

# German Translation of the Revised Physical Self-Perception Profile Competence (PSPP-R Competence)

Evidence From a Predominantly Female Sample

Emily Bringmann<sup>1</sup> and Kai T. Horstmann<sup>2</sup> 

<sup>1</sup>Institute of Psychology, Ruprecht-Karls-Universität Heidelberg, Germany

<sup>2</sup>Department of Psychology, University of Siegen, Germany

**Abstract:** This paper examines the validity of the competence scale of the Revised Physical Self-Perception Profile (PSPP-R Competence) in a large German sample of 1,007 predominantly female participants by assessing construct validity, discriminant and criterion validity, and reliability. The PSPP-R Competence measures four factors: Body Attractiveness, Physical Strength, Sports Competence, and Physical Condition. Confirmatory factor analyses confirmed the hypothesized correlated four-factor structure and offered support for a hierarchical factor structure. Discriminant and criterion validity analyses offered insight into the nomological net and were in line with theoretical considerations. Reliability of all subscales was estimated using Cronbach's  $\alpha$  and found to be good to excellent ranging from .84 to .92. Overall, this study provides support for a good adaptation of the PSPP-R in the German language and enriches previous validation studies focused mainly on factorial validity by adding discriminant and concurrent validity estimates.

**Keywords:** PSPP-R, translation, test development, Germany, physical self-perception

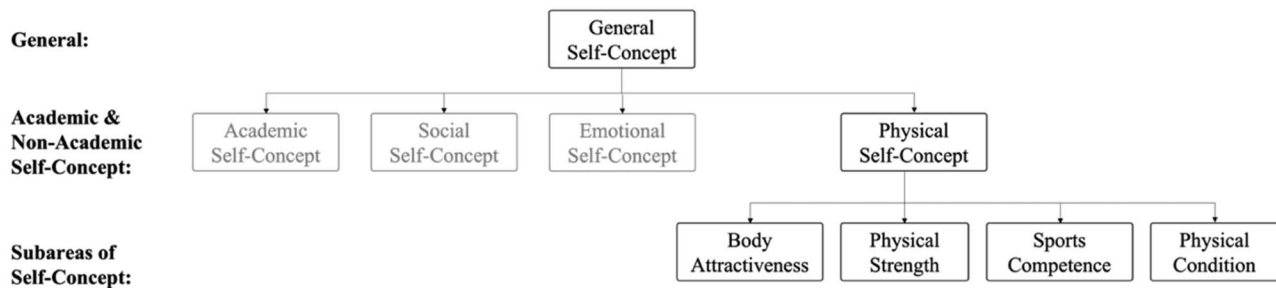


## Theoretical Background

For a long time, self-concept was conceptualized as a single-factor construct with different facets (Fox & Corbin, 1989). Shavelson et al. (1976) formulated a multidimensional, hierarchical approach that postulates four domains of self-concept: academic, social, emotional, and physical self-concept. Physical self-concept refers to the individual's perception of a person in all aspects of physical domains such as endurance, strength, athletic ability, and physical appearance (Fox & Corbin, 1989). It is not only an important contributor to overall self-esteem but also a substantial predictor of physical activity (Lindwall et al., 2014) and thereby highly relevant for physical and psychological health. Instruments that were first used to measure physical self-concept (Fitts, 1965; Ryckman et al., 1982; Sonstroem, 1976) had several shortcomings such as the absence of clearly defined subscales of physical

self-concept. Harter (1985) finally identified a scheme of domains and subdomains of the self by using an open-ended questionnaire and interview technique. Based on this scheme, Fox and Corbin (1989) developed the first Physical Self-Perception Profile (PSPP) consisting of 30 items. It assessed a total of five subscales: the four subscales Body Attractiveness, Sports Competence, Physical Strength, and Physical Condition, and a fifth subscale Physical Self-Worth (see Figure 1). According to the authors, this fifth subscale measures a superordinate factor that is hierarchically above the four other subscales. These four subscales can therefore all be considered different aspects of the superordinate factor Physical Self-Worth.

However, the PSPP has been criticized concerning three major points, which Lindwall et al. (2011) addressed in a revised version: First, a method effect was found due to an idiosyncratic response scale design that forced participants to choose between one of two statements and then rate their agreement to this statement. Second, items were both negatively and positively keyed which adds additional method variance (DiStefano & Motl, 2006; McCrae et al., 2001; Ten Berge, 1999). Furthermore, a Perceived Importance Profile (PIP) exists that refers to the *importance* individuals assign to the different subcomponents of physical self-perception. The estimate of internal



**Figure 1.** Hierarchical and multidimensional model of self-concept. Part of the model suggested by Shavelson et al. (1976) in "Self-Concept: Validation of construct interpretations," *Review of Educational Research*, 46(3), pp. 407–441. © Sage Publications.

consistency for the importance scales was comparatively poor with  $\alpha = .61$ –.76 (Lindwall & Hassmen, 2004), and the importance scale consisted only of two items per dimension.

The revised version of the PSPP (PSPP-R; Lindwall et al., 2011) consequently contains 60 items to assess importance and competence (30 items each). All items are positive statements. Participants rate their agreement to these statements on a 4-point rating scale. This new version has been validated in at least three different countries (Sweden, Turkey, and the United Kingdom) to ensure cross-cultural validity. It showed a better model fit and improved reliability estimates than the previous version (Lindwall et al., 2011). Lindwall et al. (2011) also provided evidence for factorial validity, yet not for discriminant or criterion validity, which both are important aspects of the validation process (Ziegler, 2014). Moreover, the validation samples of all countries were convenience samples of college students. So far, the PSPP-R has not been validated in a German sample (Lindwall et al., 2011).

In the following, the German version of the competence scale of the Revised Physical Self-Perception Profile (PSPP-R) will be validated on an age-heterogeneous sample of Germans. We refer to this version as the PSPP-R Competence. As the sum score of all other subscales approximates an overall physical self-worth score (Megakli et al., 2017), we exclude the subscale Physical Self-Worth and include the four subscales Body Attractiveness, Sports Competence, Physical Strength, and Physical Condition only, resulting in a 24-item instrument. We conduct confirmatory factor analyses, as well as discriminant and criterion validity analyses. We expect to replicate the results of Lindwall et al. (2011): Both first-order and second-order models would have a better fit than other conceivable models. We further extend previous findings by adding discriminant and criterion validity evidence. We decided to validate an efficient version of the PSPP-R in line with the initial version of the PSPP by Fox and Corbin (1989). Here, importance items were not

included in the PSPP, but instead, a separate instrument measuring importance of physical self-perception (PIP) was constructed. Although Lindwall et al. (2011) developed an importance scale within the PSPP-R, they concluded by stating that an independent use of each scale is possible. In line with that idea, Vlachopoulos et al. (2014) developed a short form of the PSPP-R, including only competence items, which has been used in further studies (i.e., Megakli et al., 2017). For the same reason of efficiency, we excluded the importance scale and the superordinate scale Physical Self-Worth. In the following section, we review the nomological net of physical self-worth. We then assess the constructs from this nomological net to estimate the evidence of discriminant and criterion validity.

## Constructs of the Nomological Net

### General Self-Esteem

Studies showed, in accordance with Harter's model (1985), a substantial association between physical self-worth and general self-esteem (Marsh & Sonstroem, 1995; Sonstroem et al., 1994). Therefore, we expect to find moderate positive correlations between physical self-worth and general self-esteem, as this would be evidence for a hierarchical model of self-esteem.

### Big Five Personality Traits

A study examining the Big Five and their relation to self-esteem found that the Big Five accounted for 34% of variance in self-esteem (Robins, Tracy, et al., 2001). Self-esteem correlated moderately positively with Extraversion and Conscientiousness and moderately negatively with Negative Emotionality. It correlated weakly positively but significantly with Agreeableness and Openness to Experience. Marsh et al. (2006) discovered moderate to strong positive relationships between physical self-perception indicators and Extraversion as well as Conscientiousness, moderate to strong negative relationships to Negative Emotionality, and low positive to

nonsignificant associations with Openness as well as Agreeableness. We expect to find moderate positive correlations between physical self-perception factors and the Big Five factors Extraversion and Conscientiousness. We further expect that the correlation between the competence of physical self-perception factors and Agreeableness and Openness to Experience is not significant. Finally, Negative Emotionality should be moderately negatively correlated with all four PSPP-R Competence factors.

### Dark Triad Personality Traits

The Dark Triad refers to three socially *undesirable* personality traits: psychopathy, narcissism, and Machiavellianism (Paulhus & Williams, 2002). Psychopathy, in its subclinical form, comprises forms of high impulsivity and thrill-seeking, and at the same time low empathy and anxiety. The subclinical form of narcissism is defined as comprising forms of high grandiosity, entitlement, dominance, and superiority. Machiavellianism is described as a manipulative personality trait. Individuals scoring high on this trait tend to disregard morals and instead focus on self-interests and deception. Possible links between the Dark Triad and self-esteem or physical self-worth remain unclear. Most studies examined the relation between narcissism and self-esteem and showed a significant correlation between the two (Barry et al., 2003, 2007; Raskin et al., 1991). Other studies have shown conflicting results, which has led to the definition of two types of narcissism: grandiose and vulnerable narcissism (for an overview, see Bosson et al., 2008). Most studies and definitions of narcissism have focused on the grandiose type of narcissism, while the vulnerable type, characterized by feelings of inferiority, dissatisfaction with the self, and proneness to shame, has more recently been shown to be associated with lower self-esteem (Miller et al., 2010; Okada, 2010; Zhang et al., 2017). In line with these findings, Jonason and Webster (2010) reported only barely significant correlations between the Dark Triad and self-esteem. It is therefore unclear which correlational pattern to expect exactly yet – in any case, all correlations between the Dark Triad personality traits and physical self-worth should be small in magnitude.

### Subjective Happiness

Baumeister et al. (2003) found self-esteem to be the strongest predictor of happiness. The link between happiness and physical self-perception has been established in a variety of studies (Kim & Ahn, 2021; Morales-Rodríguez et al., 2020; Roh, 2018), which found small to moderate effect sizes. Accordingly, we expect a substantial, positive association between happiness and physical self-worth.

## Criteria

Numerous studies found a strong connection between exercise and both physical self-worth and general self-esteem. Sonstroem et al. (1994), for example, discovered a positive effect of exercise on self-esteem in adults, and another study showed the same pattern in children (Ekeland et al., 2004). An intervention study in Sweden showed that exercise had a positive short-term and long-term influence on physical self-perception (Kahlin et al., 2016). Furthermore, a randomized controlled trial that involved participants in a 6-month exercise program showed a positive effect on general self-esteem and an even bigger effect on the four subdomains of physical self-worth (McAuley et al., 2000), as proposed by Harter (1985). Therefore, physical activity is mainly interesting as a possible criterion validity measure. We expect to find moderate positive correlations between physical self-worth and physical activity, as well as a significant contribution of physical self-worth factors in predicting physical activity above and beyond the Big Five. Therefore, we expect that physical self-worth shows incremental validity in explaining variance in physical activity over the Big Five personality traits.

## Summary of Hypotheses

Based on the literature review, we expect moderate positive correlations between physical self-worth and general self-esteem, the Big Five factors Extraversion and Conscientiousness, and the criterion physical activity are expected. Furthermore, we expect moderate negative correlations of physical self-worth and Negative Emotionality, as well as nonsignificant correlations of physical self-worth and the Big Five factors Agreeableness and Openness to Experience. Relationships of physical self-worth and the Dark Triad personality traits will be assessed exploratively but are generally expected to be small. Substantial positive correlations are expected between physical self-worth and happiness, and physical self-worth should show incremental validity in explaining variance in physical activity, above and beyond the Big Five.

## Methods

### Participants

Our analyses are based on a large convenience sample. The sample was collected as part of a larger study that examined personality characteristics of horse owners. Consequentially,

participants were recruited by an advertisement on the Facebook page of a horse-related magazine and via the German Equestrian Federation (Deutsche Reiterliche Vereinigung, FN), which featured the test on their website and on their mailing list. The study was conducted online, with a total duration of approximately  $Mdn = 37.78$  min, and participants participated voluntarily without being incentivized with monetary gratification. Before starting the survey, participants were informed about general study purposes, assurance of anonymity, and data protection conditions. Our sample consisted of  $N = 1,007$  participants between the ages of 18 and 73 years with an average age of 35.5 years ( $SD = 11.92$ ). Of the sample, 95.9% identified as female, 4% were male, and one person described themselves as nonbinary. The sample was diverse with respect to relationship status (29.37% single, 35.42% in a relationship, 30.46% married, 3.37% divorced, 0.3% widowed, 1.09% other) and originated from all Federal States in Germany (see Table E6 for an overview).

## Measures

All participants answered 24 competence items of the four subscales Body Attractiveness, Physical Strength, Sports Competence, and Physical Condition of the competence scale of the PSPP-R (Lindwall et al., 2011). A sample item of the first subscale translates to “I am very happy with the appearance of my body.” In the following, we refer to the higher-order factor across all four scales as Physical Self-Worth. All items were rated on a 4-point rating scale (1 = *strongly disagree*; 4 = *strongly agree*). All items were translated from English to German by a bilingual speaker and revised by a native German speaker in discussion with the bilingual speaker. All items in German and in English are listed in Table E1 in the online supplementary materials. All materials to reproduce the results of the study, as well as all supplementary materials, are available at <https://osf.io/qxecg/>.

Self-esteem was measured using a single item that translates to “I am self-confident, satisfied with myself” (“Ich bin selbstsicher, mit mir zufrieden.”; rated on 1 = *strongly disagree*, 5 = *strongly agree*). This item is part of the Negative Emotionality subscale of the BFI-2. Past research has suggested that single-item measures of self-esteem can have acceptable validity and reliability (Robins, Hendin, & Trzesniewski, 2001), although the authors asked directly for an assessment of self-esteem. While the included item is not a perfect indicator of general self-esteem, it can be considered a good proxy for general self-esteem (this is also substantiated by the high negative correlation of Negative Emotionality and general self-esteem of  $r = .57$ , as reported by Robins et al., 2001).

The Big Five personality traits were measured with the German version of the BFI-2 (Danner et al., 2016). The BFI-2 consists of 60 items that assess Extraversion, Openness to Experience, Conscientiousness, Negative Emotionality, and Agreeableness. All items were rated on a 5-point rating scale (1 = *strongly disagree*, 5 = *strongly agree*). Previous studies showed that reliability estimates, such as Cronbach’s  $\alpha$ , and discriminant measures of the BFI-2 were good or acceptable (Danner et al., 2016, 2019; Soto & John, 2017). In the present study, internal consistency estimates for the different scales varied between .80 and .88 (see Table ESM E2).

The three Dark Triad traits psychopathy, narcissism, and Machiavellianism were measured with the ultra-short version of the Short Dark Triad (uSDT; Wehner et al., 2021). Each trait was measured by three items that were rated on a 6-point rating scale (1 = *strongly disagree*, 6 = *strongly agree*). A sample item of the psychopathy subscale translates to “Payback needs to be quick and nasty.” In the current study, internal consistency estimates varied from .61 to .69 (see Table E2 in ESM 1).

Happiness was assessed with the German version of the Subjective Happiness Scale (SHS; Lyubomirsky & Lepper, 1999; Swami et al., 2009). Two of the four items are characterizations of happy people that participants had to rate their agreement to (1 = *not at all*; 7 = *a great deal*), one item assesses the absolute evaluation of happiness (1 = *not a very happy person*; 7 = *a very happy person*), and the fourth item includes the relative evaluation in comparison to peers (1 = *less happy*; 7 = *happier*). The SHS score was found to have good to excellent internal consistency, test-retest reliability, and convergent and discriminant validity in various previous studies (Lyubomirsky & Lepper, 1999; Mattei & Schaefer, 2004; Shimai et al., 2004; Swami et al., 2009). The good internal consistency was reproduced with an estimate of .85.

Physical activity, as an indicator for criterion validity, was measured by three different items that translate to “How often do you ride per week?” (“Wie oft pro Woche reiten Sie?”; Physical Activity 1), “I exercise (e.g., stretching, running, fitness) to advance my riding skills.” (“Ich mache Sport (z. B. Dehnübungen, Joggen, Fitness), damit ich besser reiten kann.”; Physical Activity 2), and “I do other sports besides riding.” (“Außer Reiten mache ich noch anderen Sport.”; Physical Activity 3). Item Physical Activity 1 was rated on a 7-point frequency rating scale, while items Physical Activity 2 and Physical Activity 3 were rated on a 6-point scale (1 = *strongly disagree*; 6 = *strongly agree*). Although these three items show face validity of measuring a form of physical activity, they will not likely comprise the construct of physical activity in its entirety. Nevertheless, they allow an approximation of the physical activity level of participants. All items were analyzed separately.

## Analytical Procedure

The analyses were performed using R (version 4.2.2), and the procedure consisted of three parts (R Core Team, 2020). First, we conducted confirmatory factor analyses to examine the factorial validity of the scores. Second, we estimated the test scores' reliability. Finally, we conducted discriminant and criterion validity analyses.

When performing confirmatory factor analyses, we first examined the four measurement models of the subscales separately. Second, we conducted a series of factor analyses in which all measurement models were included: a first-order four-factor model with correlated factors (Model 1), a higher-order factor model (Model 2), one single-factor model (Model 3), first-order four-factor model with uncorrelated factors (Model 4), and a bifactor model (Model 5). For each model, we examined model fit and its fit compared to the other models. For this, a comparative fit index (CFI)  $> .90$  was considered acceptable and  $> .95$  was considered good, and a root-mean-square error of approximation (RMSEA) and standardized root-mean-square residual (SRMR)  $< .08$  were considered acceptable. To further investigate the significance of the difference in model fit between different models tested, a chi-square test was conducted. We used the robust maximum likelihood estimator for the CFAs.<sup>1</sup>

Discriminant validity was estimated based on bivariate Pearson correlations between the PSPP-R Competence scale scores and the general self-esteem score obtained with the single-item, the personality trait scores obtained with the BFI-2, the ultra-Short Dark Triad scores, and the Subjective Happiness Scale scores. Criterion validity was investigated by correlating the PSPP-R Competence scale scores with the three items measuring physical activity and by performing regressions. In line with Cohen's (1988) suggestions, correlations below  $.30$  were considered weak, between  $.30$  and  $.50$  moderate and  $> .50$  strong. Internal consistency was estimated using Cronbach's  $\alpha$ . Cronbach's  $\alpha$  is usually considered acceptable when  $\alpha > .70$  (Bland & Altman, 1997).

## Results

### Descriptive Statistics

The responses across all items of the PSPP-R Competence ranged from 1 to 4; participants used the full range

of potential response options. The item means, which estimate the item's difficulty, varied between 2 and 3, except for one item that had a slightly higher mean (Item 7, "I feel really confident about my ability to maintain regular exercise and physical condition," of the Physical Condition factor with a mean of  $M = 3.14$ ) and one item that was slightly more difficult (Item 12, "I think that I am one of the best when it comes to joining in sports activities," of the Sports Competence factor with a mean of  $M = 1.80$ ; see Table 1). Similarly, at the scale level, the range of all scale scores was exhausted and scale means ranged between 2.21 and 2.63, thereby not showing particularly high or low item difficulty. Internal consistency estimates of all factors varied between  $.84$  and  $.92$  (see Table E2 in ESM 1).

### Confirmatory Factor Analyses

Measurement models of all four factors yielded satisfactory model fit (see Table E3 in ESM 1). Of the five tested models, only the bifactor model did not converge and was therefore not further considered. All other models converged (see Table 2 for global fit measures). The goodness of fit differed among the four models: While the first-order four-factor model with correlated factors (Model 1) and the higher-order factor model (Model 2) showed acceptable to good model fit, the single-factor model (Model 3) and the uncorrelated factor model (Model 4) showed poor model fit. Indeed, the hypothesized four-factor solution with the four correlated factors Body Attractiveness, Physical Strength, Sports Competence, and Physical Condition fit the data significantly better than all other models. For further analyses and interpretation, we will therefore draw upon this four-factor model. All factor loadings were significant at  $p < .001$ . Factor loadings varied between  $.78$  and  $.83$  for Body Attractiveness, between  $.71$  and  $.82$  for Physical Strength, between  $.76$  and  $.83$  for Sports Competence, and between  $.62$  and  $.83$  for Physical Condition (see Table 1 for all factor loadings). Therefore, all items exceeded the recommended minimum of  $\lambda = .33$ , as suggested by Ford et al (Ford et al., 1986). Furthermore, the variance of all latent variables was significantly different from zero at  $p < .001$ . All correlations among the four PSPP-R Competence factors were high (between  $r = .56$ ,  $p < .001$  and  $r = .75$ ,  $p < .001$ ), except the correlation between Body Attractiveness and Physical Strength, which was moderate ( $r = .40$ ,  $p < .001$ ). The highest correlation

<sup>1</sup> Brauer et al. (2023) suggested using the WLSMV estimator when for items with few response options. We have therefore reanalyzed the final models using the WLSMV estimator for ordered data. The results are displayed in Tables E4 and E5 in the supplementary materials. Overall, the results stayed nearly unaffected by the choice of the estimator.

**Table 1.** Items of the PSPP-R and their factor loading, *M*, and *SD*

Item	Factor loading	<i>M</i>	<i>SD</i>
<b>Body Attractiveness</b>			
2. I am very happy with the appearance of my body	.78	2.61	0.87
6. Compared to others, I think that my body looks in excellent shape physically	.79	2.27	0.91
10. I think I am often admired for my attractive physique or figure	.81	2.05	0.99
14. I think that my body looks alright in swimwear	.83	2.15	0.97
18. I find it easy to maintain an attractive body	.81	2.08	0.99
22. I have an attractive body compared to other people	.82	2.33	0.90
<b>Physical Strength</b>			
1. I am better than others of my sex at dealing with situations requiring physical strength	.76	2.85	0.91
5. I think that I am strong, and have well-developed muscles compared to other people	.81	2.67	0.88
9. I am confident when it comes to my physical strength	.74	2.72	0.89
13. When it comes to situations requiring strength, I am one of the first people to step forward	.71	2.42	0.94
17. I feel my muscles are much stronger than most others of my sex	.82	2.40	0.97
21. I am physically stronger than most other people of my sex	.82	2.53	0.95
<b>Sports Competence</b>			
4. I tend to be among the first to join in sports activities	.76	2.45	0.99
8. I am quicker than most when it comes to picking up new skills in a sports situation	.76	2.35	0.91
12. I think that I am one of the best when it comes to joining in sports activities	.80	1.80	0.83
16. I am confident in taking part in sports activities, compared to other people	.80	2.36	0.89
20. I am generally a lot better than average at sports	.83	2.17	0.94
24. I do very well at all kinds of sports	.79	2.09	0.88
<b>Physical Condition</b>			
3. I feel that, compared to most, I always maintain a high level of physical conditioning	.83	2.59	0.92
7. I feel really confident about my ability to maintain regular exercise and physical condition	.64	3.14	0.87
11. I am at ease when it comes to fitness and exercise settings	.62	2.32	1.03
15. I usually have a high level of stamina and fitness	.79	2.39	0.92
19. I make certain I take part in some form of regular vigorous physical exercise	.62	2.71	1.03
23. I am very confident about my level of physical conditioning and fitness compared to other people	.65	2.62	0.89

Note. Numbers of the items represent the rank order of item display. Range of all items was exhausted. Response options ranged from 1 = *strongly disagree* to 4 = *strongly agree*.

occurred between Physical Condition and Sports Competence ( $r = .75, p < .001$ ). Model 1 is displayed in Figure 2, including loadings and correlations.

## Validity

### Discriminant Validity

In Table 3, all discriminant measures are depicted. General self-esteem showed significant but small positive correlations with PSPP-R Competence factors ( $r = .09, p < .01$  to  $r = .27, p < .001$ ), the highest with Physical Strength. PSPP-R Competence factors correlated weakly to moderately positively with Extraversion and with Conscientiousness ( $r = .18-.33, p < .001$ ) and weakly negatively with

Negative Emotionality ranging between  $-.20$  and  $-.29$  ( $p < .001$ ). Among the three Dark Triad factors, small correlations were found between all the PSPP-R Competence factors and narcissism. For Machiavellianism and psychopathy, significant correlations were only found with Physical Strength and Sports Competence. Body Attractiveness and Physical Condition did not correlate significantly either with Machiavellianism or with psychopathy. Happiness correlated weakly with PSPP-R Competence factors ( $r = .17-.28, p < .001$ ), the highest correlation being with Physical Condition.

### Criterion Validity

The three physical activity items correlated weakly to moderately with the PSPP-R Competence factors ( $r = .19-.45$ ,

**Table 2.** Fit indices of the four structural models

Fit statistic	1. Correlated four factor model	2. Higher order factor	3. One factor	4. Uncorrelated four factor model
$\chi^2$	1,695.419***	1767.972***	4,760.781***	3,558.179***
df	246	248	252	252
RMSEA [90% CI]	.076 [.073-.080]	.078 [.075-.081]	.133 [.130-.136]	.114 [.111-.117]
CFI	.90	.90	.69	.77
SRMR	.06	.07	.11	.35
BIC	50,213.79	50,281.01	53,663.46	52,276.05
$\chi^2\Delta$ (df) <sup>2</sup>	—	74.867(2)***	2,345.6(6)***	1,737.5(6)***

Note.  $\chi^2$  = chi-square; df = degrees of freedom; RMSEA = root-mean-square error of approximation; SRMR = standardized root-mean-square residual; CFI = comparative fit index; BIC = Bayesian information criterion;  $\chi^2\Delta$  (df)<sup>2</sup> = chi-square difference test comparing the fit of Models 2, 3, and 4 with Model 1, and Model 5 (bifactor Models) excluded because it did not converge.

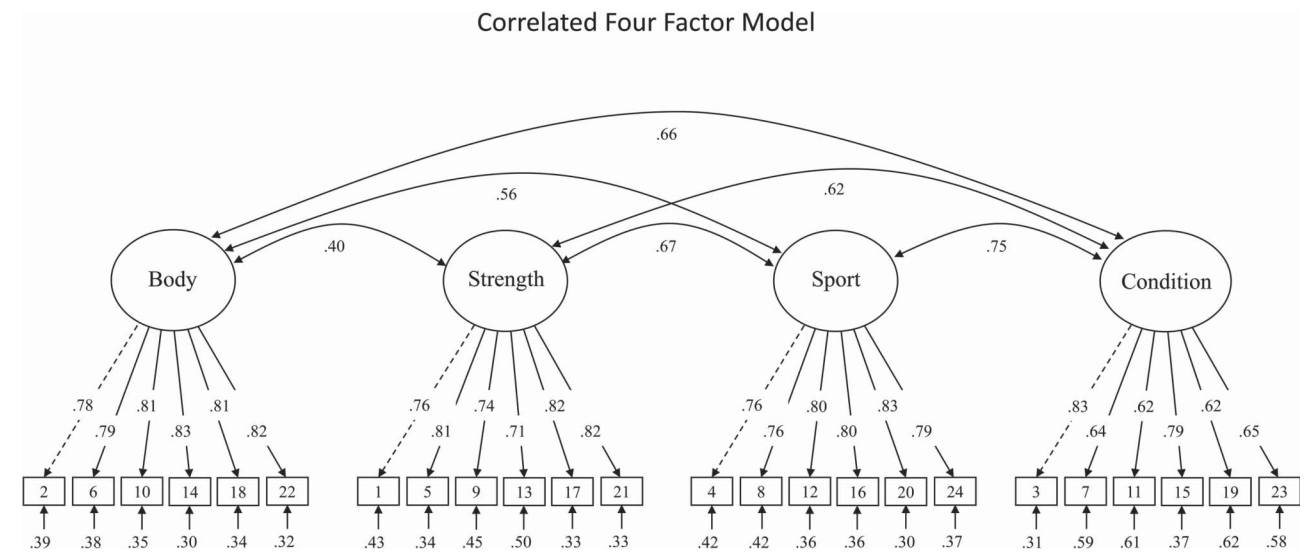
\*\*\* $p < .001$ .

$p < .001$ ; see Table 3). To examine the criterion validity concerning self-reported physical activity, we performed multiple regression analyses. First, the Big Five personality trait scores were included as predictors. Second, the four physical self-worth factor scores of the PSPP-R Competence were added to examine their incremental validity. We then examined if the physical self-worth factor scores were significant incremental predictors of physical activity scores, above and beyond the Big Five scores. The Big Five scores predicted only a small amount of variance in physical activity scores (all adjusted  $R^2 = .06$ ,  $p < .001$ ). Adding the physical self-worth factor scores lead to  $R^2$  coefficients ranging from .11 to .25 (all  $p < .001$ ). Accordingly, physical self-worth scores explained an additional 5.5% of variance in Physical Activity 1 ( $\Delta R^2 = .06$ ,  $p < .001$ ), an additional 16.6% in Physical Activity 2 ( $\Delta R^2 = .17$ ,  $p < .001$ ), and an additional 19% in Physical Activity 3 ( $\Delta R^2 = .19$ ,  $p < .001$ ). In all regression models, Physical Condition was the strongest predictor of the respective physical activity item with estimates

reaching as high as .52 (Physical Activity 2;  $p < .001$ ). The results from multiple linear regressions are provided in Table 4.

## Discussion

The confirmatory factor analyses support our hypothesis of a first-order correlated four-factor model, as suggested by Fox and Corbin (1989) and by Lindwall et al. (2011). Factor loadings were high with values mostly above .70 (the only exception being the Physical Condition subscale with the lowest factor loading of .62). All factor intercorrelations were high (between .56 and .75,  $p < .001$ ), except the correlation between Body Attractiveness and Physical Strength ( $r = .40$ ,  $p < .001$ ) and the highest correlation occurred between Sports Competence and Physical Condition ( $r = .75$ ,  $p < .001$ ). Therefore, we consider the



**Figure 2.** Correlated four-factor model.  $\chi^2$  (246) = 1,695.419,  $p < .001$ , RMSEA = .076 [90% CI: .073-.080], CFI = .90, and SRMR = .06. Dotted arrows indicate factor loadings that were fixed to one.

**Table 3.** Correlations of physical self-perception and all discriminant measures included in the study

Construct	Body Attractiveness	Physical Strength	Sports Competence	Physical Condition	Physical Self-Worth
General self-esteem	.09**	.27***	.19***	.18***	.22***
Extraversion	.18***	.33***	.31***	.31***	.33***
Openness	.13***	.11***	.14***	.17***	.16***
Conscientiousness	.22***	.20***	.22***	.30***	.28***
Negative emotionality	-.24***	-.20***	-.21***	-.29***	-.28***
Agreeableness	.06*	-.02	.02	.08*	.04
Psychopathy	-.03	.13***	.06*	-.01	.04
Narcissism	.22***	.26***	.28***	.22***	.29***
Machiavellianism	—	.17***	.14***	.04	.10**
Happiness	.21***	.19***	.17***	.28***	.25***
Physical Activity 1	.19***	.27***	.28***	.30***	.31***
Physical Activity 2	.20***	.25***	.34***	.44***	.36***
Physical Activity 3	.19***	.27***	.38***	.45***	.38***

Note. Top row refers to the four PSPP-R factors; Physical Activity refers to three single items.  
 \*\*\* $p < .001$ . \*\* $p < .01$ . \* $p < .05$ .

results a success in our goal to replicate the four-factor structure of physical self-worth in a German sample. Although this correlated four-factor model showed a better fit than did a second-order model, we found support for the supposed hierarchical structure of (physical) self-esteem (Shavelson et al., 1976) in the high factor intercorrelations

and the good model fit of the higher-order factor model (Model 2). The good model fit of Model 2, the high inter-factor correlations, and the very good internal consistency of  $\alpha = .95$  of the total physical self-perception scale offer reasons to assume that a total score of the four subscales of the PSPP-R Competence could be used in further research.

**Table 4.** Results of the multiple regression analyses

Variable	Physical Activity 1			Physical Activity 2			Physical Activity 3		
	<i>B</i>	<i>SE (B)</i>	$\beta$	<i>B</i>	<i>SE (B)</i>	$\beta$	<i>B</i>	<i>SE (B)</i>	$\beta$
Step 1									
Extraversion	0.29	0.09	0.11**	0.25	0.09	0.10**	0.54	0.11	0.19***
Openness	-0.06	0.08	-0.02	0.38	0.08	0.16***	0.19	0.09	0.08*
Conscientiousness	0.29	0.09	0.11**	0.15	0.09	0.05	0.03	0.10	0.01
Negative emotionality	-0.39	0.09	-0.15***	-0.12	0.08	-0.05	-0.09	0.10	-0.03
Agreeableness	-0.46	0.11	-0.14***	0.09	0.11	0.03	0.14	0.13	0.04
Adjusted $R^2$	.06***			.06***			.06***		
Step 2									
Extraversion	0.11	0.09	0.04	0.02	0.08	0.01	0.26	0.10	0.09*
Openness	-0.09	0.08	-0.04	0.31	0.07	0.14***	0.13	0.08	0.05
Conscientiousness	0.15	0.09	0.05	-0.08	0.08	-0.03	-0.25	0.09	-0.08**
Negative emotionality	-0.26	0.09	-0.10**	0.07	0.08	0.03	0.10	0.09	0.04
Agreeableness	-0.36	0.11	-0.11***	0.18	0.10	0.05	0.26	0.12	0.07*
Body Attractiveness	-0.05	0.09	-0.02	-0.36	0.08	-0.17***	-0.50	0.10	-0.21***
Physical Strength	0.20	0.10	0.09*	-0.13	0.08	-0.06	-0.18	0.10	-0.07
Sports Competence	0.16	0.11	0.07	0.16	0.10	0.07	0.42	0.12	0.17***
Physical Condition	0.39	0.13	0.16**	1.26	0.12	0.52***	1.32	0.14	0.50***
$\Delta R^2$	.06***			.17***			.19***		

Note. Physical Activity 1 = "How often do you ride per week?", Physical Activity 2 = "I exercise (i.e., stretching, running, fitness) to advance my riding skills.", and Physical Activity 3 = "I do other sports besides riding."

\*\*\* $p < .001$ . \*\* $p < .01$ . \* $p < .05$ .



However, it should be kept in mind that previous studies included the fifth subscale Physical Self-Worth and therefore had no reason to use an aggregated sum score to approximate physical self-worth (e.g., Megakli et al., 2017; Vlachopoulos et al., 2014).

Furthermore, the correlation pattern between the included discriminant measures and physical self-worth (see Table E2 in ESM for all bivariate correlations) was generally in line with our expectations with some minor deviations: Correlations between PSPP-R Competence factors and general self-esteem were significant but lower than expected. This could be due to the use of a single BFI-2 item, that showed face validity, but is most likely not as reliable and valid as other scales, such as the Rosenberg Self-Esteem Scale (Robins, Hendin, & Trzesniewski, 2001). The correlation pattern between PSPP-R Competence factors and the Big Five was replicated according to our hypotheses, although some correlations were slightly lower than expected. The Dark Triad factors showed small significant and nonsignificant correlations with PSPP-R Competence factors in line with our expectations. Similar to supporting our hypotheses, happiness showed small to moderate relationships to physical self-perception factors. Reliability estimates based on the internal consistency of the PSPP-R Competence were satisfactory.

However, the criterion validity, when estimated via the correlation between physical self-worth and physical activity items, was lower than expected. This could be due to our operationalization of physical activity with single items. Single items have lower reliability that affects validity estimates as well (Diamantopoulos et al., 2012). Despite these shortcomings, the regression models showed that the four physical self-worth factors explained a significant increment amount of variance, above and beyond the Big Five scores, in all three physical activity items. When interpreting the sizes of the correlations, it should be kept in mind that Cohen's (1988) suggestions of interpreting correlation sizes, which were used here, are rather strict in comparison to other conventions such as Funder and Ozer's (2019) recommendations. They recommend treating effects as  $r = .10$  as small,  $r = .20$  as medium, and  $r = .30$  as large in effect size. Our interpretation of results can therefore be considered conservative.

An aspect that could be investigated in future research is the precise mechanism that leads to high intercorrelations between personality traits, physical self-worth, and physical activity. Kahlin et al. (2016), for example, found small associations between personality factors and compliance with a sports program that enhanced physical self-worth. One could argue that higher Conscientiousness, for example, leads to higher physical activity (Wilson & Dishman, 2015), which leads to higher physical

self-worth. Another possibility is that success in sports, which is associated with personality traits (Steca et al., 2018), leads to higher self-esteem. However, with cross-sectional data, it is not possible to examine these mediation effects. The current study provides a validated measurement instrument that allows examining these and further research questions in German-speaking populations.

## Limitations

In the current study, secondary data were used, which was collected by involving a specific sample and a selection of measures considered for a different research question. Hence, we were limited in our selection of discriminant measures and their operationalization. The items selected to measure physical activity, for instance, do not mirror this construct conclusively but give a first indication of the relationship between physical self-worth and physical activity. Similarly, self-esteem was measured using a single item and should be measured with more validated instruments in future studies. Thus, based on the current study, it is unclear how the dimensions of the PSPP-R Competence scale relate to global self-reported self-esteem. Furthermore, the results concerning correlations of physical self-worth and the Dark Triad should be considered preliminary as the Dark Triad showed acceptable but low internal consistency; however, this could also mean that the relation between the Dark Triad and the PSPP-R Competence scales was underestimated. Therefore, when using these results to generate hypotheses for future studies, they should be seen in light of their limitations. Furthermore, the translation process was not ideal as no back translation was performed but instead adequacy of translations was discussed among English-German bilinguals. The results indicate, however, that the translation was successful.

Regarding the sample composition, our sample consists of almost exclusively female horse owners. This may limit generalizability: Studies have shown that men differ from women both in their physical self-perception (Edwards et al., 2005; Klomsten et al., 2004) and in their choice and intensity of exercise (De Moor et al., 2006; Deaner et al., 2012; Hickey & Mason, 2017). There is also evidence for differences in physical self-perception depending on the type of sport pursued (Edwards et al., 2005) and more generally for personality differences in different types of sports (Allen et al., 2013; Laborde et al., 2020). However, as this affects the level of physical self-worth reported, it must not necessarily affect the relation to other constructs or the structure of the scale itself. At the same time, horse owners are also an interesting

population to study, as owning a horse must not necessarily lead to or be associated with high physical activity, thereby allowing for considerable between-person variance. This is also reflected in the descriptive statistics that indicate substantial variance on all measures. Finally, data were cross-sectional and relied on self-reports only. However, as the construct that was examined is self-esteem, self-report seems to be the most appropriate measure (Paulhus & Vazire, 2007).

## Conclusion

Our study provides support for the successful validation of the competence scale of the Revised Physical Self-Perception Profile (PSPP-R Competence) in a German sample. The results show good reliability and validity evidence. Although the study has some shortcomings, they do not speak against the overall validity of the results. Furthermore, open data allow other researchers to use or refine the measure for their needs (Horstmann et al., 2020). Overall, our study suggests a good adaptation of the German version of the PSPP-R Competence, offering a useful instrument to measure the physical self-worth of German-speaking individuals.

## References

- Allen, M. S., Greenlees, I., & Jones, M. (2013). Personality in sport: A comprehensive review. *International Review of Sport and Exercise Psychology*, 6(1), 184–208. <https://doi.org/10.1080/1750984X.2013.769614>
- Barry, C. T., Frick, P. J., & Killian, A. L. (2003). The relation of narcissism and self-esteem to conduct problems in children: A preliminary investigation. *Journal of Clinical Child & Adolescent Psychology*, 32(1), 139–152. [https://doi.org/10.1207/S15374424JCCP3201\\_13](https://doi.org/10.1207/S15374424JCCP3201_13)
- Barry, C. T., Grafeman, S. J., Adler, K. K., & Pickard, J. D. (2007). The relations among narcissism, self-esteem, and delinquency in a sample of at-risk adolescents. *Journal of Adolescence*, 30(6), 933–942. <https://doi.org/10.1016/j.adolescence.2006.12.003>
- Baumeister, R. F., Campbell, J. D., Krueger, J. I., & Vohs, K. D. (2003). Does high self-esteem cause better performance, interpersonal success, happiness, or healthier lifestyles? *Psychological Science in the Public Interest*, 4(1), 1–44. <https://doi.org/10.1111/1529-1006.01431>
- Bland, J. M., & Altman, D. G. (1997). Statistics notes: Cronbach's alpha. *BMJ*, 314(7080), Article 572. <https://doi.org/10.1136/bmj.314.7080.572>
- Bosson, J. K., Lakey, C. E., Campbell, W. K., Zeigler-Hill, V., Jordan, C. H., & Kernis, M. H. (2008). Untangling the links between narcissism and self-esteem: A theoretical and empirical review: Narcissism and self-esteem. *Social and Personality Psychology Compass*, 2(3), 1415–1439. <https://doi.org/10.1111/j.1751-9004.2008.00089.x>
- Brauer, K., Ranger, J., & Ziegler, M. (2023). Confirmatory factor analyses in psychological test adaptation and development: A nontechnical discussion of the WLSMV estimator. *Psychological Test Adaptation and Development*, 4(1), 4–12. <https://doi.org/10.1027/2698-1866/a000034>
- Cohen, J. (1988). *The analysis of variance and covariance: Statistical power analysis for the behavioral sciences* (2nd ed.). Lawrence Erlbaum Associates. <https://doi.org/10.4324/9780203771587>
- Danner, D., Rammstedt, B., Bluemke, M., Lechner, C., Berres, S., Knopf, T., Soto, C. J., & John, O. P. (2019). Das Big Five Inventar 2: Validierung eines Persönlichkeitsinventars zur Erfassung von 5 Persönlichkeitsdomänen und 15 Facetten [The Big Five Inventory 2: Validation of a personality inventory to assess 5 personality domains and 15 facets]. *Diagnostica*, 65(3), 121–132. <https://doi.org/10.1026/0012-1924/a000218>
- Danner, D., Rammstedt, B., Bluemke, M., Treiber, L., Berres, S., Soto, C., & John, O. (2016). *Die deutsche Version des Big Five Inventory 2 (BFI-2)* [The German version of the Big Five Inventory 2]. <https://doi.org/10.6102/ZIS247>
- De Moor, M. H. M., Beem, A. L., Stubbe, J. H., Boomsma, D. I., & De Geus, E. J. C. (2006). Regular exercise, anxiety, depression, and personality: A population-based study. *Preventive Medicine*, 42(4), 273–279. <https://doi.org/10.1016/j.ypmed.2005.12.002>
- Deaner, R. O., Geary, D. C., Puts, D. A., Ham, S. A., Kruger, J., Fles, E., Winegard, B., & Grandis, T. (2012). A sex difference in the predisposition for physical competition: Males play sports much more than females even in the contemporary US. *PLoS ONE*, 7(11), Article e49168. <https://doi.org/10.1371/journal.pone.0049168>
- Diamantopoulos, A., Sarstedt, M., Fuchs, C., Wilczynski, P., & Kaiser, S. (2012). Guidelines for choosing between multi-item and single-item scales for construct measurement: A predictive validity perspective. *Journal of the Academy of Marketing Science*, 40(3), 434–449. <https://doi.org/10.1007/s11747-011-0300-3>
- DiStefano, C., & Motl, R. W. (2006). Further investigating method effects associated with negatively worded items on self-report surveys. *Structural Equation Modeling: A Multidisciplinary Journal*, 13(3), 440–464. [https://doi.org/10.1207/s15328007sem1303\\_6](https://doi.org/10.1207/s15328007sem1303_6)
- Edwards, S. D., Ngcobo, H. S., Edwards, D. J., & Palavar, K. (2005). Exploring the relationship between physical activity, psychological well-being and physical self-perception in different exercise groups. *South African Journal for Research in Sport, Physical Education and Recreation*, 27(1), 59–74. <https://doi.org/10.4314/sajrs.v27i1.25908>
- Ekeland, E., Heian, F., Hagen, K. B., Abbott, J. M., & Nordheim, L. (2004). Exercise to improve self-esteem in children and young people. *Cochrane Database of Systematic Reviews*, 1, Article D003683. <https://doi.org/10.1002/14651858.CD003683.pub2>
- Fitts, W. H. (1965). *Tennessee (Department of Mental Health) Self Concept Scale*. Counselor Recordings and Tests.
- Ford, J. K., MacCallum, R. C., & Tait, M. (1986). The application of exploratory factor analysis in applied psychology: A critical review and analysis. *Personnel Psychology*, 39(2), Article 2. <https://doi.org/10.1111/j.1744-6570.1986.tb00583.x>
- Fox, K. R., & Corbin, C. B. (1989). The Physical Self-Perception Profile: Development and preliminary validation. *Journal of Sport and Exercise Psychology*, 11(4), 408–430. <https://doi.org/10.1123/jsep.11.4.408>
- Funder, D. C., & Ozer, D. J. (2019). Evaluating effect size in psychological research: Sense and nonsense. *Advances in Methods and Practices in Psychological Science*, 2(2), 156–168. <https://doi.org/10.1177/2515245919847202>

- Harter, S. (1985). *Manual for the self-perception profile for children (revision of the perceived competence scale for children)*. University of Denver. <https://doi.org/10.1037/t05338-000>
- Hickey, M. E., & Mason, S. E. (2017). Age and gender differences in participation rates, motivators for, and barriers to exercise. *Modern Psychological Studies*, 22(2), Article 3. <https://scholar.utc.edu/mps/vol22/iss2/3>
- Horstmann, K. T. (2023). *Validation of the German Version of the Revised Physical Self-Perception Profile (PSPP-R)*. [Open data]. <https://osf.io/qxecg/>
- Horstmann, K. T., Arslan, R. C., & Greiff, S. (2020). Generating codebooks to ensure the independent use of research data: Some guidelines. *European Journal of Psychological Assessment*, 36(5), 721–729. <https://doi.org/10.1027/1015-5759/a000620>
- Jonason, P. K., & Webster, G. D. (2010). The dirty dozen: A concise measure of the dark triad. *Psychological Assessment*, 22(2), 420–432. <https://doi.org/10.1037/a0019265>
- Kahlin, Y., Werner, S., Edman, G., Raustorp, A., & Alricsson, M. (2016). Physical self-esteem and personality traits in Swedish physically inactive female high school students: An intervention study. *International Journal of Adolescent Medicine and Health*, 28(4), 363–372. <https://doi.org/10.1515/ijamh-2015-0017>
- Kim, I., & Ahn, J. (2021). The effect of changes in physical self-concept through participation in exercise on changes in self-esteem and mental well-being. *International Journal of Environmental Research and Public Health*, 18(10), Article 5224. <https://doi.org/10.3390/ijerph18105224>
- Klomsten, A. T., Skaalvik, E. M., & Espnes, G. A. (2004). Physical self-concept and sports: Do gender differences still exist? *Sex Roles*, 50(1/2), 119–127. <https://doi.org/10.1023/B:SERS.0000011077.10040.9a>
- Laborde, S., Allen, M. S., Katschak, K., Mattonet, K., & Lachner, N. (2020). Trait personality in sport and exercise psychology: A mapping review and research agenda. *International Journal of Sport and Exercise Psychology*, 18(6), 701–716. <https://doi.org/10.1080/1612197X.2019.1570536>
- Lindwall, M., Asci, H., & Crocker, P. (2014). The physical self in motion: Within-person change and associations of change in self-esteem, physical self-concept, and physical activity in adolescent girls. *Journal of Sport and Exercise Psychology*, 36(6), 551–563. <https://doi.org/10.1123/jsep.2013-0258>
- Lindwall, M., Asci, H., & Hagger, M. S. (2011). Factorial validity and measurement invariance of the Revised Physical Self-Perception Profile (PSPP-R) in three countries. *Psychology, Health & Medicine*, 16(1), 115–128. <https://doi.org/10.1080/13548506.2010.521567>
- Lindwall, M., & Hassmen, P. (2004). The role of exercise and gender for physical self-perceptions and importance ratings in Swedish university students. *Scandinavian Journal of Medicine and Science in Sports*, 14(6), 373–380. <https://doi.org/10.1046/j.1600-0838.2003.372.x>
- Lyubomirsky, S., & Lepper, H. S. (1999). A measure of subjective happiness: Preliminary reliability and construct validation. *Social Indicators Research*, 46(2), 137–155. <https://doi.org/10.1023/A:1006824100041>
- Marsh, H. W., & Sonstroem, R. J. (1995). Importance ratings and specific components of physical self-concept: Relevance to predicting global components of self-concept and exercise. *Journal of Sport and Exercise Psychology*, 17(1), 84–104. <https://doi.org/10.1123/jsep.17.1.84>
- Marsh, H. W., Trautwein, U., Ludtke, O., Köller, O., & Baumert, J. (2006). Integration of multidimensional self-concept and core personality constructs: Construct validation and relations to well-being and achievement. *Journal of Personality*, 74(2), 403–456. <https://doi.org/10.1111/j.1467-6494.2005.00380.x>
- Mattei, D., & Schaefer, C. E. (2004). An investigation of validity of the subjective happiness scale. *Psychological Reports*, 94(1), 288–290. <https://doi.org/10.2466/pr0.94.1.288-290>
- McAuley, E., Blissmer, B., Katula, J., Duncan, T. E., & Mihalko, S. L. (2000). Physical activity, self-esteem, and self-efficacy relationships in older adults: A randomized controlled trial. *Annals of Behavioral Medicine*, 22(2), 131–139. <https://doi.org/10.1007/BF02895777>
- McCrae, R. R., Herbst, J. H., & Costa, P. T., Jr. (2001). Effects of acquiescence on personality factor structures. In R. Riemann, F. Spinath, & F. Ostendorf (Eds.), *Personality and temperament: Genetics, evolution, and structure* (pp. 217–231). Pabst Scientific Publishers.
- Megakli, T., vlachopoulos, S. P., Thøgersen-Ntoumani, C., & Theodorakis, Y. (2017). Impact of aerobic and resistance exercise combination on physical self-perceptions and self-esteem in women with obesity with one-year follow-up. *International Journal of Sport and Exercise Psychology*, 15(3), 236–257. <https://doi.org/10.1080/1612197X.2015.1094115>
- Miller, J. D., Dir, A., Gentile, B., Wilson, L., Pryor, L. R., & Campbell, W. K. (2010). Searching for a vulnerable Dark Triad: Comparing factor 2 psychopathy, vulnerable narcissism, and borderline personality disorder. *Journal of Personality*, 78(5), 1529–1564. <https://doi.org/10.1111/j.1467-6494.2010.00660.x>
- Morales-Rodríguez, F. M., Espigares-López, I., Brown, T., & Pérez-Mármol, J. M. (2020). The relationship between psychological well-being and psychosocial factors in university students. *International Journal of Environmental Research and Public Health*, 17(13), Article 4778. <https://doi.org/10.3390/ijerph17134778>
- Okada, R. (2010). The relationship between vulnerable narcissism and aggression in Japanese undergraduate students. *Personality and Individual Differences*, 49(2), 113–118. <https://doi.org/10.1016/j.paid.2010.03.017>
- Paulhus, D. L., & Vazire, S. (2007). The self-report method. In R. W. Robins, R. C. Fraley, & R. F. Krueger (Eds.), *Handbook of research methods in personality psychology* (pp. 224–239). Guilford Press.
- Paulhus, D. L., & Williams, K. M. (2002). The Dark Triad of personality: Narcissism, Machiavellianism, and psychopathy. *Journal of Research in Personality*, 36(6), 556–563. [https://doi.org/10.1016/S0092-6566\(02\)00505-6](https://doi.org/10.1016/S0092-6566(02)00505-6)
- R Core Team. (2020). *R: A language and environment for statistical computing*. R Foundation for Statistical Computing. <https://www.R-project.org/>
- Raskin, R., Novacek, J., & Hogan, R. (1991). Narcissism, self-esteem, and defensive self-enhancement. *Journal of Personality*, 59(1), 19–38. <https://doi.org/10.1111/j.1467-6494.1991.tb00766.x>
- Robins, R. W., Hendin, H. M., & Trzesniewski, K. H. (2001). Measuring global self-esteem: Construct validation of a single-item measure and the Rosenberg Self-Esteem Scale. *Personality and Social Psychology Bulletin*, 27(2), 151–161. <https://doi.org/10.1177/0146167201272002>
- Robins, R. W., Tracy, J. L., Trzesniewski, K., Potter, J., & Gosling, S. D. (2001). Personality correlates of self-esteem. *Journal of Research in Personality*, 35(4), 463–482. <https://doi.org/10.1006/jrpe.2001.2324>
- Roh, S. Y. (2018). The influence of physical self-perception of female college students participating in Pilates classes on perceived health state and psychological wellbeing. *Journal of Exercise Rehabilitation*, 14(2), 192–198. <https://doi.org/10.12965/jer.1836088.044>
- Ryckman, R. M., Robbins, M. A., Thornton, B., & Cantrell, P. (1982). Development and validation of a physical self-efficacy scale.

- Journal of Personality and Social Psychology*, 42(5), 891–900. <https://doi.org/10.1037/0022-3514.42.5.891>
- Shavelson, R. J., Hubner, J. J., & Stanton, G. C. (1976). Self-concept: Validation of construct interpretations. *Review of Educational Research*, 46(3), 407–441. <https://doi.org/10.3102/00346543046003407>
- Shimai, S., Otake, K., Utsuki, N., Ikemi, A., & Lyubomirsky, S. (2004). Development of a Japanese version of the Subjective Happiness Scale (SHS), and examination of its validity and reliability. *Nihon Koshu Eisei Zasshi*, 51(10), 845–853.
- Sonstroem, R. J. (1976). The validity of self-perceptions regarding physical and athletic ability. *Medicine and Science in Sports*, 8(2), 126–132.
- Sonstroem, R. J., Harlow, L. L., & Josephs, L. (1994). Exercise and self-esteem: Validity of model expansion and exercise associations. *Journal of Sport and Exercise Psychology*, 16(1), 29–42. <https://doi.org/10.1123/jsep.16.1.29>
- Soto, C. J., & John, O. P. (2017). The next Big Five Inventory (BFI-2): Developing and assessing a hierarchical model with 15 facets to enhance bandwidth, fidelity, and predictive power. *Journal of Personality and Social Psychology*, 113(1), 117–143. <https://doi.org/10.1037/pspp0000096>
- Steca, P., Baretta, D., Greco, A., D'Addario, M., & Monzani, D. (2018). Associations between personality, sports participation and athletic success. A comparison of Big Five in sporting and non-sporting adults. *Personality and Individual Differences*, 121, 176–183. <https://doi.org/10.1016/j.paid.2017.09.040>
- Swami, V., Stieger, S., Voracek, M., Dressler, S. G., Eisma, L., & Furnham, A. (2009). Psychometric evaluation of the Tagalog and German Subjective Happiness Scales and a cross-cultural comparison. *Social Indicators Research*, 93(2), 393–406. <https://doi.org/10.1007/s11205-008-9331-7>
- Ten Berge, J. M. F. (1999). A legitimate case of component analysis of ipsative measures, and partialling the mean as an alternative to ipsatization. *Multivariate Behavioral Research*, 34(1), 89–102. [https://doi.org/10.1207/s15327906mbr3401\\_4](https://doi.org/10.1207/s15327906mbr3401_4)
- Vlachopoulos, S. P., Leptokaridou, E. T., & Fox, K. R. (2014). Development and initial evidence of validity of a short form of the physical self-perception profile for Greek adults. *International Journal of Sport and Exercise Psychology*, 12(2), 166–184. <https://doi.org/10.1080/1612197X.2014.880261>
- Wehner, C., Maaß, U., Leckelt, M., Back, M. D., & Ziegler, M. (2021). Validation of the Short Dark Triad in a German sample: Structure, nomological network, and an ultrashort version. *European Journal of Psychological Assessment*, 37(5), 397–408. <https://doi.org/10.1027/1015-5759/a000617>
- Wilson, K. E., & Dishman, R. K. (2015). Personality and physical activity: A systematic review and meta-analysis. *Personality and Individual Differences*, 72, 230–242. <https://doi.org/10.1016/j.paid.2014.08.023>
- Zhang, H., Luo, Y., Zhao, Y., Zhang, R., & Wang, Z. (2017). Differential relations of grandiose narcissism and vulnerable narcissism to emotion dysregulation: Self-esteem matters. *Asian Journal of Social Psychology*, 20(3–4), 232–237. <https://doi.org/10.1111/ajsp.12191>
- Ziegler, M. (2014). Stop and state your intentions! Let's not forget the ABC of test construction. *European Journal of Psychological Assessment*, 30(4), 239–242. <https://doi.org/10.1027/1015-5759/a000228>

### History

Received May 25, 2023

Revision received September 19, 2023

Accepted November 3, 2023

Published online February 2, 2024

Section: Sports & Health Psychology

### Acknowledgments

We thank Vera Maria Fahrner for her support in data collection.

### Open Science

Open Data: The information needed to reproduce all of the reported results is available at <https://osf.io/qxecg/> (Horstmann, 2023).

Open Materials: The information needed to reproduce all of the reported methodology is available at <https://osf.io/qxecg/> (Horstmann, 2023).

Preregistration and Analysis Plan: This study was not preregistered.

The supplementary materials are available at <https://osf.io/qxecg/>

### ORCID

Kai T. Horstmann

 <https://orcid.org/0000-0003-3224-1880>

### Kai T. Horstmann

Department of Psychology

Faculty V: School of Life Sciences

University of Siegen

Adolf-Reichwein-Str. 2a

57076 Siegen

Germany

[kai.horstmann@uni-siegen.de](mailto:kai.horstmann@uni-siegen.de)