (Kline 2005), $GFI \geq .90$ (Hooper et al. 2008), CFI, TLI and $IFI \geq .95$ (Hu and Bentler 1999), $RMSEA \leq .08$ (for 'reasonable approximate fit') or $\leq .05$ (for 'close approximate fit'; Kline 2005)

Fig. 1 Conformatory Factor Analyses (CFA) of the Polish version of the Sport Engagement Scale – the revised 3-factor solution

McDonald's ω coefficient. For the total score, the α value amounted to $\alpha = .93$, which most psychometricians would interpret as excellent. Internal consistency of the subscales was also good, amounting to $\alpha = .84$ for Vigor, $\alpha = .83$ for Dedication, and $\alpha = .87$ for Absorption subscales. Taking into account the criticism formulated with respect to the α coefficient (Dunn et al. 2014), we decided to broaden the internal consistency analyses by calculating McDonald's hierarchical ω , which has been shown to be much less susceptible to numerous deficiencies of α documented in the psychometric literature. Omega values for the three SES subscales amounted to $\omega = .84$ for Vigor, $\omega = .83$ for Dedication, and $\omega = .87$ for Absorption, whereas for the total engagement score it amounted to $\omega = .94$. To sum up, the ω values were equal to the α values (or even higher for the total score), providing additional evidence for the high internal

consistency of the measure for the subscales and total score. It can therefore be concluded that the internal consistency of the SES was far better than satisfactory and consistently higher than the original version of the metric for which the α values amounted to .90 for the total score and .75, .75, and .74 for the subscales, respectively.

Concurrent Criterion Validity

To provide insight into the issue of the concurrent criterion validity of the measure, we performed correlation analyses, illustrating the associations between the SES scores and (1) the number of hours per week spent on training, (2) sport-related burnout, and (3) personality traits (see Table 3). Moreover, one-factor ANOVAs were used to compare athletes' levels of engagement declaring different

Table 3 Means, standard deviations, Cronbach's alpha, and Pearson's correlation coefficients between gender, age, number of hours per week spent on training, and scales: Engagement (and its scales: Vigor, Dedication, Absorption), Burnout (and its scales: Reduced Sense of Accomplishment, Physical and Emotional Exhaustion and Sport Devaluation), and Personality scales: Intellect, Emotional Stability, Conscientiousness, Agreeableness, and Extraversion (below the diagonal) and respective partial correlations controlling for age and gender (above the diagonal)

	<i>M</i>	<i>SD</i>	α	1.	2.	3.	4.	4a.	4b.	4c.	5.	5a.	5b.	5c.	6.	7.	8.	9.	10.
1. Gender																			
2. Age	28.26	11.09																	
3. Hours per week spent on training	8.78	5.22	.14*	-.47**	–	.22**	.25**	.15*	.20**	-.05	-.12	.11	.11	-.14	-.03	-.04	.23**	-.06	.10
4. Engagement (total)	5.31	.83	.93	-.20**	.29**	–	–	–	–	-.50**	-.46**	-.21**	-.21**	-.52**	.15*	.23**	.30**	.07	.10
4a. Vigor	5.23	.88	.84	-.14*	.29**	–	–	.82**	.77**	-.47**	-.46**	-.21**	-.21**	-.46**	.15*	.22**	.29**	.07	.07
4b. Dedication	5.51	.83	.83	.02	-.09	.18**	–	.82**	.74**	-.51**	-.47**	-.23**	-.23**	-.50**	.17*	.23**	.28**	.07	.03
4c. Absorption	5.19	.99	.87	.12	-.30**	.32**	–	.77**	.74**	-.42**	-.35**	-.16*	-.16*	-.48**	.09	.19**	.25**	.05	.06
5. Burnout (total)	2.33	.55	.82	.08	-.11	.02	-.46**	-.44**	-.49**	-.35**	–	–	–	–	-.11	-.31**	-.17*	-.15*	-.04
5a. Reduced sense of accomplishment	2.60	.69	.65	.00	-.02	-.09	-.44**	-.45**	-.46**	-.33**	–	–	.27**	.47**	-.15*	-.36**	-.07	-.04	-.05
5b. Exhaustion	2.08	.77	.84	.14*	-.24**	.22**	-.15*	-.16*	-.20**	-.06	–	.26**	–	.42**	-.09	-.23**	-.19**	-.22**	-.03
5c. Devaluation	1.95	.69	.67	.01	.03	-.13	-.51**	-.46**	-.50**	-.46**	–	.47**	.39**	–	-.03	-.16*	-.12	-.06	-.03
6. Intellect	3.97	.63	.61	.16*	.26**	-.16*	.08	.10	.14**	-.01	-.14*	-.15*	-.16*	-.02	–	.23**	-.02	.19**	.29**
7. Emotional Stability	3.06	.84	.76	.25**	.15*	-.07	.20**	.20**	.21**	.15*	-.29**	-.34**	-.21**	-.15*	.21*	–	.03	.02	.15*
8. Conscientiousness	3.40	.90	.82	-.06	.21**	.09	.24**	.25**	.25**	.17*	-.19**	-.07	-.23**	-.11	.04	.04	–	.08	.09
9. Agreeableness	3.78	.69	.64	-.20**	.08	-.11	.05	.05	.06	.01	-.16*	-.04	-.25**	-.06	.22**	-.02	.10	–	.26**
10. Extraversion	3.24	.94	.83	-.11	.04	.06	.04	.05	.02	.03	-.05	-.05	-.05	-.03	.30**	.12	.11	.28**	–

N = 214; * $p < .05$; ** $p < .01$ (two-tailed); higher gender values indicate males. Statistics for the SES subscales are shadowed in grey. Emotional Stability indicates the reversed Neuroticism scale. For Pearson's correlation coefficient (r), its absolute value reflects the effect size with those less than .10 traditionally interpreted as trivial, those between .10 and .30 as weak/small, those between .30 and .50 described as moderate, while values greater than .50 are treated as strong/large (see Cohen 1992). Correlations between total score and subscales of the same measure were not provided as each of the subscales remains a part of the total score, and thus such correlations are inflated and cannot be interpreted. Statistically significant coefficients are additionally provided in bold for readers' convenience

sport levels (recreational, amateur, and professional/semi-professional; see Fig. 2).

Consistent with our predictions, athletes displaying higher levels of engagement reported more hours per week spent on training. The result was significant for all SES subscales and the total score.

Associations between engagement and burnout, a conceptual antitype of the former, were mostly significant, all in the expected direction, and often robust. The only coefficient below the significance threshold (i.e., the correlation of Exhaustion with Absorption) gained statistical significance after controlling for gender and age. Interestingly, after controlling for the two potential confounders, most of the burnout-engagement correlations proved even slightly stronger than before (e.g., the association between general engagement and burnout scores increased from $-.46$ to $-.50$). Thus, our expectation that high scores in the SES should be accompanied with lower burnout was fully supported by the data.

Finally, two personality traits from the Big Five universe, emotional stability (opposite of neuroticism) and conscientiousness, were consequently linked to greater sport engagement. The relationships remained significant after controlling for age and gender, again proving even slightly higher when their potentially confounding effects were ruled out. These effects were fully consistent with our expectations. However, contrary to our predictions, we found no evidence for any significant correlations between the features of engagement

and extraversion. Instead, we observed a slight positive association between Dedication and intellect (after controlling for age and gender, the analogical effect was also significant for general engagement score and Vigor).

Next, based on the assumption that engagement would be greater among those athletes who approach their sport in a professional way (perceiving it as a more central area of their lives), we conducted a series of ANOVAs comparing average engagement between participants who declared different sport levels (recreational, amateur, and professional/semi-professional). We observed significant differences in two of the three dimensions of engagement: Vigor, $F(2,211) = 4.72$, $p < .01$, $\eta^2 = .04$, and Absorption, $F(2,211) = 6.10$, $p < .01$, $\eta^2 = .06$, as well as in the total SES score, $F(2,211) = 4.86$, $p < .01$, $\eta^2 = .04$. No significant effect of declared sport level was observed for Dedication, $F(2,211) = 2.46$, $p = .09$, $\eta^2 = .02$. The differences were in the expected directions. Post-hoc comparisons conducted using Tukey's HSD test revealed that professional and semi-professional athletes reported significantly greater Vigor, Absorption, and general engagement compared with both recreational and amateur athletes. The differences between professional / semi-professional and recreational athletes (with Cohen's d amounting to .75, .64, and .68 respectively for Vigor, Absorption and total SES score) were markedly greater than between the former and amateur-level athletes (.37, .46, and .36, respectively). All differences were in the expected directions, and the pattern of results was in line

Fig. 2 Differences in mean scores in the SES subscales (panels **a**, **b** and **c**) and total score (panel **d**) between athletes declaring different sport levels. The error bars represent 95% confidence intervals of the means

with our general prediction that levels of engagement would increase with declared sport level.

Study 2

The main goal of the second study was to provide insight into the associations between sport engagement and objective measures of sport performance. Taking into account a conceptual overlap between engagement and sport motivation, as well as the claims that the former could be considered one of key antecedents of optimal performance (Swann et al. 2017), we hypothesized that (H9) SES scores are predictive of better performance.

Method

Participants and Procedure

The sample consisted of 135 Polish runners (37% women), aged between 19 and 67 ($M = 36.67$ years, $SD = 9.04$). Twenty participants declared their sport level as recreational, 107 as amateur, and 8 as semi-professional or professional. Subjects were recruited before a half-marathon run organized in Poland, the route of which has been certified by the Polish Athletic Association. Information about this study was presented on the event organizer's website and social media account three days before the competition. As in Study 1, data were collected online using the Qualtrics platform. The subjects consented to take part in a study regarding "their personality and sport engagement" and filled in their name and surname or start number to match their online responses with results after the half marathon run. As the data in this study were confidential rather than anonymous, participants also gave consent for personal data preservation under the General Data Protection Regulation laws. The participants were not rewarded.

Measures

Sport engagement was measured with the Polish version of the SES (Guillén and Martínez-Alvarado 2014). In the second study, Cronbach's α for the total score of the Polish version of SES was $\alpha = .92$. Internal consistency of the subscales was also good, amounting to $\alpha = .82$ for Vigor, $\alpha = .80$ for Dedication, and $\alpha = .83$ for Absorption subscales.

Sport performance was indicated by final results of the half marathon run. Results were publicly announced on the half marathon organizer's webpage in the hh:mm:ss format (hours: minutes: seconds, e.g., 01:27:45) with the participant's surname and start number. Results were converted from the initial format into seconds (e.g., 5265).

Results

Descriptive statistics and zero-order correlations are presented in Table 4. Aiming to provide a deeper insight into the analyzed associations and take into account potential confounding variables (e.g., age and gender), we ran a series of regressions, testing for the role of sport engagement in predicting the final race time obtained in the competition. In the second model, we looked into the role of particular subscales of SES in predicting the performance (see Table 5).

The effect of general SES score on the final result in the race was significant (after controlling for age and gender; see model I). However, when the overall result in the SES scale has been divided into three subscales, only Vigor was a significant predictor of the final result in the race (see model II). What is more, the second model showed higher predictive power. It is worth mentioning here that despite the strong intercorrelations between the SES subscales (see Table 4), no evidence for multicollinearity issues was found (all the VIF values were ≤ 3.0 , with tolerance $> .30$, thus easily fulfilling the rule-of-thumb criteria formulated in the literature; see e.g., Hair et al. 2006 or Field 2009).

Discussion

The present study provides initial evidence for the validity and reliability of the SES in a sample of Polish athletes. Our data further support the three-dimensional structure of engagement endorsed by the authors of the original version of the scale (Guillén and Martínez-Alvarado 2014), and they are consistent with the robust body of research on engagement conducted within the scope of organizational psychology (e.g., Bakker et al. 2008). The present results were also consistent with the conclusions of the authors of the original version in that both three- and one-factor approaches to the structure of athlete engagement found sufficient support in CFA.

We also showed that the internal consistencies of both subscales and total scores of the Polish version of the SES were higher than in the original version. Given that the internal consistency coefficients of all SES subscales exceed the value of .80 and that the alpha of total engagement score was excellent (.92/.94), it seems that the metric could be effectively used not only for research purposes but also for individual diagnosis. The latter would naturally require adequate norms for both the general population of athletes and, optimally, specific subpopulations (e.g., professionals vs. amateurs, or representing different age cohorts). Establishing such norms through testing sufficiently large samples of athletes representing each of the groups seems to be a vital step that would enable the application of the concept of athletic engagement in sport psychology practice.

Table 4 Means, standard deviations, Cronbach's alpha, and Pearson's correlation coefficients between gender, age, sport performance and Engagement (and its subscales: Vigor, Dedication, Absorption)

	<i>M</i>	<i>SD</i>	α	1.	2.	3.	4a.	4b.
1. Gender								
2. Age	36.67	9.04	-	.19*				
3. Sport performance	6869.78	1047.22	-	-.48**	.06			
4. Engagement (total)	5.26	.79	.92	-.05	-.02	-.14		
4a. Vigor	5.24	.81	.82	-.05	.00	-.24**		
4b. Dedication	5.56	.84	.81	-.03	-.05	-.09	.76**	
4c. Absorption	4.99	.96	.83	-.07	-.02	-.08	.74**	.76**

$N = 135$; * $p < .05$; ** $p < .01$ (two-tailed); higher gender values indicate males. Sport performance results were converted from the initial hh:mm:ss format (hours: minutes: seconds, e.g., 01:27:45) into seconds (e.g., 5265). Higher scores indicate worse final result of the half marathon run. Correlations between the total score of Engagement scale and its subscales are not shown as the subscales are a part of the total score, thus these correlations are inflated and cannot be interpreted. For Pearson's correlation coefficient (r), its absolute value reflects the effect size with those less than .10 traditionally interpreted as trivial, those between .10 and .30 as weak/small, those between 0.30 and 0.50 described as moderate, while values greater than .50 are treated as strong/large (see Cohen 1992). Statistically significant coefficients are additionally provided in bold for readers' convenience.

It is also worth noting that the intercorrelations between the subscales in the present studies were much higher than in the original work of Guillén and Martínez-Alvarado (2014). In the present study, the mentioned correlations ranged from .77 to .82 compared to .54 to .67 in the original study. This might be partially due to the higher reliability of the present questionnaire, as well as the sample structures and cultural differences.

Relationships between the SES scores and other variables provide additional support for the concurrent criterion validity of the questionnaire. We have replicated the correlations between SES and ABQ scores; however, in our sample the coefficients were higher than those reported by the authors of the original version (e.g., the association between total engagement and burnout scores amounted to $-.46$ [$-.50$ after controlling for age and gender] compared to $-.36$ reported by Guillén and Martínez-Alvarado 2014). Thus, hypothesis H1 was fully supported. One may wonder

whether it is justifiable to measure athlete burnout in a sample such as the present one, consisting of not only professional and semi-professional but also amateur and recreational athletes. However, the average weekly training load in our study amounted to almost nine hours, which reflects almost six 90-min long training sessions per week. Such a heavy workload may easily lead to a sense of exhaustion and weariness, as well as imbalance between training and recovery, resulting in the development of athlete burnout syndrome (see Kallus and Kellmann 2000). Thus, we believe that measuring burnout in the present sample was well founded.

In the present study we have also broadened the SES's nomological network by establishing its associations with the Big Five personality traits. Consistent with our predictions, two traits, conscientiousness and emotional stability, proved predictive of all aspects of engagement, confirming our hypotheses that elevated levels of goal-directedness and motivation, as well as the lack of the tendency to experience negative emotions, should foster engagement in most life domains including sport activity: hypotheses H2 and H3 were therefore supported. Moreover, consistent with some organizational psychology studies (e.g., Kim et al. 2009; Akhtar et al. 2015), a weak albeit significant association was observed between engagement and openness to experience/intellect, providing support for hypothesis H4. However, no significant correlations between engagement and the two remaining Big Five traits (extraversion and agreeableness) were observed. Hypotheses H5 and H6 were therefore not supported.

Finally, the links between engagement and hours spent on training, as well as differences in SES scores between athletes declaring different sport levels, were fully consistent with our predictions, showing that engagement increases with the level of sport advancement, and it is manifested in a greater amount

Table 5 Regression models predicting half marathon performance with SES scores

Step	Predictors	β	<i>p</i>	<i>F</i>	$R^2 / \Delta R^2$
I. Dependent variable: Final result of the half marathon run					
1	Gender	-.50	< .001	18.77	$R^2 = .25$
	Age	.14	< .001		
2a	Gender	-.51	< .001	14.66	$\Delta R^2 = .03$
	Age	.14	.09		
	Engagement (total score)	-.18	.03		
2b	Gender	-.51	< .001	11.42	$\Delta R^2 = .09$
	Age	.15	.06		
	Vigor	-.46	< .001		
	Dedication	.14	.30		
	Absorption	.12	.36		

Effects significant at $p < .05$ are presented in bold

of time devoted to sport practice. These results clearly support hypotheses H7 and H8.

The results of the second study provide initial evidence for the association between engagement and sport performance, here operationalized as the time in which the runners completed the race. Thus, our final prediction, reflected in hypothesis H9, was also supported. As far as we know, this is the very first study in which the associations between sport engagement and an objective measure of sport performance were demonstrated. Furthermore, it is worth noting that the core of that influence can be identified in the Vigor subscale, with the two remaining subscales—Dedication and Absorption—showing no clear relationship with performance. Such a connection is a logical implication of the theoretical assumptions regarding each subscale: Vigor depicts the energetic and emotional readiness to invest one's assets in performing. On the other hand, Dedication and Absorption portray a sense of meaning and pleasures derived from sport activity, which does not necessarily enhance athletic performance.

Future research should seek to establish a list of both contextual and individual-level underpinnings of sport burnout and engagement. Findings from the area of organizational science could become a valuable starting point in this context (e.g., Maslach and Leiter 2008; Waleriańczyk et al. 2019); however, due to the specificity of the area of sport activity, certain mechanisms characteristic of this domain of human functioning (e.g., associated with physiological responses to extreme physical effort) should also be taken into account. Furthermore, applying the SES to individuals with various levels of exercising habits would provide further evidence for the scale's validity and broaden the findings reported in the present paper. The construct of sport engagement should also be closely investigated in relation to actual sport performance in sport disciplines other than running, with both direct and indirect mechanisms of influence being distinguished (see Stolarski et al. 2019). Finally, it would be beneficial to examine the measurement invariance of the construct across different sports. Such an investigation should be a compulsory starting point ahead of comparing sport engagement's role between various sports.

Although the psychometric properties of the Polish version of the SES seem very good, certain limitations of the conducted research should be pointed out. First, the sample size could have been larger; and the group of elite athletes was particularly underrepresented. One could argue, however, that sport engagement might be a significantly more important motivating force in recreational, amateur, and semi-professional sports than in elite sports, with other factors coming into play at the highest performance level. Second, the fact that, unlike the original construction sample used by Guillén and Martínez-Alvarado (2014), our participants varied in terms of practiced discipline can be treated as both a strength and a limitation; conducting the analyses on such a diversified

sample of athletes might provide evidence for the versatility of the measure, but it could also result in unwanted sources of variance that could have been avoided if a more homogenous sample had been used. Finally, it would be beneficial to control not only for the declared performance level but also to include the actual, objective performance indicators to reduce the impairments accompanying self-assessment methods.

Funding Information The work of was supported by the grant no BST 018680039 provided by University of Warsaw.

Compliance with Ethical Standards All procedures applied in the present studies were accepted by the Ethics Committee of the Department of Psychology at the University of Warsaw, and were in accordance with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. Informed consent was obtained from all individual participants included in the study. This article does not contain any studies with animals performed by any of the authors.

Conflict of Interest Author Maciej Stolarski declares that he has no conflict of interest. Author Dominika Pruszcak declares that she has no conflict of interest. Author Wojciech Waleriańczyk declares that he has no conflict of interest.

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