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Motivation and Perceived Motivational Climate by Adolescents in Face-to-Face Physical Education during the COVID-19 Pandemic

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Abstract: The COVID-19 pandemic impacted adolescents' lives, leading to unprecedented changes in their routines, especially in education. Face-to-face physical education (PE) classes during COVID-19 were affected in organization, possibly conditioning students' participation, motivation and learning. Based on the achievement goal and self-determination theories, the aim of this study was to analyze and compare the motivational indicators of adolescents in face-to-face PE classes during COVID-19, according to gender, educational level and physical activity (PA). A total of 1369 students participated in the study (621 boys and 748 girls; mean age: 14.4 years; SD: 1.74). Data were collected via an online questionnaire and analyzed using MANCOVAs adjusted for age, pre- and post-COVID-19 PA, socioeconomic status and BMI (Z-score). Differences in achievement goals, motivational climate and motivational regulation levels were found in different groups by gender, PA and educational level, favoring older and more active participants. A more positive motivational profile was found for girls in general and, specifically, for active boys, regarding more self-determined motivations and mastery goal orientations. Overall, this study's findings suggest that the restrictions related to face-to-face PE classes during the COVID-19 pandemic had a negative impact on students' motivation.

Keywords: physical education; achievement goal; self-determination; COVID-19

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1. Introduction

1.1. Physical Activity during COVID-19

In March 2020, due to the worrying expression of the number of cases of Coronavirus Disease 2019 (COVID-19), affecting more than 100 countries, the WHO [1] declared that the disease is characterized as a pandemic, warning of the need for urgent actions to prevent the accelerated spread of the virus. Within the adopted measures that followed, many governments decided to close all formal educational and sports activity on a face-to-face regime, moving to distance learning, forcing children and adolescents to stay at home. This exceptional and unprecedented measure entailed a change in the routines of young people, with the increase in sedentary behavior and screen time [2,3] and with the decrease of level of participation in physical activity (PA) and sports [3–5].

It is agreed that regular PA is an important promoter of a set of benefits for the health and quality of life of adolescents [6–8]. However, recent pre-pandemic data show a

decrease in participation in PA during adolescence, particularly noticeable in girls, and a low percentage of young people who complied with WHO recommendations [9–12].

The school and, in particular, physical education (PE) have been identified as critical contexts for the promotion of active lifestyles, and PE is recognized as the most valid and comprehensive tool to promote adolescents' PA, which can contribute to accumulating moderate to vigorous physical activity (MVPA), provide skill learning, enrichment of motor heritage, increase knowledge and promote a lifelong and life-wide active lifestyle [13–17]. However, the exceptional circumstances in which the PE classes were held, upon return from the first lockdown, implied a set of adaptations and difficulties in the organization and dynamics of the class.

This extraordinary context of prolonged lockdown has had consequences in the adolescent population, further aggravating the decreasing trend of PA participation in this population. Several studies report negative implications in different health domains—physical, mental, emotional and behavioral—resulting from lockdown and the pandemic situation [18–21].

In the Portuguese context, in September 2020, schools reopened for all levels of education and resumed face-to-face PE classes with very restrictive and limiting operating rules for students and teachers [22]. Despite the evidence collected by the Portuguese professional associations [23], suggesting that almost all Portuguese schools (98.1%) maintained PE time with most of the decisions affecting PE taken (76.2%) or influenced (17.5%) by the PE department, the exceptional circumstances in which the PE classes were held during this period implied a set of adaptations and difficulties in the organization and dynamics of the class, constraining the possibilities to achieve the objectives and aims of PE, particularly with regards to participation in positive PA experiences.

1.2. Motivational Climate in Physical Education

It is known that positive PE experiences can contribute to a positive attitude towards PA in adulthood and it can be a key element in the acquisition of an active lifestyle in the future [24,25]. It is important, therefore, to understand the motivation of students in face-to-face PE classes during the COVID-19 pandemic and how they understand the motivational climate in a class environment with unusual operating standards due to face-to-face teaching with high curricular and pedagogical restrictions.

Understanding the motivational processes is crucial to engage students in activities that can benefit them physiologically and psychologically [26]. Motivation predicts the adoption of intentional behaviors, and high levels of motivation are associated with more positive cognitive and affective results [27].

Considering the motivational theories of achievement goal theory (AGT) [28] and self-determination theory (SDT) [29], motivation can be analyzed in a multidimensional way. Combining these theories allows to characterize the students' motivational processes in PE with reference to their participation objectives, the response to their basic psychological needs and the origin of their motivation in a context never experienced before such as that of face-to-face PE during the COVID-19 pandemic.

AGT identified the mastery and ego achievement orientations [30]. The more task-oriented individual is more likely to define success or build competence in terms of *mastery* or task improvement, leaning to adopt personal evaluation criteria. More *ego*-oriented behavior will tend towards defining success or interpret competence according to normative references, such as winning or overcoming others [31,32]. Although there are different tools and perspectives associated with AGT, it is consensual that, in addition to or in combination with intrapsychic factors, the support to objectives can be determined by environmental characteristics, that is, by the experienced motivational climate [33]. In a PE class climate where emphasis is placed on effort, improvement, cooperation and self-referenced objectives, there is a development orientation for the *task/mastery*, and thus, the subject tends to adopt developmentally appropriate adaptive strategies (e.g., more effort, choice of more challenging tasks, more persistence in behavior and better

performance). On the other hand, in a climate where social comparison and the focus on performance stand out as an *ego*-oriented climate, there may be a tendency towards less persistent behaviors, less effort, greater anxiety and worse performance [34,35]. Although it is highlighted the role and responsibility of the teacher in promoting a favorable motivational environment in the PE class, it should be recognized that the motivational climate involves other factors, such as peers and the curriculum itself [36]. From the perspective of students' perceptions, regarding the PE motivational climate from the perspective of goal orientation, we highlight two subcategories that derive from the performance-oriented objectives: *performance-approach* objectives—feeling of competence by comparison with peers and *performance-avoidance*—fear of the result; avoiding to perform the task to avoid exposure to negative judgments [36].

SDT, in turn, explains several processes that lead to self-determined behavior. One of these processes concerns with the psychological needs identified as: *autonomy* (perception of independence in the performance of the activity or behavior), *competence* (perception of achieving the expected objective) and *relatedness* (perception of opportunities for socialization in the activity or behavior). The other process concerns the reasons that lead to the adoption of self-determined behavior [29,37]. Specifically, there are different origins of behavioral regulations, framed in a motivational continuum, as core to SDT. Each point reflects a qualitatively different "reason" for acting on behavior with intrinsic motivation as the expression of self-determined behavior [31]. Before this higher level relative to intrinsic motivation, there are less self-regulated sources of motivation, namely: *external regulation* (external factors, such as rewards, compliments or punishment, which work to impose a controlled regulation externally to the individual), *introjected* (act to avoid the feeling of guilt or anxiety) and *identified* (the actions are self-sustaining because they are personally valued). Deci and Ryan also consider *amotivation* as lack of motivation, where the relationship between actions and results is not perceived and where no purpose is seen in engaging in the activity or behavior [37].

1.3. Study Objective

Given the particular context of restricted PE face-to-face delivery during the COVID-19 period, this study aims to analyze the motivational processes of adolescent students in PE classes during the COVID-19 pandemic to understand how they perceive the motivational climate of PE in this unique context, foregrounding on the combined theoretical power of AGT and SDT.

2. Materials and Methods

2.1. Participants

The sample consisted of 1369 students (385 boys and 432 girls), aged between 12 and 18 years (mean: 14.4; SD: 1.74), from 13 schools in northern Portugal, corresponding to levels two (lower secondary) and three (upper secondary) of the ISCED classification. Schools were selected for convenience covering different urban and socio-economic contexts. Only students who attended PE classes at the time of completing the questionnaire participated in the study.

Procedures

The data were collected via online questionnaire, using the *LimeSurvey* platform, in the first term between November and December of 2020. *LimeSurvey* is a free and open source online statistical survey software that enables users to develop and publish online forms, collect responses, create statistics and export the data to other software applications.

This timeframe referred to the return of students to face-to-face delivery, after the suspension of school activities and school closures from the national lockdown in March 2020. The questionnaire was delivered during the COVID-19 pandemic, with the students experiencing many changes and restrictions to the normal functioning of PE. Of the participating schools, two reported to deliver a combination of one face-to-face and one online

PE class per week for safety reasons. This information was obtained at the time of the invitation to participate in the study. Most students had two practical face-to-face PE classes, with a total weekly time of 135 to 150 min.

In October 2020, initial contacts were made with the PE teachers to participate in the study, explaining the objectives and procedures to be adopted in applying the instrument, as the teachers were the facilitating agents for the data collection. Subsequently, information was sent to the school leaders (i.e., Principals) of the participating schools and to the guardians of the students. Only students who were duly authorized by their guardians participated in the study and all were informed that confidentiality and data protection issues were assured. They were also informed that they could interrupt or terminate their participation at any time. The online link for the questionnaire was sent by e-mail to the PE teachers of the participating classes, who completed it in a PE class with the presence of the respective teacher.

Pilot tests were run with a group of 15 secondary school students to verify the time of completion of the entire questionnaire, with the average response time set at around 25 min.

The application of the instrument was approved by the Ethics Council for Research of the host institution (name omitted for review) (Log No. 16/2020) and by the Ministry of Education of the Government of Portugal (Log No. 0666900005, approved on 03/2020). Table 1 shows all the different instruments that were used in this study, with their original references and adaptation/validation/use for the Portuguese population. The number of items corresponding to each questionnaire is also presented.

Table 1. Data collection instruments and references.

The Questionnaire Assesses	Measure	Original Reference	Reference Adaptation/Validation/Use
Physical Activity	PA Frequency (1 item)	Prochaska et al., 2001 [38]	Matos et al., 2018 [39] Martins et al., 2019 [12]
PA before pandemic COVID-19	PA Frequency before COVID-19 pandemic (1 item)	Adapted from Prochaska et al., 2001 [38]	Tested with 15 students in the present study
Perceived Motivational Climate	SDT Autonomy (5 items) Competence (5 items) Relatedness (5 items)	Markland & Tobin, 2010 [40]	Teixeira et al., 2018 [41]
Motivation in PE (BREQ-2 [1])	SDT Intrinsic (4 items) Identified (4 items) Introjected (4 items) External (4 items) Amotivation (4 items)	Markland & Tobin, 2004 [42]	Palmeira et al., 2007 [43]
Objective Orientation in PE	AGT Mastery (7 items) Ego (6 items)	Duda and Nichols, 1992 [28]	Fonseca, 2001 [44] Marques, 2010 [45]
Achievement Goals (PTEGQ [2])	AGT Mastery (6 items) Performance-Approach (6 items) Performance-Avoidance (6 items)	Papaioannou et al., 2007 [36]	Martins, 2015 [46]

[1] Behavioral Regulation in Exercise Questionnaire-2; [2] Perceptions of Teacher's Emphasis on Goals Questionnaire.

In the evaluation of PA, item two was adjusted to include the reference to "before COVID-19" in order to understand the pre-pandemic PA patterns. In line with the proposal of the instrument for assessing PA frequency [38], the answers to the two questions related to the weekly PA frequency ranged from "0 to 7 days". The introduction prior to the

two questions, mentions the aspects that students should consider when talking about PA—"Physical activity is any activity that increases the heartbeat and makes you pant. Physical activity can be done to play sports, in school activities, playing with friends or walking. Some examples of physical activity are: running, cycling, dancing, skateboarding, swimming, playing basketball, football and surfing". Question 1: "In the last 7 days, how many days have you practiced physical activity for a total of at least 60 min per day?"; Question 2: "In a normal week, before COVID-19, how many days did you practice at least 60 min of physical activity per day?".

Weight, height, age, sex and year of schooling were reported by the students in the first section of the questionnaire. Weight and height were used for calculation (kg/m^2) of body mass index (BMI). The BMI Z-Score was adjusted for age and sex, according to WHO reference values [47].

The socio-economic status (SES) was assessed using the *FAS* questionnaire, which, in its revised version [39,48], consists of 6 items. Due to the circumstances of the pandemic, the question "How many times have you traveled abroad on holiday last year?" was replaced for the "In the last 12 months, how many times have you been on vacation with your family?". The answers ranged from "none" to "more than two", or between "yes" or "no" questions. From these items, a single variable was created for the SES.

In the *PESS* questionnaire [40,41], a bipolar scale of 5 points is applied, ranging from 0 ("not true for me") and 4 ("often true for me"). The remaining questionnaires, which assess the PE motivational climate and students' motivation in PE and achievement objectives, use a *Likert* scale, ranging from 1 ("I completely disagree") to 5 ("I completely agree").

2.2. Statistical Procedures

The *LimeSurvey* platform allows the results to be extracted as a spreadsheet, creating a database with all the answers to the different items of the questionnaire. This database was later exported to SPSS, version 27 to MacOS (SPSS Inc., Chicago, IL, USA), where statistical data analysis was performed.

For descriptive statistics, means (M) and standard deviations (SD) were calculated. The results were compared with MANCOVAs (Multivariate Analysis of Covariance) adjusted for age, PA pre- and post-COVID-19, SES and BMI (Z-score). Three variables were used for stratification: (a) schooling, (b) sex and (c) PA (inactive/active). When the results were stratified by PA (inactive/active), the adjustment was made for the variables, age, PA pre-COVID-19, SES and BMI (Z-score); in this case, PA post-COVID-19 was not used because it was mutually exclusive to the stratification variable.

The assumptions inherent to this analysis were met, namely, homoscedasticity of variances, evaluated with the *Levene* test, normality of the residues evaluated by the Kolmogorov–Smirnov test, and observation of the histogram. The significance level was set at 0.05.

3. Results

The characteristics of the sample are presented in Table 2, including the distribution of the number of participants and their percentage, means and SD, age, meeting or not the PA recommendations in adolescence before and during the COVID-19 pandemic. We highlight the low percentages of participants who fulfilled the 60 min of daily PA (WHO, 2020) before the pandemic (4.9%). During the pandemic the value was even lower (3.1%).

Table 2. Sample description—frequencies (n/%) and M/SD.

	ISCED 2		ISCED 3		Total		AGE		[1] PA		[2] PA		[3] PA		[4] PA	
	n	%	n	%	n	%	M	SD	n	%	n	%	n	%	n	%
Male	385	62.0	236	38.0	621	45.4	14.3	1.74	43	6.9	578	93.1	26	4.1	595	93.1
Female	432	57.8	316	42.2	748	54.6	14.4	1.74	24	3.2	724	96.8	17	2.2	731	96.8
Total	817	59.7	552	40.3	1369	100	14.4	1.74	67	4.9	1302	95.1	43	3.1	1326	96.9

[1] **PA**—Performs 60 min of PA every day before COVID-19; [2] **PA**—Does not perform 60 min of AF every day before COVID 19. [3] **PA**—Performs 60 min of PA every day during COVID-19. [4] **PA**—Does not perform 60 min of PA every day during COVID 19. ISCED 2—lower secondary education; ISCED 3—upper secondary education; M—Mean; SD—Standard Deviation.

3.1. Comparison between Sex, Stratified by Level of Education

Table 3 shows higher levels of *mastery*-orientation ($p = 0.046$) and mastery motivational climate ($p = 0.013$) in girls. Boys recorded higher values in the performance motivational climate ($p < 0.001$), ego-oriented objectives ($p < 0.001$) and avoidance motivational climate ($p < 0.001$). Equivalent results were found in secondary education, in the mastery-oriented ($p = 0.003$), ego-oriented objectives ($p = 0.001$), mastery motivational climate ($p = 0.003$), performance-approach motivational climate ($p = 0.033$) and performance-avoidance motivational climate ($p = 0.017$). In the SDT framework, there are differences in the comparison by sex, at ISCED 2, in the identified motivation ($p = 0.003$), introjected motivation ($p < 0.001$), external motivation ($p < 0.001$) and amotivation ($p < 0.001$). The identified motivation was higher in females and the remaining ones were higher in males. In ISCED 3, differences in intrinsic motivation ($p = 0.025$) and amotivation ($p = 0.019$) were observed, both higher in boys. In ISCED 2, it was observed that the boys obtained higher scores in the perception of relatedness in their PE classes ($p = 0.030$).

Table 3. MANCOVA: comparison by sex, stratified by level of education.

Outcomes	ISCED 2			ISCED 3		
	Male (n = 380)	Female (n = 429)	*p*-Value	Male (n = 214)	Female (n = 297)	*p*-Value
Goal orientation—mastery	3.81 (0.04)	3.91 (0.04)	$p = 0.046$	3.87 (0.05)	3.95 (0.04)	$p = 0.003$
Goal orientation—ego	3.14 (0.05)	2.73 (0.04)	$p < 0.001$	3.00 (0.07)	2.70 (0.06)	$p = 0.001$
Intrinsic motivation	3.90 (0.04)	3.91 (0.04)	$p = 0.825$	4.03 (0.05)	3.91 (0.05)	$p = 0.080$
Identified motivation	3.89 (0.04)	4.05 (0.04)	$p = 0.003$	4.01 (0.05)	4.01 (0.04)	$p = 0.941$
Introjected motivation	2.93 (0.05)	2.62 (0.05)	$p < 0.001$	2.54 (0.07)	2.44 (0.06)	$p = 0.27$th
External motivation	2.57 (0.06)	2.14 (0.05)	$p < 0.001$	2.22 (0.07)	2.00 (0.06)	$p = 0.025$
Amotivation	2.56 (0.06)	2.14 (0.05)	$p < 0.001$	2.18 (0.07)	1.96 (0.06)	$p = 0.019$
Motivational climate—mastery	3.72 (0.04)	3.84 (0.03)	$p = 0.013$	3.80 (0.05)	3.87 (0.04)	$p = 0.003$
Motivational climate *(performance-approximation)*	3.14 (0.04)	2.79 (0.04)	$p < 0.001$	2.90 (0.06)	2.57 (0.05)	$p = 0.033$
Motivational climate *(performance-avoidance)*	2.83 (0.05)	2.43 (0,04)	$p < 0.001$	2.49 (0.06)	2.24 (0.05)	$p = 0.017$
Autonomy	2.67 (0.05)	2.70 (0.04)	$p = 0.548$	2.78 (0.06)	2.66 (0.05)	$p = 0.153$
Competence	2.94 (0.04)	3.07 (0.04)	$p = 0.030$	3.06 (0.06)	3.12 (0.05)	$p = 0.405$
Relatedness	2.91 (0.05)	3.03 (0.04)	$p = 0.059$	3.07 (0.06)	3.07 (0.05)	$p = 0.964$

Results adjusted for age, pre- and post-COVID-19 PA, SES and BMI (Z-score); results with statistical significance are presented in bold. ISCED 2—lower secondary education; ISCED 3—upper secondary education.

3.2. Comparison between Schooling Cycles, Stratified by Sex

In Table 4, levels of education are compared by sex. Based on AGT, the performance-avoidance motivational climate stands out for presenting higher levels in ISCED 2, compared to ISCED 3, in males ($p = 0.009$). Girls present differences in the performance-approach motivational climate ($p = 0.020$) and performance-avoidance motivational climate

($p = 0.021$), being higher in ISCED 2. From the SDT perspective, higher levels of relatedness were observed in ISCED 3 boys compared to ISCED 2 boys ($p = 0.035$).

Table 4. MANCOVA: comparison by level of education, stratified by sex.

Outcomes	Male		*p*-Value	Female		*p*-Value
	Third Cycle (n = 380)	Secondary (n = 214)		Third Cycle (n = 429)	Secondary (n = 297)	
Goal orientation—mastery	3.80 (0.05)	4.00 (0.08)	$p = 0.084$	3.86 (0.05)	3.94 (0.06)	$p = 0.423$
Gioal orientation—ego	3.16 (0.06)	3.03 (0.10)	$p = 0.355$	2.71 (0.06)	2.68 (0.09)	$p = 0.839$
Intrinsic motivation	3.85 (0.06)	4.24 (0.09)	$p = 0.002$	3.89 (0.05)	3.84 (0.07)	$p = 0.609$
Identified motivation	3.84 (0.05)	4.23 (0.08)	$p = 0.001$	4.00 (0.05)	4.00 (0.07)	$p = 0.991$
Introjected motivation	2.83 (0.08)	2.72 (0.12)	$p = 0.502$	2.63 (0.06)	2.43 (0.09)	$p = 0.153$
External motivation	2.54 (0.08)	2.25 (0.13)	$p = 0.125$	2.20 (0.07)	1.94 (0.09)	$p = 0.055$
Amotivation	2.56 (0.08)	2.13 (0.13)	$p = 0.024$	2.23 (0.07)	1.85 (0.09)	$p = 0.005$
Motivational climate—mastery	3.70 (0.05)	3.90 (0.08)	$p = 0.089$	3.83 (0.05)	3.83 (0.06)	$p = 0.953$
Motivational climate *(performance-approximation)*	3.15 (0.06)	2.90 (0.10)	$p = 0.064$	2.80 (0.06)	2.53 (0.07)	$p = 0.020$
Motivational climate *(performance-avoidance)*	2.86 (0.07)	2.44 (0.11)	$p = 0.009$	2.47 (0.07)	2.19 (0.08)	$p = 0.021$
Autonomy	2.68 (0.06)	2.77 (0.10)	$p = 0.509$	2.70 (0.06)	2.64 (0.08)	$p = 0.645$
Competence	2.93 (0.06)	3.13 (0.09)	$p = 0.136$	3.00 (0.06)	3.18 (0.07)	$p = 0.127$
Relatedness	2.88 (0.06)	3.17 (0.09)	$p = 0.035$	2.99 (0.06)	3.10 (0.08)	$p = 0.373$

Results adjusted for age, pre- and post-COVID-19 PA, SES and BMI (Z-score); results with statistical significance are presented in bold.

3.3. Comparison between Sex, Stratified by PA Level

Table 5, comparing sex by PA levels, shows that inactive boys present higher levels of ego-oriented objectives ($p < 0.001$), performance-approach motivational climate ($p < 0.001$) and performance-avoidance motivational climate ($p < 0.001$). The mastery motivational climate ($p = 007$) was higher in inactive girls. Among active individuals, all outcomes with statistically significant results obtained higher scores in boys, namely, in the mastery motivational climate ($p = 018$), performance-approach motivational climate ($p = 004$) and performance-avoidance motivational climate ($p = 008$).

From the perspective of SDT, differences were observed for introjected motivation ($p < 0.001$), external motivation ($p < 0.001$) and in amotivation, all higher in inactive boys. Among active individuals, differences in intrinsic motivation ($p = 0.033$) were observed, being higher in male respondents. Inactive boys also had higher levels of competence when compared to inactive girls ($p = 0.011$). The same was not observed in active individuals, where no differences were found between sex on their basic psychologic needs.

Table 5. MANCOVA: comparison by level of education, stratified by inactive and active.

Outcomes	Inactive		*p*-Value	Active		*p*-Value
	Male (n = 570)	Female (n = 709)		Male (n = 24)	Female (n = 17)	
Goal orientation—mastery	3.83 (0.03)	3.90 (0.03)	$p = 125$	4.46 (0.14)	4.27 (0.17)	$p = 413$
Goalorientation—ego	3.09 (0.04)	2.69 (0.03)	$p < 0.001$	3.56 (0.23)	3.28 (0.27)	$p = 445$
Intrinsic motivation	3.95 (0.03)	3.90 (0.03)	$p = 106$	4.64 (0.13)	4.19 (0.15)	$p = 0.033$
Identified motivation	3.94 (0.03)	4.00 (0.03)	$p = 132$	4.56 (0.15)	4.51 (0.18)	$p = 822$
Introjected motivation	3.77 (0.04)	2.54 (0.04)	$p < 0.001$	3.50 (0.29)	2.44 (0.35)	$p = 051$
External motivation	2.54 (0.04)	2.09 (0.04)	$p < 0.001$	2.87 (0.31)	1.95 (0.37)	$p = 073$
Amotivation	2.40 (0.04)	2.07 (0.04)	$p < 0.001$	2.81 (0.31)	2.05 (0.37)	$p = 136$

Table 5. *Cont.*

Outcomes	Inactive			Active		
	Male (n = 570)	Female (n = 709)	*p*-Value	Male (n = 24)	Female (n = 17)	*p*-Value
Motivational climate—mastery	3.73 (0.03)	3.84 (0.03)	$p = 0.007$	4.46 (0.15)	3.84 (0.18)	$p = 0.018$
Motivational climate *(performance-approximation)*	3.03 (0.04)	2.70 (0.03)	$p < 0.001$	3.74 (0.21)	2.68 (0.25)	$p = 0.004$
Motivational climate *(performance-avoidance)*	2.68 (0.04)	2.35 (0.03)	$p < 0.001$	3.67 (0.26)	2.17 (0.32)	$p = 0.008$
Autonomy	2.69 (0.04)	2.68 (0.03)	$p = 892$	3.23 (0.23)	3.55 (0.27)	$p = 068$
Competence	2.97 (0.03)	3.09 (0.03)	$p = 0.011$	3.43 (0.22)	2.81 (0.27)	$p = 098$
Relatedness	2.97 (0.04)	3.04 (0.03)	$p = 112$	3.24 (0.24)	2.91 (0.28)	$p = 387$

Results adjusted for age, pre- and post-COVID-19 PA, SES and BMI (Z-score); results with statistical significance are presented in bold.

4. Discussion

From an overview, the results of the participation in PA, pre- and post-pandemic, showed that, before the pandemic, 4.9% of the participants were physically active—i.e., they complied with the WHO adolescence PA recommendations [49]. This percentage is in line with the national study by Baptista et al. [9], which used objective evaluation measures (accelerometers), while remaining below the results presented by Martins et al. [12], HBSC [50] or WHO [49]. The percentage of adolescents who met the recommendations during the pandemic dropped to 3.1%. In both moments, girls had lower percentage of PA participation than boys, which converges with different studies reporting lower female PA participation [9–12,49].

Based on this general PA participation setting, we move to discuss the results related to the motivational processes in PE, with reference to each of the motivation theoretical frameworks—AGT and SDT.

4.1. The Orientation of Objectives of Adolescents in the Face-to-Face PE during COVID-19

From AGT's perspective, several studies refer to boys as more prone at adopting ego-oriented objectives, although these results are inconclusive [51]. No differences between boys and girls have been reported in other studies [52,53]. In analyzing the students' orientation objectives in face-to-face PE, we found that girls have higher values of mastery-orientation compared to boys at both levels of education. On the other hand, boys show superior results in ego-oriented objectives at both levels of education. This same trend towards the ego also occurs at the level of PA for inactive boys, without differences in mastery-orientation between inactive boys and girls. Students with mastery-orientation will tend to focus their action on the task, on the development of their skills, effort and progression, judging their competence in a self-referenced way [46]. Thus, a goal orientation for the task in the PE motivational climate is desirable, as it seems to carry benefits for students' long-term learning and is associated with several motivation indicators in the context of PE [34,51,54–56]. When observing higher values of mastery-orientation in girls at both levels of education, one must take into account that the ego- and mastery-oriented objectives are orthogonal, i.e., they are independent of each other [57]. This means that the two objectives do not correlate and that the level of perception of one does not affect the level of perception of the other. In other words, students can present multiple objectives at the same time [51]. Several studies report a higher percentage of boys with higher values of mastery-orientation [58–60], which was not found in our results. The type of PE class performed in a pandemic context, more oriented towards individual activities and with almost a full suppression of collective situations, may have contributed to the observed result.

The results on the perception of the PE motivational climate suggest the confirmation of the above, since girls at both levels of education present higher values of perceived mastery-oriented motivational climate when compared to boys. In turn, boys from both levels of education, compared to their female counterparts, reveal higher levels of perceived performance-approach and performance-avoidance motivational climates. This difference between sex was also observed in active and inactive students for the last two outcomes. Younger students, boys and girls, compared to older ones, present values which indicate an unfavorable motivational climate perception. A mastery-oriented motivational climate is associated with the adoption by students of a mastery goal orientation, while a performance-oriented motivational climate is related to both performance-approach and performance-avoidance objectives [61,62]. According to the Portuguese professional associations [23], among the 11% of the Portuguese schools which decided to change the PE delivery model, in face-to-face this mainly referred to theoretical classes, mostly due to the lack of school assistants to ensure the health and safety policies from the Directorate of Health. Furthermore, over 20% of the schools decided to completely forbid the use of showers and locker-rooms, which lead to the reduction of teaching time to better accommodate the change to and from the PE gear. These aspects, owing to the strong restrictions from the Health Authority, sought to be countered with the provision of teaching guidelines by the educational authority [22] and professional associations [63] that aimed at promoting pedagogical strategies supportive of a mastery-oriented motivational climate. Still, the contextual challenges of the participating schools might have been too high to regularly and consistently promote such motivational climate. A mastery-oriented motivational climate is more likely to be perceived when tasks are challenging, choices are provided, recognition is emphasized and individual learning rhythms are respected and accommodated [33], which may have been more challenging to meet in PE in COVID-19 times.

4.2. Motivational Regulation in Face-to-Face PE during the COVID-19

With regards to motivational regulation based on SDT, boys, at both educational levels, presented higher values of external motivation and amotivation when compared to girls. Girls reported higher values in the identified motivation, a more self-regulated form of behavior, compared, for example, to external motivation. Additionally, among the younger students, the values of introjected motivation were higher in boys.

In the comparison between the same sex at different levels of schooling, it was found that younger boys and girls show higher amotivation values than the older ones. This is particularly relevant, because when students reveal amotivation, they do not value the activity or believe that their action will lead to the desired result [64]. Another interesting finding is that, in upper secondary boys, high values of intrinsic and identified motivation were found when compared to younger ones, which may indicate a high level of autonomous regulation (identified and intrinsic) present in older students during the COVID-19 context. The younger boys presented lower indicators in the different outcomes of motivation in face-to-face PE classes, apparently more "affected" by the constraints that the pandemic imposed. Thus, age seems to be an important factor to consider, with regards to the levels of motivation in PE classes in a pandemic context, considering that younger girls also have reported less favorable indicators of motivation when compared to those in secondary education.

Regarding basic psychological needs [27], as supportive of self-determined behavior, younger girls revealed higher competency values than boys at the same level of education. Additionally, for competence, inactive girls showed higher values when compared to inactive boys. The more individual characteristics of pandemic PE classes may have induced a perception of goal achievement and activity efficacy, which in a "normal" context could not be observed.

Older boys presented higher relatedness values compared to younger boys. The younger ones were probably less adapted to the restrictive pedagogical context during the pandemic period, namely, the mandatory physical distancing between students, which

may have influenced the perception of opportunity for socialization or connection with the peers.

The current studies during the COVID-19 pandemic focus on the PE teachers and students' PA levels during confinement. Further studies are needed to focus on students' motivation in PE during the COVID-19 pandemic, which is still ongoing.

5. Conclusions

The pandemic has confronted society with challenges never before posed. In the context of face-to-face PE during the pandemic, there were many changes to routines and these unprecedented changes may have had negative implications in motivational processes in the PE subject. Regularly, differences were found in orientation objectives, motivational climate and motivational regulation levels in different groups by sex, PA level and educational level, seeming to favor older and active young people from the motivational point of view in this adverse context of PE. Sex differences suggest a motivational profile in this context more favorable to girls in general and particularly active boys, with regards to self-determined behaviors and congruent mastery objectives. In the opposite direction, the general motivational profile of this sample clearly suggests a low to medium motivation during this pandemic period of restricted face-to-face PE.

It is important to consider that this study aimed mainly to analyze differences between different groups with a convenience sample, which represents an inherent limitation to the study.

Given the unprecedented moment in which the data were collected, and the paucity of studies evaluating the motivations, achievement objectives and motivational climate in the PE class during this pandemic situation, we consider it is important to study the post-COVID-19 to understand the perceptions and emotions of the students at the time of return to normality, the importance they ascribe to PE and the level of PA participation after such a period of severe restrictions.

The results of this study reflect a specific and never experienced conjuncture, so they should be taken with caution when seeking to extrapolate to the "normal" setting. Yet, they allow to draw conclusions about the negative effects of a situation, with regards to PE classes, and to infer about the potential for action of the teacher as a preponderant agent in the shaping of an environment favorable to learning and effective engagement in PE.

Further studies, based on SDT and AGT, are needed in order to understand students' motivational experiences in PE classes, particularly in different cultural contexts. A deeper and larger understanding of this phenomenon may, ultimately, contribute to improve student PE learning outcomes and increase the likelihood of long-term physical activity participation. Furthermore, there is an increased responsibility to document the students' motivation in PE during this unique period in human history.

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