



OPEN ACCESS

EDITED BY

Rocsana Bucea-Manea-Tonis,
National University of Physical Education and
Sport, Romania

REVIEWED BY

Dragos Ioan Tohamean,
Transilvania University of Brasov, Romania
Zikun Li,
Mount St. Mary's University, United States

*CORRESPONDENCE

Kay Brauer

✉ kay.brauer@psych.uni-halle.de

RECEIVED 19 July 2025

ACCEPTED 26 September 2025

PUBLISHED 14 October 2025

CITATION

Brauer K, Donhauser JE and Proyer RT (2025)
Studying trait-playfulness, time spent with
physical activity, and athletic identity among
self-ascribed athletes and non-athletes.
Front. Sports Act. Living 7:1669367.
doi: 10.3389/fspor.2025.1669367

COPYRIGHT

© 2025 Brauer, Donhauser and Proyer. This is
an open-access article distributed under the
terms of the [Creative Commons Attribution
License \(CC BY\)](#). The use, distribution or
reproduction in other forums is permitted,
provided the original author(s) and the
copyright owner(s) are credited and that the
original publication in this journal is cited, in
accordance with accepted academic practice.
No use, distribution or reproduction is
permitted which does not comply with
these terms.

Studying trait-playfulness, time spent with physical activity, and athletic identity among self-ascribed athletes and non-athletes

Kay Brauer*, Johanna E. Donhauser and René T. Proyer

Department of Psychology, Martin Luther University Halle-Wittenberg, Halle (Saale), Germany

Adult playfulness is an individual difference variable that describes how people (re)frame situations in a way that they are experienced as entertaining, and/or intellectually stimulating, and/or personally interesting. Playfulness relates to indicators of mental and physical health, but its role among athletes is yet understudied. In our study, we provide initial findings on playfulness with regard to self-reported athleticism by (a) comparing expressions in four facets of playfulness (Other-directed, Lighthearted, Intellectual, and Whimsical types) between athletes ($n = 205$) and non-athletes ($n = 209$), and (b) testing associations with subjective impressions of athletic identity (i.e., the degree of one's identification of being an athlete) and reports of time spent with physical activity. Our findings showed that (a) there is measurement invariance of playfulness among the groups, (b) athletes yield higher expressions of Lighthearted playfulness ($g = 0.31$), and among athletes, playfulness goes along with more time spent participating in physical activity whereas it was unrelated to athletic identity; among non-athletes, Other-directed playfulness related to perceiving oneself as being athletic. We discuss our findings regarding implications for leisure and performance-related outcomes and in line with the literature noting the important role of playfulness in sports.

KEYWORDS

playfulness, athletes, sports, athletic identity, physical activity

1 Introduction

"I'm just a hockey player. I want to play every day."—Martin Brodeur (former professional ice hockey goaltender)

The benefits of participating in physical activity (PA) for physical and mental health are well studied (1, 2), but engagement in PA is declining globally (3). As illustrated in Brodeur's quote, many athletes view and speak of their physical activity¹ as "play," and there is increasing interest in understanding what contributes to athletes and

¹We use the term "physical activity" to mean sports-related physical activity involving bodily movement that is perceived as sports, irrespective of whether it follows formal rules.

non-athletes taking part in PA from the perspective of play and playfulness [e.g., (4–6)]. While earlier research examined the role of playful approaches for designing PA programs, creating environments that enable immersion, and using gamification, our study extends the knowledge of the field by studying playfulness as a personality trait. Therefore, we compared expressions in four facets of playfulness among self-ascribed athletes and non-athletes and examined its relations with their athletic identity and time spent engaged in PA.

1.1 Adult playfulness

Playfulness is a personality trait that describes individual differences in (re)framing situations in such a way that they are experienced as personally interesting, and/or intellectually stimulating, and/or entertaining (7). Playfulness, as a trait, is relatively stable across situations and time and describes inclinations to engage in play, the behavior. The OLIW-model of adult playfulness (7) differentiates between four facets of playfulness, including: **Other-directed** (i.e., enjoying playing with others, using playful approaches in social relationships); **Lighthearted** (i.e., liking improvising, seeing life as a game rather than a battlefield); **Intellectual** (i.e., taking pleasure in playing with ideas and thoughts, preferring complexity over simplicity); and **Whimsical** (i.e., enjoying unusual hobbies, finding amusement in grotesque situations). The facet approach allows distinguishing between how people engage in playful behaviors, as people can show different profiles in expressions of the four facets. For example, a person may demonstrate Other-directed playfulness, moderate levels of playfulness, but lower degrees of Intellectual and Whimsical playfulness. The faceted nature of this approach to playfulness allows to investigate and describe individual differences in playfulness in a fine-grained manner. The OLIW model also covers intellectual components and less fun-oriented aspects that are often neglected in the literature, which allow to learn more about the role of playfulness in contexts that require a serious approach beyond mere fun and entertainment [see (8), for an overview]. Numerous studies have shown that the facets show differential relations with external outcomes, such as relationship satisfaction in couples, responses to traumatic experiences during war, dealing with stress, creativity, and well-being, to name but a few [e.g., (9–13)]. Since engaging in sports and physical activity is often challenging and requires serious approaches, we chose the OLIW model to learn more about the role of playfulness among athletes' and non-athletes' engagement in being active.

1.2 Playfulness and physical activity

Children's playfulness relates to engaging in greater activity and higher physical fitness, practicing their motor skills (14, 15). Adults engage in PA for different reasons, including to increase one's physical and mental health, or because they enjoy playing

with others [e.g., in team sports; see (16)]. Recently, the role of play and playfulness has been identified as an important quality because incorporating playful elements into exercises contributes to subjective and objective performance parameters and flow experience (4–6, 17). This fits well with studies showing that boredom can negatively affect engaging in sports. Velasco and Jorda (18) identified several types of issues that lead to boredom (e.g., monotonous activities; anticipated negative mood; lack of competitiveness and challenges) among athletes and translates to consequences such as reduced time spent in PA. Accordingly, one would expect that being able to reframe such situations in a playful manner—for example, by setting small challenges, sport-related daydreaming, or imagining different outcomes of training sessions and/or competitions—will contribute to overcoming barriers of engaging in PA. Playfulness helps prevent boredom from occurring [e.g., (19)] and may also be helpful in making daily routines in exercises more interesting. A competitive aspect to playfulness could maybe play a role here as well [see e.g., (17, 20)].

Trait-playfulness relates positively to participating in sports, as it contributes to engaging in social play and activities (e.g., team sports) as well as facilitating avenues to learning the ways in which engaging in sports and PA can elicit positive emotions [e.g., (21)]. In line with Verwijmeren et al. (6), who showed that athletes incorporate elements of amusement and challenge into how they approach sports, we expected that playful individuals would spend more time in PA than those low in playfulness because playfulness allows them to approach PA—even including monotonous and repetitive behaviors and movements—in a way that is experienced as interesting, entertaining, or intellectually stimulating. Further, playfulness has been linked to a set of variables that contribute to engaging in PA, such as adaptive approaches to deal with stressors, greater flow experiences which are linked to the ability to (re)frame situations in an interesting and entertaining way, intrinsic- and achievement-related motivation, mastery orientation, and pursuing activity-based leisure [e.g. (13, 22–25)].

Initial data support the notion of playfulness relating to greater PA and fitness: In a study of 252 participants, a global measure of playfulness related positively to the inclination to pursue an active way of life and engage in sports in leisure-time [$r_s = .22$ and $.24$ (25)]. In addition, playfulness related to higher coordination skills according to self-reports. Furthermore, Proyer et al. (26) extended these findings with two studies focusing on the OLIW facets of playfulness as well as objective criteria of fitness. In Study 1 ($N = 529$), the OLIW facets related to higher activity levels and pursuing an active way of life; in Study 2, they invited 67 participants to the lab for interviews and physical exercise tests, including hand-grip strength, a stair-climbing exercise (cardio-respiratory fitness), the sit and reach test (back and leg flexibility), the 1-min sit-to-stand test (lower body muscular strength and endurance), and tests of fine motor functions. The interviews showed that Other-directed and Lighthearted playfulness related to being active in the last seven days ($r_s = .29$ and $.26$), including time spent with moderate and vigorous activity (Other-directed) and walking (Lighthearted), as

well as negative relations to time spent sitting ($r_s = -.25$ and $-.21$). Moreover, the facets showed differential relations with the objective indicators of baseline-, activity-, and recovery heart rates, being negatively related to Other-directed playfulness; all facets showed relations to greater hand and forearm strength; and Lighthearted playfulness related to greater lower body strength and endurance. Overall, the available findings and theoretical considerations support the notion that trait-playfulness may contribute to engagement in PA, including its benefits of mental and physical health.

1.3 The present study

Despite the increasing interest in play(fulness) in sports, the role of trait-playfulness is hitherto understudied. Specifically, it is unclear whether playful people might engage in more physical activity than less playful people. Accordingly, we addressed this gap in the literature by collecting data from both self-ascribed athletes and non-athletes. In line with the literature [(27); see also (28)], we asked participants to self-identify as athlete or non-athlete. Additionally, we assessed their athletic identity, which describes how strongly and exclusively one identifies with the athlete role (27) and has been found to robustly predict various outcomes such as burnout, substance use, sensitivity to training change, and career transitions (29). This approach allowed us to examine whether there are robust differences in the expressions of facets of playfulness among those who view themselves as athletes or non-athletes, and how the OLIW facets correlate with athletic identity measured on a dimension from none to high athletic identity. We established measurement invariance for playfulness between athletes and non-athletes to clarify whether the scores from the OLIW questionnaire (7) can be compared in a meaningful way between the groups. Finally, we asked participants to report their time spent with PA. Taking earlier findings into account (6, 18, 25, 26), we expected positive associations with the OLIW facets. Our findings will contribute to the knowledge by examining playfulness as a personality trait that might explain differences between athletes and non-athletes and inclinations to engage in physical activity.

2 Methods

2.1 Sample and procedure

Our sample comprised 414 participants, of which 205 identified as athletes and 209 as non-athletes. The mean ages were 25.6 ($SD = 7.2$; non-athletes) and 27.1 years ($SD = 7.1$; athletes). Of the non-athletes, 80.4% were women, 17.2% men, 1.9% indicated third gender, and 0.5% did not indicate their gender; of the athletes, 61.5% were women, 38.0% were men, and 0.5% did not indicate their gender. As in prior research (30, 31), those who self-identified as athletes reported more time spent with PA at the time of the study ($M = 8.8$ h/week; $SD = 3.7$, 2 to 26 h/week) than non-athletes ($M = 5.1$; $SD = 3.0$; 0

to 15 h/week; Hedges' $g = 1.11$ 95% confidence interval [0.89, 1.30]. Overall, the educational status was high, with 31.7% holding a university degree and 54.3% with a high-school diploma qualifying them to attend university, 6.3% had completed vocational training, and the remaining participants held a high-school diploma without qualification to attend university. Power analyses showed that the samples allowed the detection of correlations $\geq .17/.20$ with 80/90% statistical power ($\alpha = .05$).

We collected all data online (<https://soscisurvey.de>) between May 2024 and February 2025. We advertised the study online and with leaflets through the authors' department's website and by contacting sports clubs with amateur and semi-professional members.

2.2 Instruments

We assessed playfulness using the OLIW questionnaire (7). The 28-item instrument assesses the four facets, which include: Other-directed (e.g., "I have close friends with whom I can just fool around and be silly"); Lighthearted (e.g., "I do not live from day to day at all; I rather plan ahead long in advance" [reverse]); Intellectual (e.g., "I can always think of something to do and I am never bored"); and Whimsical (e.g., "I have an unusual habit or an uncommon hobby"). Participants gave their responses on a 7-point Likert-type rating scale (1 = *strongly disagree*; 7 = *strongly agree*). The internal consistencies were comparable with prior studies [e.g., (10, 32)], with $\alpha = .70$ (Other-directed), .77 (Lighthearted), .59 (Intellectual)², and .81 (Whimsical). There is robust evidence for the reliability and validity [e.g., retest- and inter-rater agreement; self-other agreement; structural validity across data sources; (7, 32, 33)].

We used the 10-item *Athletic Identity Measurement Scale* [AIMS; (27); German version (35)] to assess athletic identity (e.g., "Sport is the most important part of my life"). Participants respond on a 7-point Likert scale (1 = *strongly disagree*; 7 = *strongly agree*). We computed the total score of the AIMS as indicator of athletic identity since Schmid and Seiler (35) noted low discriminant validity of potential subscales. Brewer et al. (27) reported a retest-correlation of .89 across 14 days and a recent meta-analysis of the AIMS provides robust evidence regarding the AIMS' reliability and validity of the total score (28). In our study, the internal consistency was high ($\alpha = .94$) and comparable to earlier research using the German

²The low number of items and the breadth of content covered in the scale yields typically comparatively low internal consistency values. Alternative approaches to estimating reliability support the use of the scale. For example, Proyer (7) found robust temporal stability, with test-retest correlations of .73 (1-week), .74 (2-week and 1-month), and .67 (3-month interval), and inter-rater reliability at zero-acquaintance is .69 and .72 [(33, 34)].

version (35). Further, Brewer and Cornelius (36) demonstrated measurement invariance between athletes and non-athletes.

2.3 Data analysis

We examined the measurement invariance of the OLIW questionnaire between the groups of athletes and non-athletes to establish whether the scale scores can be compared across groups in a meaningful way. We computed the analyses in Mplus 8.8 (37) using the robust maximum-likelihood estimator (38). We computed three models of measurement invariance with increasing constraints, namely: configural invariance (i.e., same number of factors); metric invariance (i.e., setting item-factor loadings equal between groups); and scalar invariance (i.e., assuming equal latent means across groups). We used Chen's (39) combinational guidelines of RMSEA, CFI, and SRMR to evaluate the change of model fit, suggesting that metric invariance should be rejected when $\Delta CFI \geq .010$ and $\Delta RMSEA \geq 0.015$ (or $\Delta SRMR \geq .030$) and scalar invariance should be rejected when $\Delta CFI \geq .010$ and $\Delta RMSEA \geq 0.015$ (or $\Delta SRMR \geq .010$). Further, we computed Hedges' g effect size for comparisons of group means, with coefficients $\geq 0.20/0.50/0.80$ indicating small, medium, and large effects.

We computed Pearson correlations to examine the associations between study variables, assuming $r_s \geq .10$, $.20$, and $.30$ indicate small, medium, and large effect sizes (40). Finally, we used regression analyses to examine the unique contribution of the playfulness facets beyond age and gender (included in Step 1; method = ENTER) in predicting the outcomes of time spent with PA and athletic identity. Again, we used a standardized effect size measure to evaluate the findings, namely, Cohen's regression effect size f^2 indicating small, medium, and large effects when ≥ 0.02 , 0.15 , and 0.35 .

3 Results

3.1 Preliminary analyses

Table 1 provides the descriptive statistics. Overall, the total sample showed similar expressions to those found in other

German-speaking samples [e.g., (38)]. For athletic identity, the expressions fit well with the range reported in a recent meta-analysis, with our participants who identified as athletes yielding scores that are reported as typical for athletes on the intermediate level [i.e., identify as non-elite, in extensive training; (28)] whereas the scores of the self-ascribed non-athletes align with those reported for non-athletes (41). As expected, athletes reported markedly higher athletic identity than non-athletes [$g = 2.20$, 95% confidence interval (1.95, 2.44)].

3.2 Comparing athletes' and non-athletes' playfulness

Our measurement invariance analyses showed no evidence for rejecting metric and scalar invariance (all $\Delta RMSEAs \leq 0.001$, $\Delta SRMRs \leq 0.004$, and $\Delta CFIs \leq 0.008$). Hence, the manifest scores of the OLIW questionnaire can be compared between our athletes and non-athletes.

We compared the athletes and non-athletes concerning their expressions in the facets of playfulness and found one notable group difference, namely the athletes scored higher in Lighthearted playfulness, with a small effect size [$g = 0.31$ (0.12, 0.51); Table 1]. We found no robust differences for the remaining facets.

3.3 Playfulness and athletic identity

Table 2 gives the correlations between the OLIW facets and the AIMS. While they were independent when considering the total sample and athletes, we found minor associations between athletic identity and Other-directed and Lighthearted playfulness, with coefficients of $r = .17$ and $.15$ ($ps = .012$ and $.027$) in non-athletes. Overall, the OLIW facets explained 5.8% of variance in athletic identity ($F_{4,202} = 3.15$, $p = .015$), a small effect size ($f^2 = 0.06$) beyond age and gender ($R^2 = .01$; $f = 0.01$) in non-athletes. An inspection of the predictors showed that Other-directed entered the model with a small effect size ($\beta = .20$, $p = .016$, $f^2 = 0.03$). On the contrary, playfulness was unrelated to athletic identity among self-ascribed athletes ($rs \leq |.09|$, $p \geq .200$), explaining 2.2% shared variance

TABLE 1 Means and standard deviations of playfulness and athletic identity.

Playfulness	Total ($N = 414$)		Non-athletes ($n = 209$)		Athletes ($n = 205$)		Hedges' g
	M	SD	M	SD	M	SD	
Other-directed	5.08	0.90	5.11	0.85	5.05	0.95	−0.07 [−0.26, 0.13]
Lighthearted	3.95	1.03	3.78	1.05	4.10	1.00	0.31 [0.12, 0.51]
Intellectual	4.09	0.82	4.05	0.84	4.13	0.79	0.10 [−0.10, 0.29]
Whimsical	3.93	1.06	3.84	1.01	4.01	1.11	0.16 [−0.03, 0.35]
Athletic Identity	3.39	1.59	2.23	0.90	4.58	1.22	2.20 [1.95, 2.44]

Bootstrapped 95% confidence intervals from 5,000 random samples in brackets.

TABLE 2 Partial correlations between athletic identity and facets of playfulness.

Group	Other-directed	Lighthearted	Intellectual	Whimsical
Total	.06 [−.05, .16]	.08 [−.02, .17]	.05 [−.05, .14]	.05 [−.05, .15]
Non-athletes	.17* [.04, .31]	.15* [.02, .29]	.06 [−.07, .18]	−.01 [−.15, .12]
Athletes	.07 [−.08, .22]	−.09 [−.24, .05]	.01 [−.13, .15]	.04 [−.11, .18]

* $p < .05$. Two-tailed. Bootstrapped 95% confidence intervals from 5,000 random samples in brackets. Controlled for age and gender.

TABLE 3 Partial correlations between time spent with physical activity and the OLIW facets of playfulness and athletic identity.

Group	Other-directed	Lighthearted	Intellectual	Whimsical	Athletic identity
Total	.12* [.02, .22]	.15** [.04, .25]	.17*** [.08, .26]	.15** [.05, .25]	.52*** [.45, .59]
Non-Athletes	.06 [−.07, .19]	.03 [−.10, .17]	.02 [−.10, .15]	−.04 [−.17, .10]	.35*** [.24, .46]
Athletes	.22*** [.09, .35]	.19** [.04, .35]	.31*** [.19, .42]	.27** [.15, .39]	.26*** [.12, .38]

* $p < .05$. ** $p < .01$. *** $p < .001$. Two-tailed. Bootstrapped 95% confidence intervals from 5,000 random samples in brackets. Controlled for age and gender.

($F_{4,198} = 1.16$, $p = .331$) beyond age and gender ($R^2 = .02$; $f^2 = 0.02$)³.

3.4 Playfulness and time spent engaging in physical activity

As expected, we found positive associations between athletic identity and time spent performing PA across the total sample and among athletes and non-athletes ($r_s \geq .26$, $p_s < .001$; Table 3). Hence, those with a stronger identification as an athlete reported spending more time participating in PA.

All playfulness facets related positively to time spent engaged in PA, with small effect sizes ($r_s \geq .12$, $p_s \leq .012$) in the total sample. However, the fine-grained analysis of the groups showed important differences, as the correlations were negligible among non-athletes ($r_s \leq .06$), but of medium-to-large size in athletes, with r_s between .19 (Lighthearted) and .31 (Intellectual; $p_s \leq .005$). When testing the unique contribution of the OLIW facets in a regression analysis in athletes, Intellectual ($\beta = .23$, $p = .003$; $\Delta f^2 = 0.10$; $F_{1,201} = 20.97$; $p < .001$) and Whimsical ($\beta = .16$, $p = .034$; $\Delta f^2 = 0.02$, $F_{1,200} = 4.58$) playfulness were predictors of time spent performing PA, explaining 11.8% of the variance, which translates to a small-to-medium regression effect size ($f^2 = 0.14$) after controlling for age and gender ($R^2 = .02$, $f^2 = 0.02$)⁴.

4 Discussion

The aim of our study was to extend the knowledge on how trait-playfulness relates to self-identification with being an athlete and time spent participating in PA. To the best of our

knowledge, this is the first study to analyze the measurement invariance of playfulness among self-ascribed athletes and non-athletes. Our approach of studying athletes and non-athletes with regard to facets of playfulness and physical activity revealed both interesting and surprising findings.

We found that both groups understand the items in comparable ways and allow for comparisons between the groups, thus extending further the knowledge on the generalizability of facets of playfulness across groups (42, 43). After establishing the comparability of the playfulness measurement models between athletes and non-athletes, we found that they were similar, except for athletes showing greater Lighthearted playfulness. This is somewhat surprising given that those who view themselves as athletes and are likely to adhere to more structured trainings that require planning show more inclination to improvise in this regard than non-athletes. We supplemented self-categorization of being an athlete with a dimensional self-report measure of athletic identity (27), which mirrored the findings with participants' self-classification by showing overall negligible to minor associations between playfulness and identifying as an athlete. An exception to this was that, among non-athletes, Other-directed playfulness yielded a small regression effect size. It might be argued that Other-directed playfulness plays a role in the perception of oneself being an athlete when it comes to team sports, as it could enable social interactions and provide a means to greater engagement in sports. This would fit well with recent findings from a diary study on the connection between playful sport design and sport engagement showing that (a) sports engagement increases when training partners are involved and that (b) the contribution of playful elements to make PA more interesting increases in a social context (17). However, the effect size is small and should be interpreted cautiously, pending replication and extension by studying its relationship with, for example, individual vs. team sports, which has been shown to relate to trait expressions of self-efficacy, positivity, resilience, self-esteem, and perseverance, to name but a few (44).

In extension to identification with being an athlete, we assessed how much time participants spent engaged in PA during their week. Again, we found playfulness was relevant

³All variance inflation factors were ≤ 1.66 and tolerance values ≥ 0.6 , thus, not indicating multicollinearity.

⁴When entering all OLIW facets as predictors, the explained variance does not change.

among the athletes, as all types of playfulness related to spending more time with sports, yielding moderate to large correlation effect sizes. One might argue that athletes, i.e., those who engage in sports in a very structured and (semi)professional way, might use playful approaches to make it more interesting and entertaining, which then translates to more engagement with exercise and practice. Regression analyses identified Intellectual and Whimsical playfulness as relevant variables, further supporting the notion that re(framing) situations (e.g., by playing with ideas and strategies during exercise) contributes to engaging in sports. This fits well with the current literature on play and playfulness in sports. For example, Velasco and Jorda's (18) findings from various sports and activities (e.g., soccer, basketball, and triathlon) showed that boredom, especially among athletes, has detrimental consequences, including lack of participation in activities. Accordingly, (re)framing situations, especially those experienced as monotonous, might help athletes to deal with boredom and other negative consequences related to monotony and/or repetitive activities. In addition, our findings supplement those showing that the inclusion of playful elements would contribute to engaging in sports (4, 6, 17). Further research might explore person $\times$ situation interactions, testing how playful vs. less playful persons respond to PA routines that do (not) include playful elements. It would be desirable to examine the interaction between person- and situational factors that lead to engagement with sports. From the perspective of the broaden-and-build theory of positive emotions (21), it might also be argued that a playful approach to sports and the subsequent positive emotions experienced could lead to an increase in the uptake, and thereby more time spent, in participating in sports.

One might expect that the mechanisms discussed should also be found in non-athletes. Our cross-sectional data cannot provide knowledge about the causal mechanisms of playfulness and intervention studies would be needed to clarify whether changes in playfulness would accompany changes in athletes' subjective outcomes, such as boredom during training or objective indicators such as time spent with PA [see also (4) and (5)]. One avenue to learning more about the role of playfulness among non-athletes might be focusing on the relation to Other-directed playfulness. As demonstrated in the field of relationships (9), playfulness provides means to establish and maintain social connections, and this in turn could contribute to people, especially non-athletes, engaging in sports as a "by-product," especially when social connections might be made and maintained for example, by being a member in a sports group [e.g., (45–47)].

In short, playfulness may serve as an important psychological resource in the context of training, be it in leisure-time or (semi-)professionally, particularly when exercises become repetitive, monotonous, or mentally taxing, and when additional motivation is needed. Engaging in regular training routines often requires sustained motivation, especially when progress is slow, tasks lack variety, or when training is undertaken alone with little distraction and/or under challenging or harsh conditions. In such situations, boredom can become a barrier to

adherence. Adult playfulness, particularly in its lighthearted and other-directed forms, may help individuals reframe repetitive exercises in a more enjoyable and engaging manner. For example, playful individuals might infuse their routines with small challenges, unconventional ideas and thoughts, or small games (e.g., in social settings), thereby increasing the perceived fun of the activity—and interest and engagement with the activity itself. This reframing may not only reduce boredom but may also foster positive affect and intrinsic motivation, both of which are crucial for long-term commitment to physical activity. Playfulness may function as a buffer against the demotivating and difficult effects of routine, enabling individuals to persist in training programs and potentially achieve better outcomes in physical fitness and well-being.

4.1 Limitations and future directions

Our study has several limitations. First, we relied on self-reports for all study variables. While there is robust evidence that self-reports of playfulness and time spent participating in PA are comparatively accurate [e.g., (32, 48)], supplementing the self-reports with objective recordings and reports by knowledgeable others [see (26)] is desirable in future studies to reduce method variance that can inflate correlations. Further, an objective and valid criterion for assessing the status of being an athlete or non-athlete is hitherto difficult to establish [see also (30)]. Classification is usually based on several factors such as length of athletic career, participation in competitions, gender, and age (28), but there is no consensus on the definition of athlete status. Although the WHO specifies the length of time that distinguishes between what is considered not enough and what is healthy exercise (49), this alone is not sufficient to determine athlete status and, accordingly, we relied on the frequently used method of self-identification. Also, it is unclear whether or to what degree self-selection plays a role for the findings. While we contacted sports clubs and invited members to participate, it is unclear how well our subgroups represent the underlying populations of athletes and non-athletes. Secondly, our findings are limited to German-speakers, and we have not tested professional athletes. Thirdly, we have not distinguished between the type of sports that our participants engage in. As discussed, the type of sports undertaken might relate to playfulness, for example: whether one engages in a play-based sports with rules (e.g., soccer or ice hockey) vs. activities in which there is an absence of formal rules (e.g., free swimming); team- vs. individual sports; and sports that relate to monotony [e.g., swimming the same 25 m track in a pool 100 times on a daily basis vs. being able to engage with a new environment daily, such as in long-distance running; (18)]. Fourth, women are overrepresented in our sample of non-athletes. Although the consideration of gender as covariate did not point to robust effects, replication using more balanced samples is desirable to ensure the distinction between effects of group and gender. Finally, our data are cross-sectional and do not allow conclusions about the mechanisms behind our findings. While

playfulness is a personality trait that is stable across time and situations, it is feasible that engagement in sports in adolescence might affect playfulness and attitudes toward sports and PA during adolescence [e.g., (50)]. Also, people differ regarding their motives for participating in PA, and it is feasible that personal motives (e.g., enjoyment vs. others' expectations) affect how people experience and approach PA and how playfulness contributes to meeting one's activity-related goals (51).

We hope that our findings supplement and stimulate research on the role of play and playfulness in sports as a potential facilitator of engaging in PA. There are fruitful research avenues from the growing literature on play(fulness) in sports. Beyond studying person $\times$ situation interactions, trainings of trait-playfulness might be tested in future research. In a randomized placebo-controlled study, Proyer et al. (52) showed that playfulness can be stimulated and that changes in playfulness go along with greater well-being and reduced depressiveness. We recommend that future research should examine whether interventions might provide insights into the mechanisms and might translate from athletes to non-athletes in terms of time spent participating in PA, as it might be feasible that greater playfulness also supports non-athletes in engaging in being active. Further, interventions might be adapted to the context of sports by asking participants to actively incorporate playful elements into their PA. We would expect that this might contribute to an increase in the joy of engaging in PA (4).

Data availability statement

The datasets presented in this study can be found in online repositories. The names of the repository/repositories and accession number(s) can be found below: all data and syntaxes are openly available in the Open Science Framework (<https://osf.io/gpbe9/>).

Ethics statement

Ethical approval was not required for the studies involving humans because Ethical review and approval was not required for the study on human participants in accordance with the local legislation and institutional requirements. We conducted the research in accordance with the 1964 Declaration of Helsinki and the ethical guidelines by the German Psychological Association. The participants provided their written informed consent to participate in this study. The studies were conducted

in accordance with the local legislation and institutional requirements. The participants provided their written informed consent to participate in this study.

Author contributions

KB: Conceptualization, Formal analysis, Investigation, Methodology, Project administration, Supervision, Writing – original draft, Writing – review & editing. JD: Conceptualization, Formal analysis, Investigation, Methodology, Project administration, Writing – review & editing. RP: Resources, Writing – review & editing.

Funding

The author(s) declare that no financial support was received for the research and/or publication of this article.

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Generative AI statement

The author(s) declare that no Generative AI was used in the creation of this manuscript.

Any alternative text (alt text) provided alongside figures in this article has been generated by Frontiers with the support of artificial intelligence and reasonable efforts have been made to ensure accuracy, including review by the authors wherever possible. If you identify any issues, please contact us.

Publisher's note

All claims expressed in this article are solely those of the authors and do not necessarily represent those of their affiliated organizations, or those of the publisher, the editors and the reviewers. Any product that may be evaluated in this article, or claim that may be made by its manufacturer, is not guaranteed or endorsed by the publisher.

References

1. Kokkinos P. Physical activity, health benefits, and mortality risk. *Int Sch Res Notices*. (2012) 2012(1):718789. doi: 10.5402/2012/718789
2. Ojiambo RME. Physical activity and well-being: a review of the health benefits of physical activity on health outcomes. *J Appl Med Sci*. (2013) 2(2):69–78.
3. WHO. *Physical Activity*. Geneva: World Health Organization (2024). Available online at: <https://www.who.int/news-room/fact-sheets/detail/physical-activity>
4. de Vries JP. Conceptualising physical playfulness. *Int J Play*. (2021) 10(3):243–60. doi: 10.1080/21594937.2021.1959229

5. Mareš L, Ryall E. 'Playing sport playfully': on the playful attitude in sport. *J Phil Sport*. (2021) 48(2):293–306. doi: 10.1080/00948705.2021.1934689
6. Verwijmeren S, de Vries JD, Bakker AB. Playful sport design: a game changer? *J Appl Sport Psychol*. (2024) 36(1):45–74. doi: 10.1080/10413200.2023.2185698
7. Proyer RT. A new structural model for the study of adult playfulness: assessment and exploration of an understudied individual differences variable. *Pers Individ Dif*. (2017) 108:113–22. doi: 10.1016/j.paid.2016.12.011
8. Proyer RT, Brauer K. Assessing playfulness: current challenges and overview. In: Ruch W, Bakker AB, Tay L, Gander F, editors. *Handbook of Positive Psychology Assessment*. Göttingen: Hogrefe (2023). p. 145–61.
9. Brauer K, Proyer RT, Chick G. Adult playfulness: an update on an understudied individual differences variable and its role in romantic life. *Soc Personal Psychol Compass*. (2021) 15(4):e12589. doi: 10.1111/spc3.12589
10. Brauer K, Stumpf HSC, Proyer RT. Playfulness in middle-and older age: testing associations with life satisfaction, character strengths, and flourishing. *Aging Ment Health*. (2024) 28(11):1540–9. doi: 10.1080/13607863.2024.2372471
11. Proyer RT, Tandler N, Brauer K. Playfulness and creativity: a selective review. In: Luria SR, Baer J, Kaufman JC, editors. *Creativity and Humor*. London: Academic Press (2019). p. 43–56. doi: 10.1016/B978-0-12-813802-1.00002-8
12. Rubinstein D, Lahad M, Aharonson-Daniel L, Brauer K, Proyer RT. A network model for human playfulness during war. *Sci Rep*. (2025) 15(1):17502. doi: 10.1038/s41598-025-02634-3
13. Tandler N, Schilling-Friedemann S, Frazier LD, Sendatzki R, Proyer RT. New insights into the contributions of playfulness to dealing with stress at work: correlates of self- and peer-rated playfulness and coping strategies. *New Ideas Psychol*. (2024) 75:101109. doi: 10.1016/j.newideapsych.2024.101109
14. Lieberman JN. *Playfulness: Its Relationship to Imagination and Creativity*. New York, NY: Academic Press (1977/2014).
15. Trevlas E, Matsouka O, Zachopoulou E. Relationship between playfulness and motor creativity in preschool children. *Early Child Dev Care*. (2003) 173(5):535–43. doi: 10.1080/0300443032000070482
16. Ríos D, Cubedo M, Ríos M. Graphical study of reasons for engagement in physical activity in European union. *Springerplus*. (2013) 2:1–6. doi: 10.1186/2193-1801-2-488
17. de Vries JP, Scharp YS, Bakker AB. Playful sport design and sport engagement: a diary study among amateur athletes. *Psychol Sport Exerc*. (2025) 81:102953. doi: 10.1016/j.psychsport.2025.102953
18. Velasco F, Jorda R. Portrait of boredom among athletes and its implications in sports management: a multi-method approach. *Front Psychol*. (2020) 11:831. doi: 10.3389/fpsyg.2020.00831
19. Barnett LA. How do playful people play? Gendered and racial leisure perspectives, motives and preferences of college students. *Leis Sci*. (2011) 33:382–401. doi: 10.1080/01490400.2011.606777
20. Proyer RT. A psycho-linguistic study on adult playfulness: its hierarchical structure and theoretical considerations. *J Adult Dev*. (2012) 12:141–9. doi: 10.1007/s10804-012-9141-7
21. Fredrickson BL. The broaden-and-build theory of positive emotions. *Philos Trans R Soc B*. (2004) 359(1449):1367–77. doi: 10.1098/rstb.2004.1512
22. Amabile TM, Hill KG, Hennessey BA, Tighe EM. The work preference inventory: assessing intrinsic and extrinsic motivational orientations. *J Pers Soc Psychol*. (1994) 66(5):950–67. doi: 10.1037/0022-3514.66.5.950
23. Csikszentmihalyi M. Play and intrinsic rewards. *J Human Psychol*. (1975) 15(3):41–63. doi: 10.1177/002216787501500306
24. Proyer RT. Being playful and smart? The relations of adult playfulness with psychometric and self-estimated intelligence and academic performance. *Learn Individ Differ*. (2011) 21(4):463–7. doi: 10.1016/j.lindif.2011.02.003
25. Proyer RT. The well-being of playful adults. *Eur J Humour Res*. (2013) 1(1):84–98. doi: 10.7592/EJHR2013.1.1.proyer
26. Proyer RT, Gander F, Bertenshaw EJ, Brauer K. The positive relationships of playfulness with indicators of health, activity, and physical fitness. *Front Psychol*. (2018) 9:325276. doi: 10.3389/fpsyg.2018.01440
27. Brewer BW, van Raalte JL, Linder DE. Athletic identity: hercules' muscles or achilles heel? *Int J Sport Psychol*. (1993) 24:237–54.
28. Lochbaum M, Cooper S, Limp S. The athletic identity measurement scale: a systematic review with meta-analysis from 1993 to 2021. *Eur J Investig Health Psychol Educ*. (2022) 12(9):1391–414. doi: 10.3390/ejihpe12090097
29. Brewer BW, Petitpas AJ. Athletic identity foreclosure. *Curr Opin Psychol*. (2017) 16:118–22. doi: 10.1016/j.copsyc.2017.05.004
30. Swann C, Moran A, Piggott D. Defining elite athletes: issues in the study of expert performance in sport psychology. *Psychol Sport Exerc*. (2015) 16:3–14. doi: 10.1016/j.psychsport.2014.07.004
31. Ziemainz H, Stoll O, Drescher A, Erath R, Schipfer M, Zeulner B. Die gefährdung zur sportsucht in ausdauersportarten [to be at risk from exercise addiction in endurance sports]. *Deutsche Zeitschrift für Sportmedizin*. (2013) 62(2):57–64. doi: 10.5960/dzsm.2012.057
32. Brauer K, Sendatzki R, Proyer RT. Exploring the acquaintanceship effect for the accuracy of judgments of traits and profiles of adult playfulness. *J Pers*. (2024) 92:495–514. doi: 10.1111/jopy.12839
33. Brauer K, Proyer RT. Interpersonal perception of adult playfulness at zero-acquaintance: a conceptual replication study of self-other agreement and consensus, and an extension to two accuracy criteria. *J Pers*. (2025) 93(4):817–29. doi: 10.1111/jopy.12978
34. Proyer RT, Brauer K. Exploring adult playfulness: examining the accuracy of personality judgments at zero-acquaintance and an LIWC analysis of textual self-descriptions. *J Res Pers*. (2018) 73:12–20. doi: 10.1016/j.jrp.2017.10.002
35. Schmid J, Seiler R. Identität im hochleistungssport [identity in high-performance sport]. *Diagnostica*. (2003) 49(4):176–83. doi: 10.1026/0012-1924.49.4.176
36. Brewer BW, Cornelius AE. Norms and factorial invariance of the athletic identity measurement scale (AIMS). *Acad Athl J*. (2001) 16:103–13.
37. Muthén LK, Muthén BO. *Mplus 8.11 User's Manual*. Los Angeles, CA: Muthén & Muthén (2024).
38. Brauer K, Ranger J, Ziegler M. Confirmatory factor analyses in psychological test adaptation and development: a non-technical discussion of the WLSMV estimator. *Psychol Test Adapt Dev*. (2023) 4:4–12. doi: 10.1027/2698-1866/a000034
39. Chen FF. Sensitivity of goodness of fit indexes to lack of measurement invariance. *Struct Equ Modeling*. (2007) 14(3):464–504. doi: 10.1080/10705510701301834
40. Gignac GE, Szodorai ET. Effect size guidelines for individual differences researchers. *Pers Individ Dif*. (2016) 102:74–8. doi: 10.1016/j.paid.2016.06.069
41. Good AJ, Brewer BW, Petitpas AJ, Van Raalte JL, Mahar MT. Identity foreclosure, athletic identity, and college sport participation. *Acad Athl J*. (1993) 8(1):1–12.
42. Brauer K, Scherrer T, Proyer RT. Testing the associations between adult playfulness and sensation seeking: a SEM analysis of librarians and police officers. *Front Psychol*. (2021) 12:667165. doi: 10.3389/fpsyg.2021.667165
43. Sendatzki R, Brauer K, Proyer RT. An initial study on the role of playfulness in vocational interests and career choices. *Pers Individ Dif*. (2025) 246:113371. doi: 10.1016/j.paid.2025.113371
44. Laborde S, Guillén F, Mosley E. Positive personality-trait-like individual differences in athletes from individual-and team sports and in non-athletes. *Psychol Sport Exerc*. (2016) 26:9–13. doi: 10.1016/j.psychsport.2016.05.009
45. Howie EK, Daniels BT, Guagliano JM. Promoting physical activity through youth sports programs: it's social. *Am J Lifestyle Med*. (2020) 14(1):78–88. doi: 10.1177/1559827618754842
46. Stevens M, Rees T, Coffee P, Steffens NK, Haslam SA, Polman R. A social identity approach to understanding and promoting physical activity. *Sports Med*. (2017) 47:1911–8. doi: 10.1007/s40279-017-0720-4
47. Ueshima K, Fujiwara T, Takao S, Suzuki E, Iwase T, Doi H, et al. Does social capital promote physical activity? A population-based study in Japan. *PLoS One*. (2010) 5(8):e12135. doi: 10.1371/journal.pone.0012135
48. Panter J, Griffin S, Ogilvie D. Correlates of reported and recorded time spent in physical activity in working adults: results from the commuting and health in Cambridge study. *PLoS One*. (2012) 7(7):e42202. doi: 10.1371/journal.pone.0042202
49. Repenning S, Meyrahn F, an der Heiden I, Ahlert G, Preuß H. Der Beitrag des Sports zur Erfüllung der WHO-Empfehlungen für körperliche Aktivität [The contribution of sport to meeting the WHO recommendations for physical activity]. In: GmbH, Bundesministerium für Wirtschaft und Energie (BMWi) & Bundesinstitut für Sportwissenschaft (BISp), editors. *Aktuelle Daten Zur Sportwirtschaft*. Mainz: 2HMforum (2020). p. 1–28. Available online at: https://www.bisp-sportinfrastruktur.de/SharedDocs/Downloads/DE/Sportentwicklung/who_empfehlung.pdf?__blob=publicationFile&v=1
50. Kjønniksen L, Anderssen N, Wold B. Organized youth sport as a predictor of physical activity in adulthood. *Scand J Med Sci Sports*. (2009) 19(5):646–54. doi: 10.1111/j.1600-0838.2008.00850.x
51. Molanorouzi K, Khoo S, Morris T. Motives for adult participation in physical activity: type of activity, age, and gender. *BMC public Health*. (2015) 15:66. doi: 10.1186/s12889-015-1429-7
52. Proyer RT, Gander F, Brauer K, Chick G. Can playfulness be stimulated? A randomised placebo-controlled online playfulness intervention study on effects on trait playfulness, well-being, and depression. *Appl Psychol Health Well Being*. (2021) 13(1):129–51. doi: 10.1111/aphw.12220