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**Influence of internally and externally controlling teaching behaviors on students' motivational outcomes in Physical Education: Is there a gender difference?**

22

**Abstract**

23 **Purpose:** Grounded in self-determination theory (SDT), this study examined gender  
24 latent mean differences in students' perceptions of externally and internally controlling  
25 teaching behaviors, basic psychological need (BPN) frustration, controlled motivation,  
26 amotivation, and oppositional defiance in the physical education (PE) context.  
27 Moreover, it analyzed the differentiated role that internally and externally controlling  
28 behaviors play on these SDT-related variables among girls and boys. **Method:** A  
29 sample of 1118 students ( $M_{age}=14.11\pm 1.50$ ; 50.9% girls) participated in this research. A  
30 multigroup structural equation modeling approach was performed to response the  
31 research questions. **Results:** Analyses revealed that girls reported more maladaptive  
32 outcomes in most SDT-related variables than boys. Although externally and internally  
33 controlling behaviors from PE teachers were positively related to maladaptive  
34 outcomes, both relate differently to boys and girls. **Conclusion:** Findings highlight the  
35 importance of reducing externally controlling behaviors in boys and internally  
36 controlling behaviors in both genders, but particularly in girls.  
37 **Keywords:** self-determination theory, need-thwarting teaching, motivation, basic  
38 psychological needs, sex.

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**Introduction**

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One of the main goals of Physical Education (PE) is to develop physically literate students who have the knowledge, skills, and confidence to participate in healthy physical activity throughout life (SHAPE America– Society of Health and Physical Educators, 2014). Students' positive experiences in PE have been identified as a key factor of the physical activity performed in and out of school (White et al., 2021). In contrast, negative experiences in PE are one of the main reasons for disengagement in PE lessons (Beltrán-Carrillo et al., 2012). Grounded in self-determination theory (SDT; Ryan & Deci, 2017), an important social-contextual factor that may influence students' motivational experiences is teachers' motivating style (Curran & Standage, 2017). Most previous studies have focused on the relationship between need-supportive behaviors of PE teachers and students' motivational experiences so far (Lochbaum & Jean-Noel, 2016; Vasconcellos et al., 2020). However, little attention has been paid to the impact of teachers' controlling behaviors, more specifically of its internal and external faces (De Meyer et al., 2016), on students' negative motivational experiences in PE. This pathway is known in SDT as the dark side of motivation (Bartholomew et al., 2011).

On the other hand, gender differences have been found in motivational variables in PE (Chu et al., 2019; Koka & Sildala, 2018; Shen, 2015). As girls are not engaged at the same level as boys in PE lessons (Mitchell et al., 2015; White et al., 2021), further studies should consider a gender perspective in the relationship between teachers' motivating style and students' motivational outcomes in PE. Due to the lack of previous research, there is a need to consider gender when analyzing the associations of teachers' internally and externally controlling behaviors on students' motivational outcomes in PE lessons. It will allow to theoretically deepen in whether the relationship between the

70 variables integrated in the dark side of motivation postulated by SDT are associated in a  
71 similar or different way in boys and girls. Moreover, the identification of the  
72 consequences associated with an internally and externally controlling behavior, on both  
73 boys and girls, might be particularly useful to refrain from adopting controlling  
74 strategies when teaching students in PE lessons. Based on SDT (Ryan & Deci, 2017),  
75 the current research aspires to expand previous evidence by examining gender  
76 differences in the relationships between the internal and external faces of controlling  
77 behaviors of the teachers and students' motivational outcomes in PE.

### 78 **Self-Determination Theory and Teachers' (De)Motivating Styles**

79 Central to SDT is the assumption that interpersonal styles from socializing  
80 agents (e.g., teachers) can enhance individuals' (e.g., students) motivation, behavior,  
81 and wellbeing, depending on the fulfillment of three basic psychological needs (BPN)  
82 (Ryan & Deci, 2017). In the context of school PE, one of the most important social-  
83 contextual factors that influence students' motivational experiences is the  
84 teachers' motivating styles (Curran & Standage, 2017; Vasconcellos et al., 2020; White  
85 et al., 2021). Consistent with SDT, PE teachers can adopt simultaneously two  
86 differentiated types of (de)motivating styles in terms of need-supportive behaviors and  
87 controlling behaviors in PE lessons (Ryan & Deci, 2017; Vansteenkiste et al., 2020).

88 The present study pays particular attention to controlling behaviors, which,  
89 compared to need-supportive behavior, have been notably less explored in PE. They  
90 refer to those teaching behaviors aiming to use pressuring strategies toward students to  
91 participate in learning activities in the way prescribed by the teacher (Reeve, 2009).  
92 More particularly, SDT-based research currently emphasizes that a controlling teaching  
93 style can be manifested in an internally way (i.e., seeming student indifference by  
94 appealing to their feelings of self-worth) and in an externally way (i.e., use of

95 controlling language, yelling, pressure, and threats to students) (De Meyer et al., 2016;  
96 Soenens et al., 2012). While internal controlling strategies are usually displayed in a  
97 non-verbal way (e.g., withdrawing a student's attention because he or she does not meet  
98 the teacher's expectations), external controlling strategies are usually clearly visible to  
99 others (e.g., using phrases such as "should" and "must"). Regardless of the  
100 consequences associated with controlling teaching behaviors, the assumptions of SDT  
101 (Ryan & Deci, 2017; Vansteenkiste et al., 2020), suggest that controlling teaching styles  
102 have been directly and positively related to the students' frustration of the BPN for  
103 autonomy (i.e., feelings of external or self-imposed pressures), competence (i.e.,  
104 feelings of inefficacy and failure), and relatedness (i.e., feelings of loneliness and social  
105 exclusion) of students, which, in turn, has been positively related to controlled  
106 motivation (i.e. participation in an activity due to external reasons such as avoidance of  
107 feelings of guilt or shame or to obtained rewards) and amotivation (i.e., the complete  
108 lack of volition to participate in an activity) in PE lessons. Although there is still little  
109 evidence in PE, a growing body of research (Curran & Standage, 2017; Vasconcellos et  
110 al., 2020) has revealed positive associations between students' perceptions of  
111 controlling styles from their teacher and their BPN frustration, controlled motivation,  
112 amotivation, and several maladaptive consequences, including oppositional defiance  
113 towards the PE teacher (i.e., a defensive and compensatory way by the students to do  
114 the opposite of what the teachers expect; Haerens et al., 2015).

115       However, it is worth noting that the distinction between the internal and external  
116 faces of controlling behaviors from PE teachers has been rarely studied in PE. In this  
117 vein, one of the only two existing studies showed that while both controlling practices  
118 were strongly related to each other ( $r = .54$ ), an empirical distinction between perceived  
119 internally and externally controlling teaching were identified as well. In particular, five

120 different profiles of perceived controlling teaching style were identified, with two  
121 profiles being characterized by either high or low levels of externally and internally  
122 controlling behaviors and other profiles displaying high or low levels of one of the types  
123 of controlling teaching behaviors. These results support that, although PE teachers may  
124 use both controlling practices in their instructional practice, it is also possible that only  
125 one of them predominates in their lessons. In addition, these only two previous existing  
126 studies also showed that, although both faces of controlling teaching behavior were  
127 positively related to BPN frustration, controlled motivation, and amotivation, internally  
128 controlling behaviors were more detrimental to students' motivational outcomes  
129 (Authors, xxxx; De Meyer et al., 2016). Further research is, therefore, required to  
130 examine the consequences of these two faces of the controlling teaching style in boys  
131 and girls.

### 132 **Gender Differences in Students' Motivational Processes Involved in PE Lessons**

133 Previous SDT-research, conducted in the context of PE, has found inconsistent  
134 results regarding the gender differences in students' perceptions of teachers' controlling  
135 style and students' motivational experiences. For instance, some prior studies reported  
136 no differences between boys and girls in perceptions of controlling teaching (Behzadnia  
137 et al., 2018; Koka & Sildala, 2018), BPN frustration (Haerens et al., 2015), controlled  
138 motivation and amotivation (Behzadnia et al., 2018; Haerens et al., 2015; Ntoumanis,  
139 2005). Conversely, other studies revealed that boys reported higher scores in controlling  
140 teaching (Bartholomew et al., 2018; Burgueño & Medina-Casabón, 2021; De Meyer et  
141 al., 2014; Haerens et al., 2015), BPN frustration (Bartholomew et al., 2018; Behzadnia  
142 et al., 2018), controlled motivation (Burgueño & Medina-Casabón, 2021; De Meyer et  
143 al., 2014; Ntoumanis, 2005), and oppositional defiance (Haerens et al., 2015). Girls, in  
144 contrast, in other studies, reported higher values in amotivation (De Meyer et al., 2016;

145 Johnson et al., 2011; Ntoumanis, 2005; Shen, 2015) and, more specifically, in  
146 competence need frustration (Burgueño & Medina-Casaubón, 2021).

147 Yet, SDT-based research examining the relationship of teachers' controlling  
148 styles on motivational outcomes, considering the differentiated role of gender in this  
149 motivational process, is relatively scarce in PE. The Koka and Sildala's (2018) study  
150 was the only one found that analyzed the association of controlling behaviors from PE  
151 teachers and students' amotivation in both boys and girls. Although this research did not  
152 consider the external and internal faces of controlling teaching (De Meyer et al., 2014),  
153 and only partially examined the dark side of motivation described by SDT (Ryan &  
154 Deci, 2017), it revealed that girls obtained a greater predictive effect in the relationships  
155 of two controlling teaching behaviors (i.e., perceive and conditional regard and  
156 intimidating behaviors) to amotivation, while boys showed a higher predictive capacity  
157 in the association of teachers' controlling use of praise and amotivation (Koka &  
158 Sildala, 2018). Therefore, this previous study suggests that PE teachers' controlling  
159 behaviors could impact the motivational process of boys and girls differently.

160 However, there are no studies that have examined the extent to which internally  
161 and externally controlling behaviors from teachers may trigger different motivational  
162 processes between female and male students in the PE setting. From a theoretical  
163 perspective, examining the gender differences in the relationship between the variables  
164 integrated in the dark side of motivation, postulated by SDT, can help to better  
165 understand their functioning in boys and girls in PE. To obtain a better insight into the  
166 detrimental effects of internally and externally controlling teaching behaviors on boys'  
167 and girls' motivational experiences in PE, additional research is, therefore, required.  
168 This might help PE teachers to refrain from using controlling behaviors when teaching  
169 students, from a gender perspective.

## 170 **Objectives and Hypotheses**

171 To fill these gaps in the literature, the aim of this research is twofold. First, this  
172 study aims to identify any gender differences in students' perceptions of internally and  
173 externally controlling behaviors from PE teachers, the frustration of the three BPN,  
174 controlled motivation, amotivation, and oppositional defiance in PE. Due to inconsistent  
175 results regarding gender differences in SDT-related variables (i.e., internally and  
176 externally controlling behaviors, need frustration, controlled motivation, and  
177 amotivation), no hypothesis was formulated. Next, this study also aims to examine the  
178 extent to which internally and externally controlling teaching behaviors may have  
179 different effects on the frustration of each BPN (i.e., autonomy, competence, and  
180 relatedness), controlled motivation, amotivation, and oppositional defiance between  
181 girls and boys in PE lessons. We hypothesize that internally controlling behaviors will  
182 be more detrimental to students' motivational outcomes than externally controlling  
183 behaviors (Authors, xxxx; De Meyer et al., 2016). In line with prior research (Koka &  
184 Sildala, 2018), we also postulate that the relationships of internally and externally  
185 controlling behaviors on students' frustration of each BPN, controlled motivation,  
186 amotivation, and oppositional defiance towards their teacher in PE lessons would be  
187 different in boys and girls.

## 188 **Methods**

### 189 **Participants and Setting**

190 A convenience sample of 1153 coeducational secondary school students from  
191 five of the eight secondary schools in [details have been removed for peer review]  
192 (Spain) were invited to voluntarily participate in this cross-sectional study. After  
193 obtaining written informed consent from both adolescents and their parents, and  
194 removing invalid data (valid response rate: 97%), the final sample consisted of 1118



195 secondary school students ( $M_{age}=14.11$ ,  $SD=1.50$ ; 50.9% girls), who answered different  
196 validated questionnaires in PE. A paper-and-pencil survey was administered by the  
197 researchers in a quiet classroom environment without the presence of the PE teacher.  
198 The approximate time to complete the questionnaire was 15-20 minutes. Importantly,  
199 students' responses regarding internally and externally controlling behaviors were based  
200 on nine different PE teachers (eight men and one woman), in a range of approximately  
201 125 students per teacher. Class size ranged from 20 to 32 students per class ( $M=25$ ,  
202  $SD=2.85$ ). All students received two 50-minute coeducational lessons of PE per week.  
203 PE is a compulsory subject for all secondary school students in Spain. Generally, the PE  
204 teacher's annual program contains between 6 and 8 different teaching units per year.  
205 These teaching units correspond to different types of content (i.e., individual sports,  
206 cooperative games, outdoor activities, etc.), which are collected in the PE curriculum.  
207 Ethical approval for this study was obtained from the Ethics Committee of [details have  
208 been removed for peer review].

## 209 **Instruments**

210 Students completed a paper-and-pencil survey measuring different SDT-related  
211 variables in the context of PE (i.e., internally and externally controlling teaching  
212 behaviors, BPN frustration, controlled motivation, amotivation, and oppositional  
213 defiance). Unless otherwise noted, students were asked to rate their agreement with the  
214 items on a 5-point Likert scale ranging from 1 ("strongly disagree") to 5 ("strongly  
215 agree").

### 216 ***Internally and externally controlling teaching behaviors***

217 Students' perceptions of internally and externally controlling teaching behaviors  
218 from the PE teacher were assessed using the Spanish version (Authors, xxxx) of a  
219 previously questionnaire developed by De Meyer et al. (2016). The stem "In PE classes,

220 my teacher...” was followed by 8 items that assessed: internally controlling behaviors  
221 (four items; e.g., “Pays less attention to me when I disappoint him/her”) and externally  
222 controlling behaviors (four items; e.g., “Yells when I am not doing what (s)he wants me  
223 to do”). In this study, the confirmatory factor analysis (CFA) showed a good fit to the  
224 data ( $\chi^2 [19] = 76.29, p < .001$ ; CFI = .976; TLI = .966; RMSEA = .078), and the  
225 Cronbach alphas for internally and externally controlling behaviors were .81 and .93,  
226 respectively.

### 227 ***Basic psychological need frustration***

228 Students’ perceptions of the frustration of the three BPN in PE were assessed  
229 using the Spanish version (Zamarripa et al., 2020) of the Basic Psychological Need  
230 Satisfaction and Frustration Scale validated in an educational context (BPNSNF) (Chen  
231 et al., 2015). This scale includes 12 items (four per need) that assess autonomy  
232 frustration (e.g., “I feel pressured to do too many things”), competence frustration (e.g.,  
233 “I feel disappointed with many of my performance”), and relatedness frustration (e.g., “I  
234 feel that people who are important to me are cold and distant towards me”). In the  
235 current study, the CFA showed a good fit to the data ( $\chi^2 [51] = 190.641, p < .001$ ; CFI =  
236 .984; TLI = .979; RMSEA = .050), and Cronbach’s alphas for autonomy, relatedness  
237 and competence frustration were .85, .89, and .90, respectively.

### 238 ***Controlled motivation and amotivation***

239 Students' perceptions of controlled motivation and amotivation in PE were  
240 assessed using the Spanish version of the Perceived Locus of Causality Scale (PLOC)  
241 (Ferriz et al., 2015). From the 24 items of this scale, in this study, we only measured the  
242 items (four items per factor) that reflect introjected regulation (e.g., “Because I want the  
243 others to think that I’m good”), external regulation (e.g., “So that the teacher won’t yell  
244 at me”), and amotivation (e.g., “But I really feel I’m wasting my time in PE”).

245 Following the stem: “I engage in PE lessons...” students were asked to rate each item  
246 on a 7-point scale ranging from 1 (“strongly disagree”) to 7 (“strongly agree”). Based  
247 on SDT and previous studies in PE (e.g., Haerens et al., 2015), average values of  
248 introjected and external regulations were used to calculate a composite variable of  
249 controlled motivation. In the present study, the CFA showed a good fit to the data ( $\chi^2$   
250 [53] = 293.971,  $p < .001$ ; CFI = .971; TLI = .962; RMSEA = .065), and the Cronbach’s  
251 alphas for controlled motivation and amotivation were .88 and .92, respectively.

### 252 ***Oppositional defiance***

253 Students' perceptions of oppositional defiance towards the PE teacher were  
254 measured using the Spanish validated version (Authors, yyyy) of a previously scale  
255 developed in the PE context (Haerens et al., 2015). The stem “In PE lessons...” was  
256 followed by four items that reflected students' tendencies to reject PE teacher’s  
257 authority (i.e., oppositional defiance) (e.g., “I sometimes think about completely  
258 ignoring what the PE teacher asks me to do”). In the current study, the CFA showed a  
259 good fit to the data ( $\chi^2$  [2] = 3.199,  $p < .05$ ; CFI = .999; TLI = .996; RMSEA = .023),  
260 and the Cronbach’s alpha was .72.

### 261 **Data Analysis**

262 Prior to the main analyses, CFA and Cronbach's alpha reliability of the study  
263 variables were performed. In addition, we also examined discriminant validity between  
264 internally and externally controlling behaviors via the heterotrait-monotrait (HTMT)  
265 ratio of correlations (Henseler et al., 2015), which is acceptable with values under .90,  
266 and via the Fornell and Larcker's (1981) criterion, which is acceptable when square root  
267 of the average variance extracted (AVE) for a target variable is greater than its  
268 correlations among other variables. Regarding the first aim, a multigroup (i.e., boys and  
269 girls) analysis was performed to determine if the measurement model was invariant

270 across gender. First, the measurement model for each group (i.e., boys and girls) was  
271 conducted, verifying that it fit well to the data. Second, configural, metric (i.e., factor  
272 loadings), strong (i.e., factor loadings and intercepts), and strict (i.e., factor loadings,  
273 intercepts, and uniquenesses) models of invariance were performed (Putnick &  
274 Bornstein, 2016). Each model was compared to the previous model by considering  
275 changes in the fit indices ( $\Delta$ ). Greater decreases than .010 in the comparative fit index  
276 (CFI) and in the Tucker-Lewis Index (TLI), and greater increases than .015 in the root  
277 mean square error of approximation (RMSEA) show a lack of invariance (Putnick &  
278 Bornstein, 2016). Third, only after obtaining a strong invariance in the multigroup  
279 model, latent mean differences between gender were compared. Consistent with Kline  
280 (2016), to compare latent mean between genders, the boys' group latent mean was  
281 constrained to 0 and the latent means of the girls' group was free to estimate. To  
282 determine if there was a statistical significance between the latent means of boys and  
283 girls, the z statistic was used.

284       Regarding the second aim, to investigate gender differences in the relationship  
285 between internally and externally controlling teaching styles and SDT dark-side  
286 variables in PE, a multigroup structural equation modeling (SEM) was conducted. To  
287 evaluate the model fit, the CFI, TLI, and RMSEA were selected. Higher values of .90  
288 and .95 for CFI and TLI indicate good and excellent fit, respectively, whereas values of  
289 .08 and .06 or less for RMSEA indicate adequate and excellent fit, respectively (Marsh  
290 et al., 2004). In addition, point estimates and the 95% bias-corrected bootstrap  
291 confidence intervals (95% CI<sub>BC</sub>) with 5000 bootstrap samples were calculated and  
292 reported for each of the proposed direct and indirect pathways (Hayes, 2013). Finally,  
293 the standardized regression weights of direct effects, specific indirect effects, total  
294 indirect effects, and explained variance ( $R^2$ ) were reported. All models (i.e., CFA,

295 measurement invariance, and SEM) were conducted using the maximum likelihood  
296 (ML) estimator. Analyses were carried out using the statistical programs SPSS v.25 and  
297 Mplus v8.0.

## 298 **Results**

### 299 **Preliminary Results**

300 Table 1 shows HTMT values less than .85 between internally and externally  
301 controlling behaviors in boys and girls. Additionally, scores regarding square root of the  
302 AVE were higher than the correlation in question in boys and girls. Taken together,  
303 these results gathered evidence supporting discriminant validity between internally and  
304 externally controlling behaviors.

305

306 <PLEASE, INSEr TABLE 1 ABOUT HERE>

307 The measurement model of the study variables showed acceptable fit to the data  
308 both in boys ( $\chi^2 = (630, n = 549) = 1886.324, p < .001$ ; CFI = .905; TLI = .901;  
309 RMSEA = .060; 90% CI = .057 – .063) and girls ( $\chi^2 = (630, n = 569) = 1676.687, p <$   
310  $.001$ ; CFI = .932; TLI = .921; RMSEA = .054; 90% CI = .051 – .057).

311 Subsequently, multigroup analysis of invariance revealed that the model was invariant  
312 across gender since invariance assumptions were met (see Table 2). Particularly, all  
313 measurement invariance models indicated acceptable fit indices and none of the four  
314 steps fell below the recommended guidelines ( $\Delta$ CFI and  $\Delta$ TLI  $> .010$ ;  $\Delta$ RMSEA  $\geq$   
315  $.015$ ).

316 <PLEASE, INSEr TABLE 2 ABOUT HERE>

### 317 **Gender Differences in Study Variables**

318 Based on the establishment of the full strong invariance across gender, we can  
319 compare the latent mean differences between boys and girls in study variables. As

320 observed on the left part of Table 3, findings of the latent mean comparisons between  
321 genders showed girls obtained significantly higher scores than boys in autonomy need  
322 frustration, competence need frustration, controlled motivation, and amotivation. No  
323 significant differences in students' perceptions of internally and externally controlling  
324 teaching style, in relatedness need frustration, nor in oppositional defiance were found.

325 <PLEASE, INSERT TABLE 3 ABOUT HERE>

### 326 **Gender Differences in the Associations of Internally and Externally Controlling** 327 **Behaviors on Students' Motivational Outcomes**

328 A multigroup SEM including indirect paths from internally and externally  
329 controlling behaviors, through the frustration of the three BPN, toward controlled  
330 motivation, amotivation, and oppositional defiance, was estimated, displaying good fit  
331 to the data ( $\chi^2$  (1328,  $n$  = 1118; 549 boys) = 4132.75,  $p$  < .001; CFI = .903; TLI = .900;  
332 RMSEA = .061; 90% CI = .059 – .064). Additionally, a direct path from internally and  
333 externally controlling behaviors to oppositional defiance was included in that model  
334 after observed high modification indices. All these direct and indirect effects and their  
335 bias-corrected bootstrap confidence intervals are reported in Table 4, and are shown  
336 graphically in Figure 1.

337 <PLEASE, INSERT FIGURE 1 ABOUT HERE>

338 As observed in Figure 1, the independent variables of the model (i.e., internally  
339 and externally controlling behaviors) were positively correlated with each other in both  
340 genders. Internally controlling behaviors positively predicted autonomy, competence,  
341 relatedness frustration, and oppositional defiance for both girls and boys. Importantly,  
342 all these direct effects were higher for girls. In contrast, externally controlling behaviors  
343 positively predicted autonomy, competence, and relatedness frustration only for boys,  
344 and oppositional defiance only for girls. The relationships between BPN frustration and

345 controlled motivation, amotivation, and oppositional defiance, were slightly different  
346 between boys and girls. Autonomy frustration positively predicted amotivation in both  
347 genders. Yet, only for girls, autonomy frustration positively predicted controlled  
348 motivation. In addition, competence frustration positively predicted controlled  
349 motivation and amotivation in boys, but only positively predicted controlled motivation  
350 in girls. Relatedness frustration positively predicted controlled motivation in boys and  
351 amotivation in girls. Finally, competence frustration positively predicted oppositional  
352 defiance only for boys.

353 <PLEASE, INSER TABLE 4 ABOUT HERE>

354 With regard to indirect effects, internally controlling behaviors displayed  
355 indirect effects on controlled motivation through autonomy and competence frustration  
356 in girls. Yet, these indirect effects were not found for boys. In addition, in both genders,  
357 no indirect effects were found between externally controlling teaching style and  
358 controlled motivation. Moreover, internally controlling behaviors displayed indirect  
359 effects on amotivation through autonomy frustration in both genders, and through  
360 competence frustration only for boys. As occurred with controlled motivation, no  
361 indirect effects were found between externally controlling teaching style and  
362 amotivation in both genders. Finally, no indirect effects were found between internally  
363 and externally controlling style and oppositional defiance in both genders.

### 364 Discussion

365 The purpose of this research was twofold. Grounded in SDT, the first of them  
366 was to identify any gender differences in students' perceptions of internally and  
367 externally controlling behaviors from their PE teacher, the frustration of the three BPN,  
368 controlled motivation, amotivation, and oppositional defiance in PE. The second and  
369 main objective of this study was to examine the differentiated role that internally and

370 externally controlling behaviors play on SDT-related variables between girls and boys  
371 in PE. The main findings of this study revealed that 1) while no gender differences in  
372 students' perceptions of internally and externally controlling behaviors were found, the  
373 consequences of using both demotivating styles were differently associated in boys and  
374 girls; 2) internally controlling behaviors were more detrimental to maladaptive  
375 motivational outcomes, especially in girls; 3) although externally controlling behaviors  
376 seem to have relatively less detrimental direct effects on students' need frustration, it is  
377 important that PE teachers avoid these practices in boys; 4) autonomy frustration was  
378 the most closely and positively BPN related to controlled motivation and amotivation in  
379 girls, while competence frustration was in boys; and 5) students' tendency to oppose the  
380 teacher's authority was a more direct outcome of perceiving controlling behaviors,  
381 especially internally controlling behaviors.

382       Regarding the first objective, our results showed no gender differences in  
383 students' perceptions of internally and externally controlling behaviors from the PE  
384 teachers. However, girls reported significantly higher perceptions of autonomy and  
385 competence frustration, controlled motivation, and amotivation than boys. Consistent  
386 with our results, Koka and Sildala (2018) found no gender differences in controlling  
387 teaching behaviors, but higher values of amotivation were perceived by girls. Yet, with  
388 the exception of the study of Koka and Sildala (2018), our results are not completely in  
389 line with the few existing previous studies in PE. Contrary to our findings,  
390 Bartholomew et al. (2018), De Meyer et al. (2016), and Haerens et al. (2015) reported  
391 that boys perceived significantly higher values in controlling teaching behaviors than  
392 girls. Nevertheless, it should be noted that all the aforementioned studies, with the only  
393 exception of De Meyer et al. (2016), had either measured controlling behaviors from PE  
394 teachers in an undifferentiated way or had focused on one particular feature of



395 controlling style (i.e., externally controlling behaviors or internally controlling  
396 behaviors). Further qualitative studies are required to find out more about why some  
397 studies found gender differences in students' perceptions of controlling behaviors from  
398 their PE teacher and others not. Contrary to our results, Burgueño and Medina-  
399 Casaubón (2020), De Meyer et al. (2016), and Haerens et al. (2015) reported that boys  
400 perceived significantly higher values in controlled motivation, while Bartholomew et al.  
401 (2018) showed that girls perceived less need frustration and amotivation than boys in  
402 PE. One finding that was common among most of the previous studies (De Meyer et al.,  
403 2016; Haerens et al., 2015; Koka & Sildala, 2018) and the present research was that  
404 girls reported significantly higher values in amotivation than boys in PE. A possible  
405 explanation of these findings could be that girls, compared to boys, usually perceive  
406 lower values of competence (Mitchell et al., 2015), provide a lower value for the tasks,  
407 and have less interest in PE activities (Shen, 2015), which are factors closely linked  
408 with the concept of amotivation proposed by SDT (Ryan & Deci, 2017).

409       Regarding the second aim, our results are consistent with previous literature in  
410 the context of PE, indicating that the exposure to controlling teaching environments is  
411 associated with experiences of need frustration among students which, in turn, relates to  
412 less self-determined forms of motivation and maladaptive outcomes (Bartholomew et  
413 al., 2018; Behzadnia et al., 2018; Haerens et al., 2015). It must be noted that although  
414 both controlling practices were strongly related to each other in this study ( $r = .64$ ), a  
415 distinction between perceived internally and externally controlling teaching were found  
416 across evidence of discriminant validity. Consistent with De Meyer et al. (2016), this  
417 result suggests that although some teachers may use both controlling practices in their  
418 instructional practice, others use only one of the two controlling behaviors  
419 predominantly. Perhaps internally controlling behaviors could emerge in PE teachers

420 when externally controlling behaviors do not work with students and, therefore, it is  
421 common for some PE teachers to use them in combination. Moreover, our results are in  
422 line with a previous study conducted by De Meyer et al. (2016), which showed that,  
423 although both faces of controlling style are associated with students' maladaptive  
424 outcomes in PE lessons, internally controlling behaviors from PE teachers are more  
425 detrimental. A possible justification would rest on the fact that when students perceive  
426 that their teacher more frequently adopts covert ways of internally controlling behaviors  
427 (e.g., guilt-induction, withdrawal of attention, or facial and verbal expressions of  
428 disappointment) than overt ways of externally controlling behaviors (e.g., yelling,  
429 threats or coercive language), they will likely feel more pressured to participate in the  
430 lessons (i.e., autonomy frustration), more inefficient to perform the activities (i.e.,  
431 competence frustration), and more socially excluded from their peer group (i.e.,  
432 relatedness frustration).

433         With regard to gender inspection, consistent with our research, Koka and Sildala  
434 (2018) also found that the different faces of teachers' controlling behaviors were related  
435 to girls' and boys' amotivation differently. Several explanations could be given to  
436 explain these gender differences. Firstly, as boys reported more disruptive behaviors  
437 than girls in PE lessons (Garn et al., 2011; Granero-Gallegos et al., 2020), externally  
438 controlling behaviors provided by PE teachers to all class members could be more  
439 internalized in boys and, consequently, lead to the frustration of their BPN. However,  
440 girls may interpret externally controlling strategies in a relatively less straightforward  
441 manner because they know that these practices are particularly related to boys'  
442 misbehavior. This justification should be interpreted with caution because externally  
443 controlling behaviors were also significantly and positively related to oppositional  
444 defiance in girls. Secondly, the fact that PE teachers interact more with boys than girls

445 (Mitchell et al., 2015; Nicaise et al., 2007) could explain those internally controlling  
446 behaviors may be slightly more detrimental to girls. Withdrawal of attention from PE  
447 teachers could mean that girls feel more ignored, invisible, and unvalued compared to  
448 boys (Mitchell et al., 2015; Shen, 2015). Given gender differences in personality traits  
449 could play an important role in girls' and boys' perceptions of internally and externally  
450 controlling strategies (Lippa, 2010; Thomas et al., 2020), future studies should include  
451 students' personality traits in the hypothetical model.

452 Furthermore, the findings of this research also align with the previous studies in  
453 the PE setting (Bartholomew et al., 2018; Behzadnia et al., 2018; Haerens et al., 2015),  
454 in the sense that the students' perception of BPN frustration was primarily related to  
455 controlled motivation and amotivation, although gender differences were firstly  
456 reported. Particularly, in our study, autonomy frustration was the most closely and  
457 positively BPN related to controlled motivation and amotivation in girls, while  
458 competence frustration was in boys. A plausible explanation might lie in the fact that  
459 boys and girls have distinct conceptualizations that differentially guide their  
460 motivational processes in PE (Corr et al., 2019; Garn et al., 2011). While boys are more  
461 likely to understand PE as a subject to display competence and physical superiority,  
462 girls tend to conceive PE as a choice for learning and socialization (Garn et al., 2011).  
463 This would suggest that when boys perceived their competence as being frustrated, they  
464 would participate in PE lessons by controlled reasons (e.g., getting good grades) or for  
465 any intrinsic or extrinsic reason (e.g., not valuing the subject). Instead, girls would  
466 adopt behaviors guided by controlled or amotivated reasons in the PE lesson, when they  
467 perceive autonomy as frustrated.

468 In addition, our results are in line with previous studies in the PE context  
469 (Haerens et al., 2015), demonstrating that students' tendency to oppose the teacher's

470 authority was a more direct outcome of perceiving controlling teaching behaviors,  
471 especially the internal face. There are several plausible explanations for these findings.  
472 Firstly, teachers' externally controlling behaviors were only associated with  
473 oppositional defiance in girls, suggesting that they were more likely to rebel against  
474 their PE teacher when (s)he makes use of a controlling language, threats, and shouts.  
475 Instead, boys seem to have well-normalized externally controlling teaching behaviors in  
476 PE lessons, which could explain why this type of controlling strategies was not related  
477 to oppositional defiance in boys. Indeed, boys could interpret that the teachers who used  
478 externally controlling behaviors are more involved because they make greater efforts  
479 into the lesson and are more engaged with the teaching and learning process. Secondly,  
480 internally controlling behaviors were more strongly associated with oppositional  
481 defiance both in boys and girls. Maybe as internally controlling behaviors (e.g.,  
482 withdrawal of attention, facial or verbal display of deception, or being less friendly) are  
483 less normalized in PE lessons, they could have a greater tendency to oppose their  
484 teacher's authority by feeling personally rejected or disapproved by their teacher.  
485 Although this direct relationship would suppose an impulsive desire to oppose the  
486 teacher in boys and girls, boys also developed a more reflective process via need  
487 frustration. This process would imply that, particularly, boys decide to rebel against  
488 their teacher, in a relatively conscious way, after being exposed for a long time of  
489 internally controlling practices, entailing an accumulation of autonomy frustration  
490 experiences.

#### 491 **Implications for Practice**

492         The results from the present research suggest that when PE teachers adopt  
493 externally and, more particularly, internally controlling behaviors, their students' will  
494 experience a frustration of their BPN, which, in turn, will be associated with

495 maladaptive outcomes such as controlled motivation, amotivation, and oppositional  
496 defiance. In light of our results, there is a primary need to develop continuous training  
497 programs that help in-service teachers reduce their internally and externally controlling  
498 practices to their students during PE lessons. Given previous studies have suggested that  
499 need-supportive behaviors do not act as a buffer against the detrimental effects of this  
500 type of controlling behaviors (Haerens et al., 2018), it is important to make teachers  
501 aware of the detrimental effects of controlling practices on students' motivational  
502 experiences to reduce or avoid them. Some of the internally and externally controlling  
503 behaviors that can be commonly observed in PE are identified below so that teachers  
504 can avoid their use. The teacher who uses externally controlling behaviors adopt  
505 strategies such as: 1) punishment for misbehavior, 2) threatening to give bad grades or  
506 sanctions when the proposed tasks are not performed well, 3) threatening with a more  
507 monotonous or boring type of activities, 4) yelling, and 5) using a controlling language  
508 with phrases such as "you should" and "you must" (De Meyer et al., 2016). The teacher  
509 who uses externally controlling behaviors adopt strategies such as: 1) showing an  
510 apathetic or distant attitude, 2) withdrawal of attention, 3) making the student feel  
511 guilty, and 4) showing visible feelings of disappointment (De Meyer et al., 2016). In  
512 addition, it seems also recommendable that teachers reflect deeply upon how their  
513 teaching behaviors might be perceived by students. In this sense, although teachers do  
514 not intentionally use neither internally nor externally controlling behaviors, they might  
515 be perceived as controlling by students, fostering maladaptive motivational experiences  
516 in PE lessons. To illustrate, there are class dynamics such as the creation of groups for  
517 an activity, where the teacher can use different controlling strategies. For example, the  
518 PE teacher establishes a deadline to have made four groups and counts down aloud  
519 (externally controlling behaviors), while students are creating the groups, making them

520 feel their autonomy frustrated and their behavior motivated in a controlled way.  
521 Similarly, the PE teacher does not assign some students to any group because they  
522 perceive that they are not going to work. By ignoring them and withdrawing their  
523 attention (internally controlling behaviors), these students would likely feel their BPNs  
524 as more frustrated.

525         Considering gender differences in the association of controlling behaviors and  
526 maladaptive outcomes, PE teachers should reduce internally controlling behaviors in  
527 both genders, but particularly in girls, and externally controlling behaviors in boys.  
528 Understanding the male and female students' motivational processes involved in PE  
529 lessons could help teachers not only to refrain from using controlling strategies,  
530 especially the strategies that are most detrimental to each gender, but also to be more  
531 need-supportive toward boys and girls through the use of teaching behaviors such as the  
532 use of an informational and noncontrolling language, the creation of opportunities for  
533 students input and initiative, enough time for self-paced learning, and the  
534 acknowledgment of expression of negative affect in the PE lesson (Reeve, 2009).

### 535 **Limitations and Directions for Future Research**

536         It should be noted that this research has a number of limitations. Firstly, the use  
537 of a non-probabilistic sampling method suggests that the results should be taken with  
538 caution and, therefore, these findings cannot be generalized. Future studies are, thus,  
539 needed to investigate whether the relationships of controlling teaching behaviors with  
540 boys' and girls' motivational experiences would vary across other educational levels, as  
541 well as other social and cultural contexts. A second limitation may be the only use of a  
542 self-reported questionnaire to measure internally and externally controlling behaviors  
543 from PE teachers. Complementary observational measures to self-reported  
544 questionnaires should be required to provide a better insight into the relationships of the

545 two faces of teachers' controlling behaviors with male and female students' bright (i.e.,  
546 BPN satisfaction, autonomous motivation) and dark (i.e., BPN frustration, controlled  
547 motivation and amotivation) motivational experiences in PE (De Meyer et al., 2014). As  
548 a third limitation, this research relied on the theoretical distinction between the internal  
549 and external faces of teachers' controlling behaviors proposed by SDT (Reeve, 2009;  
550 Ryan, 1982; Ryan & Deci, 2019); there might be, however, another approaches to  
551 measuring teachers' controlling behaviors (e.g., Koka & Sildala, 2018). A fourth  
552 limitation would be that, although the hypothetical model was based on the SDT's  
553 tenets, causal inferences cannot be made given the cross-sectional nature of this study.  
554 Further longitudinal and experimental research is required to confirm the direction of  
555 causality between these SDT-related variables.

### 556 **Conclusions**

557 This study adds evidence to a very small body of research in the PE field,  
558 demonstrating that, although no gender differences in students' perceptions of internally  
559 and externally controlling behaviors were found, the consequences of using both  
560 controlling behaviors could differently affect boys' and girls' maladaptive motivational  
561 experiences in PE. Taking together, the results of this study suggested that, although  
562 both faces of controlling teaching style were related to students' maladaptive  
563 motivational experiences in PE, the internal face of controlling style was more strongly  
564 associated with BPN frustration, controlled motivation, amotivation, and oppositional  
565 defiance, particularly in girls. Results also suggest that, although externally controlling  
566 behaviors seem to have relatively less detrimental direct effects on students' need  
567 frustration, it is important that PE teachers avoid these practices in boys. Broadly  
568 speaking, the findings recommend that both initial education programs for preservice  
569 PE teachers and continuous professional development programs for in-service teachers

570 should train teachers to become less controlling towards their students (Reeve, 2009).  
571 Indeed, these findings suggest that PE teachers should be aware of the risks associated  
572 with internally and externally controlling behaviors on boys' and girls' maladaptive  
573 motivational experiences in PE lessons.

#### 574 References

575 Authors (xxxx).

576 Authors (yyyy).

577 Bartholomew, K. J., Ntoumanis, N., Mouratidis, A., Katartzi, E., Thøgersen-Ntoumani,  
578 C., & Vlachopoulos, S. (2018). Beware of your teaching style: a school-year long  
579 investigation of controlling teaching and student motivational experiences.  
580 *Learning and Instruction, 53*, 50–63.

581 <https://doi.org/10.1016/J.LEARNINSTRUC.2017.07.006>

582 Bartholomew, K. J., Ntoumanis, N., & Thøgersen-Ntoumani, C. (2011). Self-  
583 determination theory and diminished functioning: The role of interpersonal control  
584 and psychological need thwarting. *Sport & Exercise Psychology Review, 7*(2), 23–  
585 27.

586 Behzadnia, B., Adachi, P. J., Deci, E. L., & Mohammadzadeh, H. (2018). Associations  
587 between students' perceptions of physical education teachers' interpersonal styles  
588 and students' wellness, knowledge, performance, and intentions to persist at  
589 physical activity: A self-determination theory approach. *Psychology of Sport and*  
590 *Exercise, 39*, 10–19. <https://doi.org/10.1016/j.psychsport.2018.07.003>

591 Beltrán-Carrillo, V. J., Devís-Devís, J., Peiró-Velert, C., & Brown, D. H. K. (2012).

592 When physical activity participation promotes inactivity: Negative experiences of  
593 Spanish adolescents in physical education and sport. *Youth and Society, 44*(1), 3–  
594 27. <https://doi.org/10.1177/0044118X10388262>



- 595 Burgueño, R., & Medina-Casabón, J. (2021). Validity and reliability of the  
596 interpersonal behaviors questionnaire in physical education with Spanish  
597 secondary school students. *Perceptual and Motor Skills*, 128(1), 522–545.  
598 <https://doi.org/10.1177/0031512520948286>
- 599 Chen, B., Vansteenkiste, M., Beyers, W., Boone, L., Deci, E. L., Van der Kaap-Deeder,  
600 J., Duriez, B., Lens, W., Matos, L., Mouratidis, A., Ryan, R. M., Sheldon, K. M.,  
601 Soenens, B., Van Petegem, S., & Verstuyf, J. (2015). Basic psychological need  
602 satisfaction, need frustration, and need strength across four cultures. *Motivation  
603 and Emotion*, 39(2), 216–236. <https://doi.org/10.1007/s11031-014-9450-1>
- 604 Chu, T. L. (Alan), Zhang, T., Thomas, K. T., Zhang, X., & Gu, X. (2019). Predictive  
605 strengths of basic psychological needs in physical education among hispanic  
606 children: A gender-based approach. *Journal of Teaching in Physical Education*,  
607 38(3), 233–240. <https://doi.org/10.1123/jtpe.2018-0126>
- 608 Corr, M., McSharry, J., & Murtagh, E. M. (2019). Adolescent girls' perceptions of  
609 physical activity: A systematic review of qualitative studies. *American Journal of  
610 Health Promotion*, 33(5), 806–819. <https://doi.org/10.1177/0890117118818747>
- 611 Curran, T., & Standage, M. (2017). Psychological needs and the quality of student  
612 engagement in physical education: Teachers as key facilitators. *Journal of  
613 Teaching in Physical Education*, 36(3), 262–276.  
614 <https://doi.org/10.1123/jtpe.2017-0065>
- 615 De Meyer, J., Soenens, B., Aelterman, N., De Bourdeaudhuij, I., & Haerens, L. (2016).  
616 The different faces of controlling teaching: implications of a distinction between  
617 externally and internally controlling teaching for students' motivation in physical  
618 education. *Physical Education and Sport Pedagogy*, 21(6), 632–652.  
619 <https://doi.org/10.1080/17408989.2015.1112777>

- 620 De Meyer, J., Tallir, I. B., Soenens, B., Vansteenkiste, M., Aelterman, N., Van den  
621 Berghe, L., Speleers, L., & Haerens, L. (2014). Does observed controlling teaching  
622 behavior relate to students' motivation in physical education? *Journal of*  
623 *Educational Psychology, 106*(2), 541–554. <https://doi.org/10.1037/a0034399>
- 624 Ferriz, R., González-Cutre, D., & Sicilia, A. (2015). Revision of the Perceived Locus of  
625 Causality Scale (PLOC) to include the measure of integrated regulation in physical  
626 education. *Revista de Psicología Del Deporte, 24*(2), 329–338.
- 627 Fornell, C., & Larcker, D. F. (1981). Evaluating Structural Equation Models with  
628 Unobservable Variables and Measurement Error. *Journal of Marketing Research,*  
629 *18*(1), 39–50. <https://doi.org/10.1177/002224378101800104>
- 630 Garn, C. A., McCaughtry, N., Shen, B., Martin, J. J., & Fahlman, M. (2011). Social  
631 goals in urban physical education: Relationships with effort and disruptive  
632 behavior. *Journal of Teaching in Physical Education, 30*(4), 410–423.  
633 <https://doi.org/10.1123/jtpe.30.4.410>
- 634 Granero-Gallegos, A., Baños, R., Baena-Extremera, A., & Martínez-Molina, M. (2020).  
635 Analysis of misbehaviors and satisfaction with school in secondary education  
636 according to student gender and teaching competence. *Frontiers in Psychology, 11*.  
637 <https://doi.org/10.3389/fpsyg.2020.00063>
- 638 Haerens, L., Aelterman, N., Vansteenkiste, M., Soenens, B., & Van Petegem, S. (2015).  
639 Do perceived autonomy-supportive and controlling teaching relate to physical  
640 education students' motivational experiences through unique pathways?  
641 Distinguishing between the bright and dark side of motivation. *Psychology of Sport*  
642 *and Exercise, 16*(3), 26–36. <https://doi.org/10.1016/j.psychsport.2014.08.013>
- 643 Haerens, L., Vansteenkiste, M., De Meester, A., Delrue, J., Tallir, I., Vande Broek, G.,  
644 Goris, W., & Aelterman, N. (2018). Different combinations of perceived autonomy

- 645 support and control: identifying the most optimal motivating style. *Physical*  
646 *Education and Sport Pedagogy*, 23(1), 16–36.  
647 <https://doi.org/10.1080/17408989.2017.1346070>
- 648 Hayes, A. F. (2013). *Introduction to mediation, moderation, and conditional process*  
649 *analysis. A regression-based approach*. Guilford Press.
- 650 Henseler, J., Ringle, C. M., & Sarstedt, M. (2015). A new criterion for assessing  
651 discriminant validity in variance-based structural equation modeling. *Journal of*  
652 *the Academy of Marketing Science*, 43(1), 115–135.  
653 <https://doi.org/10.1007/s11747-014-0403-8>
- 654 Johnson, T. G., Prusak, K. A., Pennington, T., & Wilkinson, C. (2011). The effects of  
655 the type of skill test, choice, and gender on the situational motivation of physical  
656 education students. *Journal of Teaching in Physical Education*, 30(3), 281–295.  
657 <https://doi.org/10.1123/jtpe.30.3.281>
- 658 Kline, R. B. (2016). *Principles and practice of structural equation modeling* (4th ed.).  
659 The Guilford Press.
- 660 Koka, A., & Sildala, H. (2018). Gender differences in the relationships between  
661 perceived teachers' controlling behaviors and amotivation in physical education.  
662 *Journal of Teaching in Physical Education*, 37(2), 197–208.  
663 <https://doi.org/10.1123/jtpe.2017-0199>
- 664 Lippa, R. A. (2010). Gender differences in personality and interests: When, where, and  
665 why? *Social and Personality Psychology Compass*, 4(11), 1098–1110.  
666 <https://doi.org/10.1111/j.1751-9004.2010.00320.x>
- 667 Lochbaum, M., & Jean-Noel, J. (2016). Perceived autonomy-support instruction and  
668 student outcomes in physical education and leisure-time: A meta-analytic review  
669 of correlates. *RICYDE: Revista Internacional de Ciencias Del Deporte*, 43(12),

- 670 226–244. <https://doi.org/10.5232/ricyde2016.04302>
- 671 Marsh, H. W., Hau, K.-T., & Wen, Z. (2004). In Search of Golden Rules: Comment on  
672 Hypothesis-Testing Approaches to Setting Cutoff Values for Fit Indexes and  
673 Dangers in Overgeneralizing Hu and Bentler's (1999) Findings. *Structural*  
674 *Equation Modeling: A Multidisciplinary Journal*, 11(3), 320–341.  
675 [https://doi.org/10.1207/s15328007sem1103\\_2](https://doi.org/10.1207/s15328007sem1103_2)
- 676 Mitchell, F., Gray, S., & Inchley, J. (2015). 'This choice thing really works ...'  
677 Changes in experiences and engagement of adolescent girls in physical education  
678 classes, during a school-based physical activity programme. *Physical Education*  
679 *and Sport Pedagogy*, 20(6), 593–611.  
680 <https://doi.org/10.1080/17408989.2013.837433>
- 681 Nicaise, V., Cogérino, G., Fairclough, S., Bois, J., & Davis, K. (2007). Teacher  
682 feedback and interactions in physical education: Effects of student gender and  
683 physical activities. *European Physical Education Review*, 13(3), 319–337.  
684 <https://doi.org/10.1177/1356336X07081799>
- 685 Ntoumanis, N. (2005). A prospective study of participation in optional school physical  
686 education using a self-determination theory framework. *Journal of Educational*  
687 *Psychology*, 97(3), 444–453. <https://doi.org/10.1037/0022-0663.97.3.444>
- 688 Putnick, D. L., & Bornstein, M. H. (2016). Measurement invariance conventions and  
689 reporting: The state of the art and future directions for psychological research.  
690 *Developmental Review*, 41, 71–90. <https://doi.org/10.1016/j.dr.2016.06.004>
- 691 Reeve, J. (2009). Why teachers adopt a controlling motivating style toward students and  
692 how they can become more autonomy supportive. *Educational Psychologist*, 44(3),  
693 159–175. <https://doi.org/10.1080/00461520903028990>
- 694 Ryan, R. M. (1982). Control and information in the intrapersonal sphere: An extension

- 695 of cognitive evaluation theory. *Journal of Personality and Social Psychology*,  
696 43(3), 450–461. <https://doi.org/10.1037/0022-3514.43.3.450>
- 697 Ryan, R. M., & Deci, E. L. (2017). *Self-Determination Theory: Basic psychological*  
698 *needs in motivation, development, and wellness*. Guilford Publications.  
699 <https://doi.org/10.7202/1041847ar>
- 700 Ryan, R. M., & Deci, E. L. (2019). Brick by brick: The origins, development, and future  
701 of self-determination theory. In A. J. Elliot (Ed.), *Advances in Motivation Science*  
702 (Vol. 6, pp. 111–156). Elsevier Inc. <https://doi.org/10.1016/bs.adms.2019.01.001>
- 703 SHAPE America– Society of Health and Physical Educators. (2014). *National*  
704 *standards & grade-level outcomes for K-12 physical education*. Human Kinetics.
- 705 Shen, B. (2015). Gender differences in the relationship between teacher autonomy  
706 support and amotivation in physical education. *Sex Roles*, 72(3–4), 163–172.  
707 <https://doi.org/10.1007/s11199-015-0448-2>
- 708 Soenens, B., Sierens, E., Vansteenkiste, M., Dochy, F., & Goossens, L. (2012).  
709 Psychologically controlling teaching: Examining outcomes, antecedents, and  
710 mediators. *Journal of Educational Psychology*, 104(1), 108–120.  
711 <https://doi.org/10.1037/A0025742>
- 712 Thomas, L. B., Fadeeva, A., & Oliver, E. J. (2020). The double negative: Personality  
713 differentially predicts sensitivity to need support and thwarting, and subsequent  
714 behavioural response planning. *Personality and Individual Differences*, 156,  
715 109767. <https://doi.org/10.1016/j.paid.2019.109767>
- 716 Vansteenkiste, M., Ryan, R. M., & Soenens, B. (2020). Basic psychological need  
717 theory: Advancements, critical themes, and future directions. In *Motivation and*  
718 *Emotion* (Vol. 44, Issue 1). Springer US. [https://doi.org/10.1007/s11031-019-](https://doi.org/10.1007/s11031-019-09818-1)  
719 09818-1

- 720 Vasconcellos, D., Parker, P. D., Hilland, T., Cinelli, R., Owen, K. B., Lee, J., Antczak,  
721 D., Ntoumanis, N., Ryan, R. M., Lonsdale, C., Applied, O. S. T., & Kapsal, N.  
722 (2020). Self-determination theory applied to physical education: A systematic  
723 review and meta-analysis. *Journal of Educational Psychology*, *112*(7), 1444–1469.  
724 <https://doi.org/10.1037/edu0000420>
- 725 White, R. L., Bennie, A., Vasconcellos, D., Cinelli, R., Hilland, T., Owen, K. B., &  
726 Lonsdale, C. (2021). Self-determination theory in physical education: A systematic  
727 review of qualitative studies. *Teaching and Teacher Education*, *99*, 103247.  
728 <https://doi.org/10.1016/j.tate.2020.103247>
- 729 Zamarripa, J., Rodríguez-Medellín, R., Pérez-García, J. A., Otero-Saborido, F., &  
730 Delgado, M. (2020). Mexican Basic Psychological Need Satisfaction and  
731 Frustration Scale in Physical Education. *Frontiers in Psychology*, *11*(March), 1–8.  
732 <https://doi.org/10.3389/fpsyg.2020.00253>
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**Table 1***Discriminant validity between internally and externally controlling behaviors*

	Girls				Boys			
	AVE	$\sqrt{\text{AVE}}$	1	2	AVE	$\sqrt{\text{AVE}}$	1	2
1. Internally controlling behaviors	.54	.73	-	.64	.64	.80	-	.74
2. Externally controlling behaviors	.61	.78	<b>.73</b>	-	.67	.82	<b>.77</b>	-

*Note:* AVE = Average variance extracted; Numbers above diagonal display correlations, while bold numbers below diagonal show heterotrait-monotrait (HTMT) ratio of correlations

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**Table 2***Multigroup invariance across gender of the measurement model*

Model	$\chi^2$ (df)	CFI	TLI	RMSEA [90% CI]
M1. Configural invariance	3563.32 (1260)	0.920	0.911	0.057 [0.055-0.060]
M2. Weak invariance	3636.24 (1290)	0.919	0.911	0.057 [0.055-0.059]
M3. Strong invariance	3686.50 (1320)	0.916	0.912	0.057 [0.055-0.059]
M4. Strict invariance	4071.35 (1360)	0.907	0.903	0.060 [0.058-0.062]

*Note:*  $\chi^2$ =Scaled chi-square test of exact fit; df=Degrees of freedom; CFI=Comparative fit index; TLI=Tucker-Lewis index; RMSEA=Root mean square error of approximation; RMSEA [90% CI]=90% Confidence interval of the RMSEA; CM=Comparison model;  $\Delta$ =Change in fit information relative to the CM.

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782 **Table 3**783 *Latent mean differences and latent correlations between study variables by gender*

	<i>Mean boys</i> ( <i>n</i> = 549)	<i>Mean girls</i> ( <i>n</i> = 569)	<i>Difference</i>	<i>z-value</i>	<i>p</i>	1	2	3	4	5	6	7	8
1. Internally controlling	1.98	1.99	-0.01	1.27	.202	-	.64	.39	.32	.30	.34	.38	.61
2. Externally controlling	2.09	2.17	-0.08	0.28	.776	.74	-	.33	.27	.29	.29	.25	.49
3. Autonomy frustration	2.31	2.56	-0.25	3.70***	.001	.55	.45	-	.47	.46	.24	.43	.36
4. Competence frustration	1.76	2.16	-0.40	6.04***	.001	.46	.39	.67	-	.54	.31	.42	.38
5. Relatedness frustration	1.52	1.58	-0.06	1.00	.313	.34	.29	.49	.60	-	.27	.37	.34
6. Controlled motivation	3.31	3.73	-0.42	2.58**	.010	.41	.37	.45	.44	.37	-	.26	.36
7. Amotivation	1.79	2.37	-0.58	6.34***	.001	.57	.49	.65	.54	.46	.37	-	.48
8. Oppositional defiance	1.86	1.97	-0.11	1.61	.107	.60	.57	.41	.39	.25	.31	.43	-

*Note:* Latent correlations for boys are shown above the diagonal and correlations for girls are shown below the diagonal. All correlations were significant at the level  $p < .001$ .

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**Table 4**

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*Direct and indirect effect of internally and externally controlling behaviors and autonomy, competence, and relatedness frustration on motivational outcomes*

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	$\beta$ -coefficient (SE)		<i>p</i> -values		[95% CI <sub>BC</sub> ]	
	Boys	Girls	Boys	Girls	Boys	Girls
Direct effects on autonomy frustration						
Internally controlling	<b>.31**(.07)</b>	<b>.48**(.07)</b>	<.001	<.001	[.18, .44]	[.35, .61]
Externally controlling	<b>.14†(.07)</b>	.12 (.07)	.058	.106	[.01, .25]	[-.01, .24]
Direct effects on competence frustration						
Internally controlling	<b>.27**(.07)</b>	<b>.41**(.07)</b>	<.001	<.001	[.14, .39]	[.27, .54]
Externally controlling	<b>.12* (.07)</b>	.12 (.08)	.067	.115	[.01, .24]	[-.01, .26]
Direct effects on relatedness frustration						
Internally controlling	<b>.20**(.07)</b>	<b>.29**(.07)</b>	.009	.001	[.07, .33]	[.14, .42]
Externally controlling	<b>.16* (.07)</b>	.08 (.09)	.029	.347	[.04, .29]	[-.06, .23]
Direct effects on controlled motivation						
Autonomy frustration	.08 (.07)	<b>.26* (.12)</b>	.267	.032	[-.04, .19]	[.10, .40]
Competence frustration	<b>.21**(.06)</b>	<b>.22†(.16)</b>	.003	.065	[.09, .32]	[.04, .42]
Relatedness frustration	<b>.14* (.06)</b>	.12 (.09)	.043	.209	[.02, .24]	[-.02, .24]
Direct effects on amotivation						
Autonomy frustration	<b>.27**(.07)</b>	<b>.50**(.11)</b>	<.001	<.001	[.14, .39]	[.35, .63]
Competence frustration	<b>.25**(.07)</b>	.14 (.15)	.001	.358	[.12, .36]	[-.02, .32]
Relatedness frustration	.11 (.07)	<b>.12†(.08)</b>	.153	.068	[-.01, .24]	[.02, .25]
Direct effects on oppositional defiance						
Internally controlling	<b>.59**(.10)</b>	<b>.54**(.09)</b>	<.001	<.001	[.42, .75]	[.38, .71]
Externally controlling	.03 (.09)	<b>.18* (.09)</b>	.717	.049	[-.11, .18]	[.03, .32]
Autonomy frustration	.01 (.07)	-.02 (.11)	.883	.819	[-.11, .13]	[-.18, .11]
Competence frustration	<b>.15†(.08)</b>	.12 (.16)	.074	.459	[.03, .28]	[-.06, .30]
Relatedness frustration	.07 (.08)	-.04 (.09)	.386	.603	[-.06, .21]	[-.18, .08]
Indirect effects of internally controlling style on controlled motivation						
Total indirect	<b>.10**(.03)</b>	<b>.25**(.05)</b>	.001	<.001	[.05, .16]	[.17, .33]
Autonomy frustration	.02 (.02)	<b>.13* (.06)</b>	.316	.042	[-.01, .06]	[.04, .21]
Competence frustration	.06 (.02)	<b>.09†(.08)</b>	.052	.253	[-.01, .10]	[.01, .19]
Relatedness frustration	.02 (.02)	.03 (.03)	.162	.274	[-.01, .06]	[-.01, .08]
Indirect effects of externally controlling style on controlled motivation						
Total indirect	<b>.05* (.02)</b>	.07 (.04)	.031	.094	[.01, .10]	[-.01, .14]
Autonomy frustration	.01 (.01)	.03 (.02)	.373	.224	[-.01, .03]	[-.01, .07]
Competence frustration	.02 (.01)	.03 (.08)	.136	.337	[-.01, .05]	[-.01, .07]
Relatedness frustration	.02 (.01)	.01 (.01)	.155	.502	[-.01, .05]	[-.01, .03]
Indirect effects of internally controlling style on amotivation						
Total indirect	<b>.17**(.04)</b>	<b>.33**(.06)</b>	<.001	<.001	[.10, .25]	[.24, .42]
Autonomy frustration	<b>.08* (.03)</b>	<b>.24**(.07)</b>	.020	.001	[.03, .15]	[.14, .35]
Competence frustration	<b>.07* (.02)</b>	.06 (.07)	.035	.437	[.02, .12]	[-.01, .14]
Relatedness frustration	.02 (.02)	.03 (.03)	.303	.226	[-.01, .06]	[-.01, .08]
Indirect effects of externally controlling style on amotivation						
Total indirect	<b>.08* (.03)</b>	.09 (.05)	.019	.087	[.02, .14]	[-.01, .18]
Autonomy frustration	.03 (.02)	.06 (.04)	.084	.137	[-.01, .07]	[-.01, .12]
Competence frustration	.03 (.02)	.02 (.02)	.114	.518	[-.01, .06]	[-.01, .06]
Relatedness frustration	.02 (.01)	.01 (.01)	.252	.505	[-.01, .04]	[-.01, .04]
Indirect effects of internally controlling style on oppositional defiance						
Total indirect	<b>.06* (.02)</b>	.02 (.03)	.028	.552	[.01, .10]	[-.04, .07]
Autonomy frustration	.01 (.02)	-.01 (.05)	.886	.809	[-.04, .04]	[-.09, .05]
Competence frustration	.04 (.02)	.04 (.07)	.115	.409	[-.01, .08]	[-.02, .12]
Relatedness frustration	.01 (.01)	-.01 (.02)	.425	.610	[-.01, .04]	[-.05, .02]
Indirect effects of externally controlling style on oppositional defiance						
Total indirect	.03 (.02)	.01 (.01)	.110	.638	[-.01, .06]	[-.01, .03]
Autonomy frustration	.01 (.01)	-.01 (.01)	.897	.856	[-.01, .02]	[-.02, .01]
Competence frustration	.01 (.01)	.03 (.02)	.244	.591	[-.01, .04]	[-.01, .05]
Relatedness frustration	.01 (.01)	-.01 (.01)	.462	.740	[-.01, .04]	[-.02, .01]

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*Note:* 95% CI<sub>BC</sub> = 95% biased-corrected bootstrap confidence intervals. SE = Standard error. Significant effects are highlighted in bold. \*\*  $p < .01$ ; \*  $p < .05$ ; †  $p > .05$  but 95%CI<sub>BC</sub> but do not contain 0.

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