# Running head: SELF-ESTEEM: THE IMPORTANCE OF SPORTS COMPETENCE

1	Predicting global self-esteem in early adolescence: The importance of individual and gender-
2	specific importance of perceived sports competence
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#### Abstract

24 One important issue in exercise psychology is to determine the mechanisms behind the 25 relationship between exercise and self-esteem. This study tested the assumption that the effect 26 of perceived sports competence on early adolescent's global self-esteem depends on individual 27 and gender-specific importance ratings. 257 adolescents participated in this cross-sectional 28 study, in which they completed paper-pencil-questionnaires to measure the perceived sports 29 competence, the importance of sports competence, global physical self-concept and global self-30 esteem. Using structural equation modeling procedures, the individual- and gender-specific 31 importance hypothesis were tested. Results revealed that the effect of perceived sports 32 competence on global self-esteem is moderated by individual importance. Although boys rated 33 sports as more important than girls, the regression coefficients were not different. In summary, 34 the present study supports an individual but not a gender-specific importance hypothesis with 35 regard to the relationship between perceived sports competence and self-esteem in early 36 adolescence.

37

Keywords: self-worth, physical self-concept, centrality, moderation, sex

38 Predicting global self-esteem in early adolescence: The importance of individual and gender-

39

specific importance of perceived sports competence

A person's global self-esteem, defined as "the overall evaluation of one's worth or value 40 41 as a person" (Harter, 2012, p. 22-24), is considered to be an important indicator of 42 psychological well-being throughout life. Individuals with high global self-esteem are generally 43 more satisfied with their lives (Sowislo & Orth, 2013). Conversely, low global self-esteem is 44 associated with increased substance abuse (Fisher, Zapolski, Sheehan, & Barnes-Najor, 2017), 45 delinquent behaviour (Farrington, Gaffney, & Ttofi, 2017) and depression disorder (Sowislo & 46 Orth, 2013). Furthermore, low global self-esteem in childhood and adolescence appears to be a 47 predictor of certain maladaptive outcomes in later adolescence and adulthood, such as the 48 development of anxiety and depression disorders (Keane & Loades, 2017). Considering this, 49 the development of positive global self-esteem in childhood and adolescence is consistently 50 regarded as a crucial development task (Harter, 2012).

51 A multidimensional perspective on the self allows the examining of relationships between 52 domain-specific self-concepts and global self-esteem, helping to detect important sources in 53 individual's global self-esteem. According to Shavelson, Hubner and Stanton (1976), the self-54 concept consists of both descriptive and evaluative dimensions, such that people may describe 55 themselves ("I can run fast") and evaluate themselves ("I am happy with this specific skill"). 56 The global self-esteem represents the evaluative peak of a hierarchically organized, and 57 multidimensional structured self-concept, whereas descriptive and evaluative self-perceptions 58 of specific attributes (e.g. academic or physical self-concept) mark lower level self-concept 59 domains (Shavelson et al., 1976). Previous research revealed that specific self-concept facets 60 affect more global self-concept dimensions (Marsh, 1990), with the global physical self-concept 61 being the most important source of adolescent's global self-esteem in both boys and girls 62 (Harter, 2012). The global physical self-concept itself is also multidimensionally organised, 63 with perceived physical competence and physical appearance representing its two subdomains 64 (Shavelson et al., 1976). Considering the central role of global physical self-concept in the
65 multidimensional organized self-concept, sports and exercise, in which one's body is highly
66 relevant, seem to be of particular interest in terms of promoting positive self-esteem
67 development in juveniles.

68 The assumption that exercise enhances children's global self-esteem is well recognised 69 with meta-analyses revealing a promising pattern of results. A systematic review of 25 70 randomized controlled trials (RCT) identified a moderate positive effect (d = 0.49, 95% CI: 71 0.16-0.81) of short-term exercise on global self-esteem among children and adolescents 72 (Ekeland, Heian, & Hagen, 2005). However, methodological weaknesses constrain the 73 explanatory power of this study, such as high risk of bias and small sample sizes (Liu, Wu, & 74 Ming, 2015). Other meta-analyses by Ahn and Fedewa (2010) and Liu et al. (2015) revealed 75 small positive effects of exercise on global self-esteem in RCTs, but contradictory results for 76 non-RCTs. For example, Ahn and Fedewa (2010) found a strong positive effect in non-RCTs 77 (g = 0.78; SE = 0.28), whilst Liu et al. (2015) found no beneficial effect. In summary, it could 78 be concluded that there is a small to moderate sized relationship between exercise and global 79 self-esteem in childhood and adolescence. Considering these modest effect sizes, the underlying 80 mechanisms explaining the relationship between exercise and global self-esteem should be 81 investigated in more detail.

82 The "exercise and self-esteem model" (EXSEM; Sonstroem & Morgan, 1989) provides a 83 useful framework to investigate the mechanisms behind the relationship between exercise and 84 global self-esteem. According to the EXSEM, individuals experience physical self-efficacy 85 during physical exercise participation, which increases perceived physical competence. The 86 resulting positive perceptions of one's physical competence have a positive impact on global 87 physical self-concept, which in turn affects global self-esteem. This model conceptualizes 88 specific physical self-concepts, such as perceived sports competence, which act as mediators in 89 the association between exercise and global self-esteem. Past studies supported this mechanism

90 (Slutzky & Simpkins, 2009; Wagnsson, Lindwall, & Gustaffson, 2014) with some findings
91 indicating a relatively weak association between perceived sports competence and global self92 esteem, when compared to the relationship between exercise and perceived sports competence
93 (e.g. Slutzky & Simpkins, 2009). Therefore, the question arises whether there are relevant
94 moderators acting in the specific relationship between perceived sports competence and global
95 self-esteem.

96 According to William James (1890/1963), domains of self-concept that individuals deem 97 to be more important will contribute more strongly to their global self-esteem than those 98 domains that individuals deem to be less important. This so-called individual-importance 99 hypothesis has been tested in several studies including samples of older adolescents and adults 100 (Dickhäuser & Schrahe, 2006; Marsh, 1986, 1993, 1994, 2008; Marsh & Sonstroem, 1995). 101 Whilst studies conducted by Dickhäuser and Schrahe (2006) and Marsh (1986, 2008) found 102 support for the individual-importance hypothesis, studies by Marsh (1993, 1994), Marsh and 103 Sonstroem (1995) did not. Overall, findings from general multiple regression models appear to 104 be inconsistent. This has led to the use of more sophisticated methodological approaches, such 105 as latent interaction analyses (Marsh, 2008). Lindwall, Aşçi, Palmeira, Fox and Hagger (2011) 106 also suggested that previous studies might have been constrained as their samples were 107 homogeneous in terms of variation in the importance factor. Therefore, recent research tested 108 the individual-importance hypothesis using latent interaction analyses in a sample of adults 109 from different nationalities and found support for this hypothesis in the relationship between 110 perceived sports competence and global self-esteem (Lindwall et al., 2011; Scalas, Morin, 111 Marsh, & Nagengast, 2014). In conclusion, recent studies found mixed support for the 112 moderating role of importance of sports competence in predicting individuals' global self-113 esteem and revealed that the focus on samples with higher inter-individual differences in the 114 importance ratings and the implementation of latent interaction analysis appear to be crucial for 115 testing the *individual-importance hypothesis*.

116 Individual differences regarding the importance of sports competence might typically 117 occur in early adolescence, where the individual-importance effect is considered particularly 118 relevant in this developmental period. Empirical evidence highlights that perceived sports 119 competence and the importance of this domain are closely linked, and how both undergo 120 declines from childhood to adolescence (Jacobs, Lanza, Osgood, Eccles, & Wigfield, 2002). 121 The synchronistic decline of these constructs is interpreted as a consequence of a number of 122 age-related developmental changes, such as physical changes due to the entrance into puberty, 123 cognitive-developmental processes and age-related changes in the social environment (Horn, 124 2004). Considering that early adolescents differ considerably in the timing and tempo of how 125 and when physical and cognitive processes occur (Marceau, Ram, Houts, Grimm, & Susman, 126 2011), it can be speculated that individual differences in the physical self and the associated 127 importance attached to this life domain should be more pronounced in early adolescence than 128 in other age groups. Although there are some studies with older adolescents or adults, to the 129 best of our knowledge, no study has tested the individual-importance hypothesis in a sample of 130 early adolescents. Thus, the first aim of the present study was to test the *individual-importance* 131 hypothesis in a sample of early adolescents.

132 Normative importance ratings act as basic standards against which individuals evaluate 133 themselves (Cross & Gore, 2012). Therefore, in addition to individual differences in importance 134 ratings, normative importance ratings also seem to play a central role in self-esteem formation 135 (Marsh, 1994; Marsh & Sonstroem, 1995; Scalas et al., 2014). One important social category 136 that drives the importance of specific life domains is gender (Brown & Diekman, 2010; Boiché, 137 Chalabaev, & Sarrazin, 2014). Past studies consistently observed differences in favour of boys 138 in the levels of perceived sports competence and the importance of sports competence (Boiché 139 et al., 2014; Gentile et al., 2009; Jacobs et al., 2002). Research has also consistently documented 140 gender differences in youth physical activity such that boys are more active than girls (e.g. Park 141 & Kim, 2008). However, there is no study which tested the gender-specific importance *hypothesis*, which assumes that the effect of perceived sports competence on global self-esteem is stronger for boys than for girls, as boys value sports as more important. The identification of a gender-specific importance effect could be one explanation for the overall mixed support of the individual importance hypothesis in the literature. Moreover, the investigation of the gender-specific importance hypothesis provides closer insights into the mechanisms behind the relationship between exercise and self-esteem. Therefore, the second aim of the present study was to test this gender-specific importance hypothesis.

149

#### Method

## 150 Participants

151 The study involved 257 adolescents (52.5% girls,  $M_{age} = 11.3$ , SD = 0.70) recruited from 152 15 schools in urban and rural areas around the city of Bern, Switzerland. The participants' age 153 ranged from 8.8 to 13.9 years. In view of previous studies that have tested the individual-154 importance hypothesis with regard to perceived sports competence (Dickhäuser & Schrahe, 155 2006; Lindwall et al., 2011; Scalas et al., 2014), an a priori power analysis was performed with 156 power  $(1 - \beta$  error probability) = .80,  $\alpha$  error probability = .05, effect size  $\gamma$  = .24, numerator of 157 latent variables = 5, number of observed variables = 15, resulting in an optimal sample size of 158 251.

## 159 Measures

160 To measure the three main constructs of the study (perceived sports competence, global 161 physical self-concept and global self-esteem), the respective subscales of the German version 162 of the Physical Self-Description Questionnaire Short (PSDQ-S; Braun, Martin, Alfermann, & 163 Michel, 2018) were used. Evidence of the reliability and validity of the PSDQ-S in a sample of 164 early adolescents has been shown by Brown and Bonsaksen (2019). Since Freund, Tietjens, and 165 Strauss (2013) have demonstrated better psychometric properties for the four response 166 categories format in children and adolescents, the response format was adjusted for age-167 appropriate use, exchanging the original 6-point Likert scale for a 4-point Likert scale that

ranged from 1 (strongly disagree) to 4 (strongly agree). Evidence for the reliability of the 4point-Likert scale version of the PSDQ-S of has been provided by Schmidt, Blum, Valkanover
and Conzelmann (2015).

171 **Perceived Sports Competence**. The perceived sports competence scale consists of three 172 items with one example of item being: «I am good at most sports». In the present study, the 173 factor loadings of the individual items ranged between .61 and .89, with a Cronbach's alpha of 174 .79. Test-retest reliability with a 1-year interval was r = .76 (Marsh et al., 2010).

175 Global Physical Self-Concept. The global physical self-concept scale also consists of 176 three positive worded items with one example of item being: «Physically, I am happy with 177 myself». The factor loadings of the items ranged between .79 and .89 in the present study, with 178 a Cronbach's alpha of .87. Schmidt et al. (2015) used the same scale and reported a test-retest 179 reliability with an interval of 10 weeks of r = .73.

180 Global Self-Esteem. The original global self-esteem scale consists of five items. Two 181 items are negative and three are positive worded, with one example of a positive item being: 182 «Most things I do, I do well». Because it is well known that negative item bias is produced by 183 the inability of young individuals to respond appropriately to negatively worded items on rating 184 scales (Hagger, 2007), the two negative worded items were excluded. The data of the present 185 study revealed factor loadings between .59 and .74, with a Cronbach's alpha of .69. In the study 186 from Schmidt et al. (2015) test-retest reliability with an interval of 10 weeks was satisfying with 187 r = .74 (Schmidt et al., 2015).

Importance of Sports Competence. The scale to measure the importance of sports competence was originally developed by Dickhäuser and Schrahe (2006), with an example item being: «For me personally, it is very important to be good at sports». All items were rated on a 4-point Likert scale ranging from 1 (strongly disagree) to 4 (strongly agree). Dickhäuser and Schrahe (2006) reported a Cronbach's alpha of .85 in a sample of adolescents indicating good psychometric properties. Furthermore, a positive correlation between the sum score of the scale

194 with the school grade in sports indicates criterion validity. Initially the scale contained five 195 items, three are positive and two are negatively worded. In line with the same rationale as 196 explained above, in the present study only three positively worded items were used. In the 197 present study, the factor loadings of the individual items ranged between .72 and .85, with a 198 Cronbach's alpha of .83.

199 **Background variables**. As background variables age, gender, socioeconomic status, 200 physical maturation and self-reported physical activity were assessed. The socioeconomic 201 status was measured with the Family Affluence Scale II (FAS II; Boudreau & Poulin, 2009). 202 The scale consists of four questions asking children about things they are likely to know about 203 in their family (cars, bedrooms, holidays, and computers). A sample item is: "Does your family 204 own a car, van or truck?" Response options are: "no" (0 points); "yes, one" (1 point); "yes, two 205 or more" (2 points). The response format varies by item. The prosperity index (ranging from 0 206 to 9) was calculated from the sum of the four items. Evidence for the reliability and validity in 207 a sample of 11 to 15 years old adolescents has been provided by Boyce, Torsheim, Currie and 208 Zambon (2006). Physical maturation was measured with the Pubertal Development Scale, 209 validated by Watzlawick (2009) in a sample of early adolescents ( $M_{age} = 11.2$ ; SD = 0.89). The 210 scale consists of three items (4-point Likert scale) asking boys and girls about things they are 211 likely to know about their physical maturation (e.g. body hair, beard or breast development, 212 occurrence of menstruation or puberty vocal change). The maturity index (ranging from 4 to 213 12) was calculated from the sum of the four items. As an indicator for children's physical 214 activity level, the self-reported frequency of physical activity (in hours per week) was measured 215 with a single-item. The item-wording was: How many hours per week do you do sports in an 216 average week?".

### 217 Procedure

After receiving the permission of the participating school principals, the teachers werecontacted for study enrolment. The children and their parents were informed about the purpose

of the study, the voluntary nature of their involvement, and that they could discontinue at any time. The legal guardians of all participants have signed an informed consent form approved by the Institutional Review Board. The participants completed the paper-pencil questionnaire during two regular school lessons (between 10 am and 12 pm) in a quiet classroom and under surveillance of a research assistant.

## 225 Statistical analyses

226 All structural equation modeling procedures were performed based on latent variables 227 using R-package "lavaan" (Rosseel, 2012)<sup>1</sup>. Since the data was not normal distributed, a maximum likelihood estimation with robust standard errors and a scaled test statistic that is 228 229 (asymptotically) equal to the Yuan and Bentler (2000) test statistic was used (Rosseel, 2012). 230 The MCAR-Test (Little & Rubin, 2002) revealed that the 6.6% are missing completely at random ( $\chi^2 = 132.42$ , df = 119, p = .189). Therefore, full information maximum likelihood was 231 232 used to impute missing data. As such, the full sample (N = 257) was retained for all procedures. 233 To assess model-data fit, standard indices were calculated and compared with the criteria 234 for acceptable fit recommended by Marsh et al. (1996; also see Marsh, Wen, & Hau, 2004): 235 The robust Comparative Fit Index (CFI), Tucker-Lewis-Index (TLI), the root mean square error of approximation (RMSEA) and the chi-square statistic. The CFI and TLI vary between 0 to 1, 236 237 with values greater than .90 and .95 typically taken to reflect acceptable and excellent fits in 238 the data. RMSEA values of less than .06 are taken to reflect a reasonable fit, whereas RMSEA 239 values greater than .10 are unacceptable (Marsh et al., 2004).

<sup>&</sup>lt;sup>1</sup> Although students are nested within classes, intraclass correlation coefficients (ICC) ranging from .01 to .02 indicate that the between-group variance can be ignored (Hox, 2002). Thus, all analyses were performed at the individual level.

### 243 *Testing the individual-importance hypothesis*

244 To test the main hypothesis of the study – that the relationship between perceived sports 245 competence and global self-esteem is moderated by the importance of sports competence – 246 structural equation modeling procedures with latent variable interaction were performed. Since 247 global physical self-concept has been found to mediate the relationship between subdomain 248 factors and higher order factors such as global self-esteem (Sonstroem & Morgan, 1989), it may 249 be relevant to also include the global physical self-concept factor as a mediator in analyses that 250 examine the relationship between perceived sports competence and global self-esteem. 251 Therefore, aside from the direct effects of the latent competence, importance and competence 252 × importance factors on global self-esteem, indirect effects mediated by global physical self-253 concept were included in the model. 95 % confidence intervals for specific indirect and total 254 effects were computed.

255 The interaction between perceived sports competence and importance of sports 256 competence was specified using the matched-pair double-mean-centred unconstrained 257 approach (Lin, Wen, Marsh, & Lin, 2010). According to Scalas et al. (2014), support for the 258 individual-importance hypothesis is given if (1) the interaction-model fits the data compared to 259 standard indices (Marsh, Balla, & Hau, 1996), (2) the interaction factor explains additional 260 variance of global self-esteem and (3) the effect of the interaction factor is positive and 261 statistically significant. The appropriate standardized interaction effect was calculated with the 262 formula by Marsh, Wen, Nagengast and Hau (2012).

263 Testing the gender-specific importance hypothesis

264 To test the gender-specific importance hypothesis, multi-group analyses were performed.265 First, three preconditions were tested to ensure that the intended multi-group analyses are

266 permissible: The models to be compared must exhibit configural, metric and scalar invariance 267 (Byrne, 2010). Configural invariance exists if the number of factors across the groups are 268 identical to the pattern of factor-indicator relationships, as well as if the models fits the data 269 well (based on the evaluation of multiple fit indices). A comparison of structural relationships 270 is permissible only if metric invariance is achieved. This is the case if the loadings are equal 271 across groups. Furthermore, a comparison of latent means is permissible only if scalar 272 invariance is achieved. The latter exists, if additionally, the intercepts are equal across groups. 273 These three types of invariance were tested with scaled chi-square difference tests (Satorra & 274 Bentler, 2001). Next, gender differences in the mean values of importance of sports competence 275 (invariance of latent means) and gender differences in the regression paths (structural 276 invariance) were investigated with two additional scaled chi-square difference tests (Satorra & 277 Bentler, 2001). Support for the gender-specific importance hypothesis is given if the perceived 278 sports competence has a bigger impact on global self-esteem in boys.

279

#### Results

#### 280 Preliminary Analyses

281 *Descriptive statistics* 

282 Analysis of the physical activity level (M = 6.90, SD = 6.73) and the socioeconomic status 283 (M = 4.69, SD = 1.50) provide evidence that the present sample is representative for a large 284 population of same-aged-children from different social classes from Switzerland (Boyce & 285 Dallago, 2004). As expected, the 122 boys ( $M_{age} = 11.34$ , SD = 0.75) differed from the 135 girls 286  $(M_{age} = 11.32, SD = 0.65)$  in the amount of self-reported weekly physical activity (t(255) = 4.13, t)287 p < .0005, d = 0.52), with boys ( $M_{c} = 8.71$ , SD = 8.36) being more active than girls ( $M_{girls} =$ 288 5.25, SD = 4.21). Analysis of physical maturity revealed that girls ( $M_{\odot} = 5.25$ , SD = 4.21;  $M_{\odot}$ 289 = 8.71, SD = 8.36) are more advanced with respect to pubertal development (t(230.59) = -6.93, 290 p < .0005, d = 0.87).

291 Table 1 shows descriptive statistics, Cronbach's alpha values and bivariate correlations 292 between the latent variables for both the total sample and gender-specific groups. For the total 293 sample and for the subgroups, Cronbach's alpha values were in an acceptable range between 294 .65 and .89. With respect to the descriptive statistics, boys tend to rate their sports competence 295 higher, ascribe higher importance to their sports competence, are more satisfied with their 296 bodies, and tend to report higher levels in global self-esteem than girls. Independent *t*-tests 297 revealed only the differences in perceived sports competence (t(255) = 2.88, p = .004, d = 0.36) 298 and importance of sports competence (t(249) = 3.52, p = .001, d = 0.43) to be statistically 299 significant. All differences in favour of boys are in line with previous research findings (see 300 Gentile et al., 2009).

301

#### [Insert Table 1 here]

# 302 *Testing invariance between boys and girls*

303 Configural invariance was demonstrated since the number of factors and the factor-304 loading patterns were the same across the two groups of boys and girls, and both models fitted 305 the data acceptable (Table 2). Metric invariance was demonstrated since the chi-square 306 difference test between the model-configural and the model-loadings (with equality constraints 307 on factor loadings) was not significant ( $\Delta \chi^2 = 6.83$ , df = 10, p = .741). The factor loadings 308 between the boys and girls can therefore be considered as equal. Furthermore, scalar invariance 309 was demonstrated since the chi-square difference test between the model-loadings and the 310 model-intercepts (with additional equality constraints on the intercepts) was not significant ( $\Delta \gamma^2$ 311 = 7.47, df = 10, p = .681). Hence, all intended multi-group analyses are permissible.

312

#### [Insert Table 2 here]

313 Primary Analyses

# 314 Individual-importance hypothesis

315 The structural equation model in Figure 1 shows that perceived sports competence is 316 highly correlated with the importance factor (r = .74, p < .0005) and significantly related to 317 physical self-concept ( $\gamma = .61, p < .0005$ ) and global self-esteem ( $\gamma = .44, p = .005$ ). The 318 importance factor is not substantially related to the physical self-concept ( $\gamma = .05, p = .754$ ) 319 and global self-esteem ( $\gamma = .17, p = .235$ ). Furthermore, there is a significant relation between 320 physical self-concept and global self-esteem ( $\beta = .41, p = .001$ ) and the physical self-concept 321 partially mediates the effect between perceived sports competence and global self-esteem (see 322 Table 3).

323 To test the main study hypothesis – whether the relationship between perceived sports 324 competence and global self-esteem is moderated by the importance of sports competence – 325 latent interaction analyses were performed. First, the interaction model (see Figure 1) displays 326 a good model-fit, with CFI, TLI and RMSEA satisfying common critical values (see Table 2). 327 Second, the interaction factor explains 2 % of the results for global self-esteem and 5 % of the 328 variance in global physical self-concept. Third, the interaction factor is significantly related to 329 global physical self-concept ( $\gamma = .17, p = .003$ ) but not to global self-esteem ( $\gamma = .11, p = .051$ ). 330 However, there is a significant indirect and a significant total interaction effect on global self-331 esteem, indicating that the interaction effect is fully mediated by the physical self-concept (see 332 Table 3). Taken together, it can be asserted that the importance young adolescents ascribe to 333 their sports competence moderates the relationship between perceived sports competence and 334 more global self-concept dimensions.

335

[Insert Figure 1 here]

336

[Insert Table 3 here]

**337** *Gender-specific importance hypothesis* 

To test the second study hypothesis – whether the gender-specific importance of sports competence moderate the relationship between perceived sports competence and global selfesteem – multi-group analyses were performed (see Table 2). In a first step, a chi-square difference test between a model with equality constraints on loadings and intercepts (model equal intercepts), and a model with additional equality constraints on the latent means (model343 means) was performed to test whether boys ascribe a higher importance to their sports 344 competence. The model with equality constraints on the means (model equal means) was inferior to the model equal intercepts ( $\Delta \chi^2 = 15.82$ , df = 5, p = .007), indicating boys and girls 345 346 differ in latent means. As hypothesized and consistent with the independent t-test-results 347 reported above, boys assessed their sports competence more positively ( $M_{c} = 0.26, SD_{c} = 0.61$ ,  $M_{\mathcal{Q}} = 0$ ,  $SD_{\mathcal{Q}} = 0.63$ , p = .003, d = 0.42) and attached greater importance to their sports 348 349 competence than girls ( $M_{c} = 0.27, SD_{c} = 0.53, M_{\varphi} = 0, SD_{\varphi} = 0.75, p = .001, d = 0.51$ ). The 350 mean-differences between global physical self-concept and global self-esteem were not 351 significant. In a second step, a chi-square difference test between a model with equality 352 constraints on the loadings (model equal loadings) and a model with additional equality 353 constraints on the regression paths (model equal regressions) was performed to test whether the 354 relations between perceived sports competence and global self-esteem are stronger for boys 355 than for girls. Against expectations, the regression paths did not differ between boys and girls, 356 since the chi-square difference test between the model equal loadings and the model equal 357 regressions was not significant ( $\Delta \chi^2 = 13.7$ , df = 7, p = .057). Therefore, the data of the current 358 study provides no empirical evidence for the gender-specific importance hypothesis.

359

### Discussion

Since one important issue in exercise psychology is to reveal the mechanisms explaining the relationship between exercise and self-esteem, the aim of the present study was to test (a) the individual-importance hypothesis and (b) the gender-specific importance hypothesis in a sample of early adolescents. Whereas in the current study, further support for the individualimportance hypothesis in the physical domain was found, the gender-specific importance hypothesis had to be rejected.

366 Support for the Individual-importance hypothesis

367 Latent interaction analysis showed that the relationships between perceived sports368 competence and more global facets of self-esteem are moderated by the importance early

369 adolescents attach to their sports competence. Thus, the relationship between perceived sports 370 competence and global self-esteem is especially strong, if an individual values sports as 371 important. The effect size of the interaction factor lies in a small range, as in line with the results 372 from older individuals (Dickhäuser & Schrahe, 2006; Lindwall et al., 2011; Marsh, 1986, 2008). 373 In accordance with the logic of a hierarchical self-concept model (Shavelson et al., 1976), the 374 interaction effect was fully mediated by global physical self-concept. The revealed moderating 375 effect of the importance of sports competence, however, contradicts the study findings of Marsh 376 and Sonstroem (1995). The present study probably had more statistical power, because the SEM 377 methodology provides relevant advantages towards the multiple regression approach, such as 378 the control of the unreliability and the measurement error of the factors (Lindwall et al., 2011). 379 Another explanation for the diverging findings refers to the different samples used in the 380 respective studies. Whereas Marsh and Sonstroem (1995) investigated adult female aerobic 381 dancers, the present study involved young adolescents from different German-speaking parts 382 of Switzerland.

383 Based on theoretical considerations, greater variability in the importance of sports 384 competence in a sample of early adolescents and consequently a more pronounced interaction 385 effect was expected. Whereas Marsh and Sonstroem (1995) and Lindwall et al. (2011) reported 386 standard deviations of the importance factor in a range from 0.52 to 0.85, the present study 387 revealed a standard deviation of 0.63. Therefore, there is no evidence for more variability in the 388 importance factor and a more pronounced interaction effect in the present sample. Since all data 389 were reported on a 4-point Likert scale, and all sample means were above the scale midpoint, a 390 potential ceiling effect could be an explanation for the occurrence of such a weak interaction 391 effect. However, to clarify, whether the individual-importance effect varies as a function of age 392 was not the main aim of the present study, thus further research is needed.

393 *No support for the gender-specific importance hypothesis* 

394 In line with a large body of research, multi-group analysis revealed that boys value sports 395 competence as more important than girls (e.g. Boiché et al., 2014). However, incongruous to a 396 gender-specific importance hypothesis, the relationships between perceived sports competence, 397 global physical self-concept and global self-esteem did not differ between boys and girls. 398 Therefore, there is no support for a gender-specific importance hypothesis in the present study. 399 One explanation for this finding refers to the missing intra-individual or idiographic perspective 400 in this present study (Hardy & Moriarty, 2006; Pelham, 1993). Idiographic approaches focus 401 on the specific pattern of traits within each individual (Hardy & Moriarty, 2006). The present 402 study adopted a nomothetic perspective, whereby the level of importance was operationalized 403 by an interindividual frame of reference. Consequently, no statement about the importance of 404 sports competence relative to importance ratings of other domains within a person is 405 permissible (idiographic approach). Hence, it remains unclear whether the gender-specific 406 findings would be different if the importance would be operationalized in an ideographic way. 407 To clarify this open question, future research should investigate this gender-specific importance 408 hypothesis with a nomothetic and an ideographic approach.

409 Practical recommendations

410 The present study showed that perceived sports competence is strongly linked to global 411 self-esteem. Lindwall et al. (2011) found a similar pattern of results in a sample of adults. 412 However, the relationship found in the current study, in which a sample of early adolescents 413 was investigated, turned out to be stronger. This is in line with the assumption that especially 414 early adolescent's global self-esteem is dependent on how skilled they perceive themselves in 415 physical activities (Schmidt et al., 2015). Therefore, the promotion of competence experiences 416 in sports and exercise appears to be a promising way to support positive self-esteem 417 development in early adolescence.

418 Another practical recommendation that could be derived from this present study is to take 419 the importance of sports competence into account when planning interventions to promote 420 global self-esteem in early adolescence. For example, promoting global self-esteem through 421 physical activity could hold little relevance if the child values sports as unimportant. Additionally, it might be relevant to identify individuals with both negative perceptions of their 422 423 physical abilities and high importance attributed to sports, as they are especially vulnerable to 424 establishing a negative sense of self-worth, which could lead to mental health problems in later 425 adolescence and adulthood (Keane & Loades, 2017). This pattern might be more frequent in 426 early adolescence because of the physical and cognitive changes that challenge previous 427 positive physical self-perceptions (Schaffhauser, Allemand, & Schwarz, 2017). However, 428 considering the small interaction effect, it could be presumptuous to declare the individual-429 importance effect as the key mechanism for explaining global self-esteem formation in early 430 adolescence (Dickhäuser & Schrahe, 2006).

431 Contrary to the assumption, the present study found no support for a gender-specific 432 importance hypothesis. This result indicates that perceived sports competence affects males' 433 and females' global self-esteem to a similar extend in early adolescence. Therefore, the 434 promotion of perceived sports competence appears to be a promising way to support positive 435 global self-esteem development for both groups. However, since recent studies showed that 436 girls generally display lower ratings in physical self-concept and global self-esteem (Gentile et 437 al., 2009) and steeper decreases in these self-concept domains from late childhood to early 438 adolescence (Schaffhauser et al., 2017), specific interventions for girls might be advisable. 439 Therefore, the missing support for the gender-specific importance hypothesis implies that the 440 individual importance effect occurs independently of gender. Hence, the consideration of the 441 individual importance when planning interventions to promote global self-esteem is reasonable 442 in both gender groups.

443 Since the present study focused on one important part of the EXSEM (Sonstroem &
444 Morgan, 1989), namely the relationship between specific and global self-perceptions, future
445 studies should also investigate other relevant mechanisms. For example, situational and

contextual factors of the sports setting (e.g. teacher behaviour, didactic implementation ofsports), and how these factors influence the process of self-concept development.

448 *Limitations* 

449 Beside the small interaction effect and the missing idiographic approach, an obvious 450 limitation of the current study is the cross-sectional nature of the data, making it impossible to 451 draw conclusions in terms of cause and effect. Hence, the directional paths in the model could 452 be considered in both causal directions. Consequently, it remains open as to whether the 453 correlation between perceived sports competence and global self-esteem constitutes a cognitive 454 integration process of perceived sports competence into more global facets of self-esteem 455 (bottom-up), or a top-down regulation process of global self-esteem (Marsh, Gerlach, 456 Trautwein, Lüdtke, & Brettschneider, 2007). Because of the cross-sectional nature of the data, 457 there could also be two psychological mechanisms underlying the correlations between the 458 interaction factor and the global self-concept facets (Dickhäuser & Schrahe, 2006). On the one 459 hand, it is conceivable that the interaction effect stands for a moderated integration process of 460 perceived sports competence into global self-esteem. On the other hand, the interaction effect 461 could represent a moderated discounting process (Harter, 2012). Although previous research 462 assumes that both causal directions occur in early adolescence (Wagnsson et al., 2014), more 463 longitudinal research is needed to gain insight in terms of causality and the underlying 464 psychological mechanisms.

465

#### Conclusions

The central findings of this study revealed that individual differences in early adolescents' importance of sports competence explain variations in the relationship between perceived sports competence and global self-esteem, yet normative gender-specific differences do not. Hence, there is evidence that perceived sports competence affects hierarchically superior self-concept dimensions, such as global physical self-concept and global self-esteem, especially when considered to be of great importance. From a theoretical point of view, these findings support 472 the general assumption that global self-esteem is comprised of both descriptive and evaluative 473 dimensions. In trying to precisely predict early adolescents' global self-esteem, the contribution 474 of specific descriptive dimensions of global self-esteem should be based on the saliency of the 475 dimensions to particular individuals. With regard to practitioners who pursue the goal of self-476 esteem promotion by means of physical activity, the present findings illustrate the relevance of 477 a differential psychological perspective: Since individuals differ not only in physical but also 478 psychological characteristics such as their values and norms, physical activity interventions 479 could be tailored to address these individual differences.

480

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Figures



*Figure 1.* Path diagram of the latent interaction model. Continuous arrows indicate significant (p < .05) and dashed arrows non-significant (p > .05) effects. All path coefficients are standardized solutions

# Tables

# Table 1

Descriptive Statistics, Cronbach's Alpha and Pearson Correlations for the Latent Variables by Gender and Total Sample

	Descriptive Statistics M (SD)			Cronbach's α			Pear	Pearson Correlations			
	Total	Boys	Girls	Total	Boys	Girls	1	2	3	4	
Variables											
1 Perceived Sports Competence	3.34 (0.59)	3.45 (0.57)	3.24 (0.59)	.79	.79	.78	-	.45*	.52*	.60*	
2 Global Physical Self-Concept	3.51 (0.64)	3.57 (0.60)	3.45 (0.68)	.87	.84	.89	.26*	-	.50*	.27*	
3 Global Self-Esteem	3.27 (0.48)	3.32 (0.49)	3.21 (0.45)	.69	.71	.65	.35*	.46*	-	.32*	
4 Importance of Sports Competence	3.38 (0.63)	3.52 (0.59)	3.25 (0.63)	.83	.81	.82	.61*	.15	.35*	-	

*Note*. \*p < .05; total sample n = 257; boys n = 122, girls n = 135; in correlations, girls lie above and boys below the diagonal

# Table 2

Goodness of Fit Statistics for Estimated Models Compared With Recommendations for Model Evaluation by Marsh et al. (1996)

Fit-Indizes	$\chi^2 (df)$	CFI	TLI	RMSEA	RMSEA 90% CI	
A.S.		≥.90	≥.90	≤.06		
Samples						
Model full sample	114.29 (80)*	.972	.964	.041	.024056	
Model boys	91.84 (80)*	.949	.934	.050	.019074	
Model girls	89.60 (80)*	.970	.961	.046	.013069	
Invariance levels						
Model equal structure	208.23 (160)*	.961	.949	.048	.028065	
Model equal loadings	210.71 (170)*	.967	.960	.043	.021060	
Model equal intercepts	218.70 (180)*	.969	.964	.041	.018058	
Model equal means	233.04 (185)*	.962	.956	.045	.025061	
Model equal regressions	224.13 (177)*	.962	.955	.046	.026062	

*Note*. \*p < .05: CFI; A.S. = Accepted Standard for Good Fit; CFI = Comparative Fit Index; TLI = Tucker Lewis Index; RMSEA = Root Mean Square Error of Approximation.

## Table 3

	Global Self-Esteem				Global Physical Self-Concept					
	Parameter	Std.	95% CI		Parameter	Std.	95% CI			
	Estimate	Error	LL	UL	Estimate	Error	LL	UL		
Sports Competence										
Direct effect	0.44*	0.15	0.14	0.72	0.61*	0.15	0.32	0.90		
Indirect effect	0.25*	0.08	0.10	0.41						
Total effect	0.69*	0.14	0.41	0.97						
<b>Competence</b> × <b>Impor</b>										
Direct effect	0.11	0.11	-0.03	0.38	0.17*	0.11	0.06	0.51		
Indirect effect	0.07*	0.06	0.01	0.23						
Total effect	0.18*	0.12	0.06	0.53						

Confidence Intervals of Direct, Indirect and Total Effects from Perceived Sports Competence and of Competence × Importance Latent Factors on Global Self-Esteem

*Note*. p < .05; Parameter estimates and confidence intervals are standardized solutions; CI = confidence interval; LL = lower limit, UL = upper limit.