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5 **The role of perceived competence in determining teacher support in upper**

6 **secondary school physical education**

7 **Abstract**

8 **Background and purpose:** Physical education remains one of the most liked school subjects irrespective of grade
9 level or geography. Nevertheless, there are sections of the student body who dislike the subject immensely, and
10 even more who think it should be organized differently. There have been longstanding accusations from the less
11 competent students claiming that the physical education teachers and the curriculum favor the competent. Despite
12 clear refusals of any conscious favoritism from the teachers themselves, perceived competence is one of the
13 premier predictors for liking and being motivated to participate in the subject, the other being participation in
14 organized sport. The purpose of this study was therefore to refute or confirm the veracity of the aforementioned
15 claims by investigating the relationship between perceived competence and teacher dependent support in upper
16 secondary school physical education.

17 **Participants and methodology:** 1133 upper secondary school students ($M_{age} = 17.2$, $SD = 0.86$) from Norway (n
18 = 554) and Iceland ($n = 579$) participated in a cross-sectional survey. Four different teacher dependent support
19 variables were measured using self-reporting: perceived competence support, perceived relatedness support,
20 perceived autonomy support and perceived teacher learning support. To simplify comparison between groups the
21 sample was divided into three units, highly competent students, moderately competent students and less competent
22 students.

23 **Results and conclusion:** A one-way multivariate analysis of covariance (MANCOVA), with gender as a covariate,
24 found indications of biased teacher behavior, thus supporting the aforementioned accusations. Even though some
25 discrepancy may exist between the reported and the actual support levels, the students respond and react in
26 accordance with their perceptions, which is why their perceptions are of concern. These findings are incongruent
27 with the aims of the subject, and indicate that modified practices are needed if a more equal learning environment
28 for all students is desired. To reverse the current trend, we have provided three measures that we believe can reduce
29 the aforementioned discrepancy. Firstly, PE teachers must become more aware of their own biases, recognizing
30 their tendency to treat the competent more favorably. Secondly, challenges related to the students who show less
31 appreciation for the subject should become more prominent in the physical education teacher education. Finally,
32 the advantage those who participate in leisure time sporting activities have, over those who do not, should be
33 reduced by reevaluating the current curricular implementation.

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35 Key words: basic psychological needs, high school, self-determination theory, teacher bias.

36 Physical Education (PE) remains among the most popular school subjects, irrespective of grade
37 level or geography (Kangas, 2010; Moen, Westlie, Bjørke & Brattli, 2018; Säfvenbom, Haugen
38 & Bulie, 2015). However, the students who dislike the subject tend to dislike it with an intensity
39 not associated with other subjects (Andrews, & Johansen, 2005; Olafson, 2002). PE teachers
40 have often been accused of favoring certain sections of the population, whether it were males,
41 active athletes or the more competent students (Ennis, 1999; Leslie et al., 1999; Säfvenbom et
42 al., 2015). The fact that a plethora of studies have found males to dominate just about every
43 occurrence and interaction within the PE context (Alfermann, 1999; Derry & Phillips, 2004;
44 Duffy, Warren & Walsh, 2001; Hannon & Ratliffe, 2007; Shimon, 2005) and that the greatest
45 predictors for PE appreciation are perceived competence and leisure time sporting participation
46 (Redelius, 2004, 162; Säfvenbom et al., 2015), give credence to these accusations.

47 The main phenomena of interest in this study is perceived competence. Competence
48 refers to the capacity to interact effectively with a given environment, and is usually the result
49 of prolonged learning (White, 1959). According to the basic psychological needs theory, which
50 is a mini-theory derived from Deci and Ryan's self-determination theory (1985, 2000),
51 competence is one of three basic psychological needs an individual relies upon to function
52 optimally in any social context (the other two being autonomy and relatedness). For the basic
53 psychological needs to be fulfilled, need-supportive environments that facilitate competence,
54 support autonomy and stimulate emotional connections have to be in place. Neglecting any of
55 the basic needs can result in functional costs (Deci & Ryan, 2000).

56 In accordance with the theoretical postulations of Deci and Ryan (2000), Standage,
57 Duda & Ntoumanis (2005) found the degree of need satisfaction to be indicative of the degree
58 of perceived need support in secondary school PE. Those findings are congruent with other
59 research findings, which affirm the relationship between relatedness support and relatedness on
60 one hand (Chang, Chen, Tu, & Chi, 2016; Cox, Duncheon, & McDavid, 2009), and autonomy

61 support and autonomy on the other (Shen, McCaughtry, Martin, & Fahlman, 2009; Shen,
62 McCaughtry, Martin, Fahlman, & Garn, 2012). However, the same does not necessarily apply
63 to competence; at least not to the same degree. Competence seems to separate itself from the
64 other two psychological needs, at least in the PE context, as it is not as dependent on external
65 facilitation. Even though perceived competence tends to be higher in environments that are
66 mastery oriented, and evaluate on individual criteria as opposed to comparative ones (Kalaja,
67 Jaakkola, Watt, Liukkonen, & Ommundsen, 2009; Ntoumanis, 2001), most of the variance
68 appears to be determined by physical activity levels and sport participation (Anderssen, 1993;
69 Carroll, & Loumidis, 2001; Goudas, Dermitzaki, & Bagiatis, 2001).

70 Previous studies within the PE context have found that perceived competence is
71 associated with the degree of motivation for the subject (Ntoumanis, 2001), can predict future
72 levels of physical activity (Timo, Sami, Anthony & Jarmo, 2016), and is consistently more
73 prominent in male students than female ones (Cairney et al., 2012; Carrol & Loudimis, 2001;
74 Robinson, 2011). Even though variations in competence occur in all school subjects, PE stands
75 out as the nature of the subject puts these variations on display to a greater extent (Fagrell,
76 Larsson & Redelius, 2012). The physical and exhibitional nature of PE makes concealment of
77 shortcomings onerous, which may explain why, given the opportunity to opt out of
78 participating, less competent students tend to do so (Fagrell et al., 2012; Ntoumanis, 2005).

79 In line with the rest of the western world, PE in the Nordic countries is based on a multi-
80 activity approach that is heavily congested with traditional team-based ball sports (Annerstedt,
81 2008). Many of the PE teachers have backgrounds in these same sporting activities, and as a
82 result PE lessons tend to be organized in line with the modus operandi of sports clubs (Moen et
83 al., 2018; Syrmpas, Digelidis, Watt, & Vicars, 2017; Trost, 2004). In addition, PE classes have
84 been found to be a subpar arena for skill development as most of the time is allotted to the
85 execution and evaluation of skills at the expense of actually acquiring them (Digelidis, &

86 Papaioannou, 1999; Gibbons, 2008; Smith, Lounsbery & McKenzie, 2014). Students who
87 actively participate in sports outside the PE context are therefore at a great advantage. Instead
88 of reacting to the challenge, too many PE teachers choose the path of least resistance and hide
89 behind the preferred activities of the majority, as opposed to using pedagogical tools to design
90 inclusive activities that benefit everyone (Crum, 2012). This results in an environment where
91 sections of the students are rewarded for using skills acquired outside the confines of PE to
92 succeed, while others are left behind (Crum, 2012; Fagrell et al., 2012). This trend comes across
93 as curious seeing as previous research within the PE context indicates that the more capable
94 students are likely to thrive irrespective of their environment, while the disadvantaged have
95 been found to benefit greatly from facilitation (Dudley, Okely, Pearson, & Peat, 2010; Gabbei,
96 2004; Nicaise, Cogérino, Bois, & Amorose, 2006). Likewise, these priorities are incongruent
97 with the aims of the subject which do not include improving proficiency or incite competition,
98 but rather teach the basic rules of the games, develop teamwork and inspire students to live
99 active lives (Fagrell et al., 2012).

100 To date, most research into psychological need satisfaction in PE has centered on the
101 integral role autonomy plays in determining well-being within the subject, and how
102 internalizing the reasons for participation is paramount to mediating motivation (Prusak,
103 Treasure, Darst, & Pangrazi, 2004; Shen et al., 2009; Shen et al., 2012). This study attempted
104 to expand the ongoing discussion on the subject by illuminating the tacit importance
105 competence plays in teacher-student interactions. The objective of this study was therefore to
106 investigate the relationship between perceived competence and the perceived level of support
107 provided by the teachers in the Nordic PE context. Based on the aforementioned empirical
108 rationale, our expectation was to find a positive relationship between the students' perceived
109 competence and the level of support provided by the teachers on all observed support variables.

110 **Method**

111 *Participants and procedure*

112 The participants in this study were 1133 upper secondary school students ($M_{age} = 17.2$, $SD =$
113 0.86) from Norway ($n = 554$) and Iceland ($n = 579$). The eight participating schools, four from
114 each country, were selected through a stratified sampling procedure representing both urban,
115 suburban and rural settlements. Informed consent was obtained from all participants and school
116 representatives before the data collection commenced. The data was collected through a
117 questionnaire, administered by a project leader, in a group setting, during PE class.

118 *Instruments*

119 The students' perception of their PE specific competence was measured using a 5-item modified
120 short version of the 18-item Intrinsic Motivation Inventory (IMI; McAuley, Duncan &
121 Tammen, 1989). Answers were given on a 7-point Likert scale, ranging from 1 (strongly
122 disagree) to 7 (strongly agree). Examples of items are 'I am pretty skilled at PE' and 'I am
123 satisfied with my performance in PE.' The instrument has repeatedly displayed satisfactory
124 construct validity and internal consistency in the PE context, both internationally and in Norway
125 (Standage et al., 2005; Ommundsen & Kvalø, 2007).

126 Competence support was measured using a 4-item PE-specific instrument developed by
127 Standage et al., (2005). Answers were given on a 7-point Likert scale ranging from strongly
128 agree (1) to strongly disagree (7). Examples of items are 'In this PE class the PE teacher helps us
129 to improve' and 'In this PE class the teacher makes us feel like we are good at PE.' The instrument
130 has displayed satisfactory construct validity and internal consistency in the PE context
131 previously (Standage et al., 2005).

132 Autonomy support was measured using a 6-item PE-specific version of the Learning
133 Climate Questionnaire (LCQ; Williams & Deci, 1996). Answers were given on a 7-point Likert
134 scale ranging from strongly agree (1) to strongly disagree (7). Examples of items are 'In this

135 PE class the PE teacher encourages us to ask questions’ and ‘In this PE class we feel that the
136 teacher provides us with choices and options.’ Satisfactory construct validity and internal
137 consistency have been demonstrated in the PE context previously (Standage et al., 2005;
138 Ommundsen & Kvalø, 2007).

139 Relatedness support was measured using a 5-item PE-specific scale developed by
140 Standage et al. (2005) intended to measure the quality of the interpersonal relationship between
141 the teacher and the students. Answers were given on a 7-point Likert scale ranging from
142 strongly agree (1) to strongly disagree (7). Examples of items are ‘In this PE class the PE teacher
143 supports us’ and ‘In this PE class the PE teacher has respect for us.’ Standage et al., (2005) study
144 on secondary school PE students demonstrated the measurement’s satisfactory construct
145 validity and internal consistency.

146 To measure the perceived teacher learning support an 8-item PE specific scale
147 developed by Laxdal, Mjåtveit, Leibinger, Haugen & Giske (2019) was used. The items
148 measured the students’ experiences with different elements related to teacher learning support,
149 such as the dissemination of learning goals, use of feedback and willingness to modify behavior.
150 Items include questions such as ‘It is important to the PE teacher that we learn new skills’ and
151 ‘The PE teacher provides us with clear advice on how we can improve our performance.’
152 Answers were given on a 6-point Likert scale, ranging from 1 (strongly disagree) to 6 (strongly
153 agree). The scale was found to display satisfactory construct validity and internal consistency
154 in the Norwegian PE context by Laxdal et al. (2019).

155 ***Statistical analysis***

156 All statistical analyses were performed using SPSS statistical software (version 25; IBM,
157 Armonk, NY). When the data had been processed, the sample was divided into three groups
158 depending on their level of perceived competence. The participants who were placed in the
159 highly competent group were the ones who scored above the 66th percentile, while the less

160 competent group consisted of the ones who scored below the 33rd percentile. The moderately
161 competent group consisted of the remaining individuals, who placed between the 33rd and the
162 66th percentile. The internal reliability of the applied measures was assessed using Raykov's
163 composite reliability coefficient (Raykov, 1998). The relationship between variables was
164 assessed using Spearman's rank correlation coefficient and a one-way multivariate analysis of
165 covariance (MANCOVA). Gender and nationality were used as covariates. Between group
166 differences were examined using LSD post-hoc tests. As normality is a criteria to perform a
167 MANCOVA, non-normally distributed variables were transformed to normality using the
168 Rankit procedure (Bliss, Greenwood and White, 1956). The Rankit procedure was chosen as it
169 has been found to be the most reliable normalizing procedure, irrespective of sample size and
170 distribution (Solomon & Sawilowsky, 2009). To quantify the differences between groups,
171 Cohens d (for comparison between two groups; benchmarks .2 for small, .5 for medium and .8
172 for large (Cohen, 1969)) and partial eta squared (for comparison between three groups;
173 benchmarks .0099 for small, .0588 for medium and .1379 for large (Cohen, 1969)) were
174 computed. For all analysis, significance was accepted at $p < .05$.

175 **Results**

176 Descriptive statistics, internal reliability scores and the correlation matrix for all observed
177 variables can be seen in table 1. Mean scores for all variables were relatively high, which
178 explains the negatively skewed distribution of the data. The measurements displayed high levels
179 of internal consistency, with composite reliability coefficients ranging from .91-.96 (Raykov,
180 1998). Table 2 illustrates the gender representation in each of the three groups.

181 As can be seen in table 3, a one-way MANCOVA, with gender as a covariate, revealed
182 significant differences between groups on all measured support variables (Pillai's Trace = .1, F
183 = 14.57, $df = (8,2116)$, $p < .001$). Between groups post-hoc comparisons revealed that the more
184 competent groups outsourced the less competent groups consistently. Analyzing each country

185 separately did not affect the conclusion. To further verify the validity of the results, the
186 untransformed data was tested using the Kruskal-Wallis nonparametric one-way ANOVA,
187 resulting in the same conclusion (not reported). The between-group differences were quantified
188 using Cohen's d estimation of effect size, and can be seen illustrated in figure 1.

189 **Discussion**

190 The purpose of this study was to investigate the relationship between perceived competence
191 and the perceived level of support provided by the teacher in the Nordic PE context. As previous
192 studies within the field of physical education have indicated that perceptions of both
193 competence and teacher support were gender-dependent, gender was controlled for in all
194 analysis (Cairney et al., 2012; Carrol & Loudimis, 2001; Lentillon, Cogèrion & Kaestner, 2006;
195 Robinson, 2011). In line with the findings of the aforementioned studies, the current study
196 found that males reported higher scores than females on both variables.

197 Congruent with our expectations, the results of this study indicated varying levels of
198 support, depending on the students' competence levels, on all measured support variables. The
199 different subgroups of high, moderate and low perceived competence reported significantly
200 different scores, with the highly competent group scoring the highest and the less competent
201 group scoring the lowest, consistently across all variables. These results give further support to
202 the claims that PE is an arena for the athletically competent and that the less competent are at a
203 disadvantage (Dowling, 2016). These findings are incongruent with previous findings from the
204 more academic subjects, where the less able students have been found to receive higher levels
205 of support than their peers, using both observation and self-reporting (Baker, 1999; Mercer,
206 Nellis, Martínez & Kirk, 2011). In the academic context, the less competent students are
207 consistently identified as needing additional support, which is reasonable as they are likely to
208 be less familiar with the subject matter and to be less comfortable within the context, compared
209 to the more competent students (Bruggink, Meijer, Goei & Koot, 2014). Disproportionate levels

210 of support in favor of the less competent appears to be a shrewd method of counteracting the
211 Matthew effect, which has been found to be prevalent in the school system (Merton, 1968;
212 Stanovich, 2009). The Matthew effect is the tendency for those who already possess desirable
213 capital, whether it is money, power, recognition or ability, to accrue more of it over time, while
214 those who are without tend to remain so; in other words, the rich-get-richer and the poor-get-
215 poorer (Merton, 1968).

216 At first glance the discrepant teaching behavior between these two contexts may seem
217 illogical, however, these results fit in line with our expectations and the available empirical
218 evidence in the field (Dowling, 2016; Ennis, 1999; Olafson, 2002). As previously mentioned,
219 PE lessons are heavily influenced by the modus operandi of sports clubs, and PE teachers tend
220 to have backgrounds as active participants or coaches in various sports (Moen et al., 2018;
221 Syrmpas et al., 2017; Trost, 2004). Ideally, sports clubs and educational institutions operate
222 according to a different set of principles, that although not bipolar, should find themselves
223 leaning towards the different ends of a spectrum. Sports clubs should, to a much greater extent
224 than the educational institutions, allow for the cultivation of the competent, as they are more
225 likely to act as catalysts in future sporting successes (Abbott & Collins, 2004; Digelidis &
226 Papaioannou, 1999). Even though acquiring an understanding of the rules of the game,
227 encouraging teamwork and promoting fair play are all integral components of sports at a grass-
228 root level, the ultimate objective tends to be winning (Ring & Kavussanu, 2018). Therefore, a
229 system designed to accommodate the less competent rather than the most competent would be
230 counterproductive in the sporting context. However, everyone should be entitled to an
231 opportunity to succeed in the educational system, and the teachers ought to provide appropriate
232 tasks for all students, in an effort to facilitate progress irrespective of prior knowledge and
233 experience (Norwegian Board of Education, 2015).

234 Nevertheless, it would be simplistic to allocate the teachers sole responsibility for the
235 differing perceptions reported by the various competency groups; as the students should be
236 viewed as active rather than passive participants in their own learning process. There are
237 indications from both sports and higher education that individuals who are more successful,
238 confident and motivated are more likely to seek support, as well as being better equipped to
239 detect and make use of said support, than their less successful counterparts (Karabenick &
240 Sharma, 1994; Van Yperen, 2009). In addition, repeated negative experiences, confusion and
241 general discomfort within the PE context can result in a state of learned helplessness for certain
242 students. Likewise, the less successful may be incentivized to mask their own shortcomings by
243 blaming a dearth of support instead of coming to terms with their own deficiencies.

244 In congruence with previous research, the inter-variable correlation between the
245 different support variables was relatively high (Zhang, Solmon, Kosma, Carson, & Gu, 2011).
246 The average score for all three sub-groups of students for said support variables was also
247 relatively high (above the arithmetic mean of the scale), which indicates a generally supportive
248 learning environment. The concern is the consistent unconscious bias in favor of the competent
249 students, which they are bound to benefit from. Curricular implementation has also been raised
250 as a cause of concern, as activity preferences have been found to be both skill- and gender-
251 dependent (Dudley et al., 2010; Olafson. 2002). According to Dudley et al. (2010), less skilled
252 students tend to prefer recreational activities focusing on fitness, while the more skilled students
253 tend to prefer sport specific competition, which focuses on individual performances. In
254 addition, female students have expressed their frustration at the superfluous focus on
255 competition in the PE context, and the lack of priority traditionally feminine activities have in
256 the curriculum (Gibbons, 2008; Olafson, 2002; van Daalen, 2005).

257 The results of this study have to be interpreted with its limitations in mind. The cross-
258 sectional nature of the study design does not allow for any determination of causality. Non-

259 random sampling diminishes the probability of the sample being representative of the general
260 population, thus potentially limiting the generalizability of the results. However, the sampling
261 procedure included several measures designed to increase generalizability. These measures
262 appear to have been successful, as certain key characteristics of the sample mirrored the
263 designated population (e.g. age, gender composition, ethnicity, and urban settlement). Self-
264 reporting presents certain obstacles which can skew the results, such as social desirability and
265 response bias. However, steps were taken during the data collection to minimize the impact of
266 those phenomena. There is also an unknown discrepancy between the actual and the perceived
267 prevalence of the measured behavior. We rely on the students perceptions when measuring
268 support, which only gives us an indication of the actual received support. However, students
269 respond and react in accordance with their perceptions, which underlines the importance of
270 documenting and understanding those perceptions. Despite these limitations, the results of the
271 study are interesting and have important practical implications. Additionally, we would like to
272 point out that sampling participants from two countries represents a strength to the study, and
273 that the similarities in results across borders bolster the argument for these findings to be
274 generalized even further.

275 Our recommendations for future research are threefold; 1) the replicability of the results
276 across grade levels should be investigated, 2) longitudinal study design should be used to
277 determine whether the perceptions of the sample remain constant over time, or whether they
278 change in accordance with the Matthew effect, and 3) the discrepancy between perceived and
279 received support in the PE context should be explored using observation.

280 **Conclusion and recommendations for practice**

281 Our findings indicate discrepant perceptions of support, on all measured support variables,
282 depending on the students' competence levels. Irrespective of the discrepancy that may exist
283 between the actual and the reported support, the student's perceptions are of concern and

284 indicate biased teacher behavior. To reverse the current trend, we have provided four measures
285 that we believe can reduce the aforementioned discrepancy. Firstly, PE teachers must become
286 more aware of their own biases, recognizing their tendency to treat the competent more
287 favorably. Secondly, challenges related to the students who show less appreciation for the
288 subject should become more prominent in the PE teacher education. The current system has a
289 tendency to affirm the predetermined views of an already homogenous group of individuals
290 instead of challenging their preconceptions, thus broadening their horizons. Finally, non-
291 traditional sports and activities should become more prominent on the agenda, at the expense
292 of more traditional sports, in an effort to reduce the advantage those who participate in leisure
293 time sporting activities have over those who do not. When traditional sports are on the agenda,
294 the rules of the game can be modified to even the playing field.

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471 **Appendix**

472

473 ***Table and figure captions***

474

475 **Table 1.** Descriptive statistics, composite reliability coefficients and correlations for all observed variables

476 **Table 2.** Gender distribution across the various competence groups

477 **Table 3.** Mean scores by confidence levels and MANCOVA results for all support variables

478

479 **Figure 1.** Cohens d was used to quantify the difference between groups. Whole lines indicate significant
480 differences at the $p < .01$ level.

481 **List of tables**

482

483 **Table 1.** Descriptive statistics, composite reliability coefficients and correlations for all observed variables

Variable	M	SD	Range	ρ	1	2	3	4
(1) Perceived Competence	5.66	1.25	1-7	.91	-			
(2) Perceived Competence Support	5.63	1.40	1-7	.95	.35*	-		
(3) Perceived Relatedness Support	5.89	1.40	1-7	.96	.33*	.85*	-	
(4) Perceived Autonomy Support	5.29	1.41	1-7	.95	.28*	.78*	.82*	-
(5) Perceived Teacher Learning Support	4.32	1.08	1-6	.92	.27*	.64*	.62*	.69*

Note: ρ = Raykov's Rho; Correlation is indicated using Spearman's ρ , * $p < .001$

484

485 **Table 2.** Gender distribution across the various competence groups

	Boys (n = 449)	Girls (n = 684)
Low perceived competence	27.8 % (n = 125)	34.1 % (n = 233)
Moderate perceived competence	29.4 % (n = 132)	35.4 % (n = 242)
High perceived competence	42.8 % (n = 192)	30.6 % (n = 209)

486

487 **Table 3.** Mean scores by confidence levels and MANCOVA results for all support variables

	Perceived Competence <i>M (SD)</i>			df	<i>F</i>	<i>p</i>	η_p^2
	Low	Moderate	High				
Perceived Competence Support	5.19 (1.40)	5.53 (1.40)	6.11 (1.23)	2	52.60	< .001	.09
Perceived Relatedness Support	5.49 (1.43)	5.78 (1.45)	6.34 (1.18)	2	52.17	< .001	.09
Perceived Autonomy Support	4.87 (1.38)	5.19 (1.48)	5.75 (1.24)	2	37.81	< .001	.07
Perceived Teacher Learning Support	3.99 (1.05)	4.29 (1.13)	4.65 (.95)	2	29.64	< .001	.05

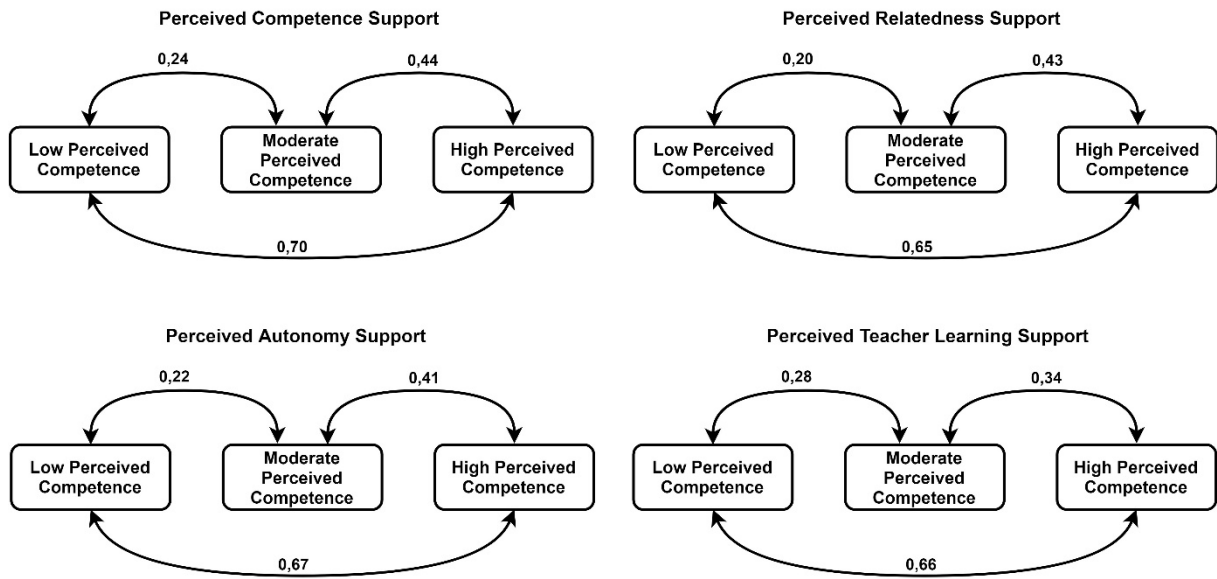
Covariates (gender and nationality) are not included in the table for the sake of clarity

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489

490 *List of figures*

491



492

493 **Figure 1.** Cohens d was used to quantify the difference between groups. Whole lines indicate significant

494 differences at the $p < .01$ level.

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