

1     **The role of task and ego-oriented climate in explaining students' bright and dark**  
2                     **motivational experiences in Physical Education.**

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1 **The role of task- and ego-oriented climates in explaining students' bright and dark**  
2 **motivational experiences in Physical Education**

3 **Background:** A distinction is made in Achievement Goal Theory (AGT) between task-  
4 oriented (i.e., effort, intra-individual progress, and **self-comparison**) and ego-oriented  
5 (i.e., inter-individual progress and normative comparison) climates. Combining insights  
6 from AGT and Self-Determination Theory (SDT), studies in the PE context have shown  
7 that a task-oriented climate positively relates to need satisfaction, although the findings  
8 regarding the motivating role of an ego-oriented climate are inconsistent. Moreover,  
9 little is known about the role of task- or ego-oriented climates in explaining experiences  
10 of basic psychological need frustration.

11 **Purpose:** Grounded in AGT and SDT, the aim of the present study was to examine if  
12 experiences of basic psychological need satisfaction and need frustration can explain  
13 why task- and ego-oriented climates elicit positive and negative motivational outcomes  
14 in PE, respectively.

15 **Research design:** Cross-sectional study.

16 **Method:** A sample of 524 secondary school students (51.1% boys,  $M_{age} = 14.51$ ;  $SD =$   
17  $1.81$ ) from five different secondary schools participated in this study. Students reported  
18 on their perceptions of task- and ego-oriented climates, motivational regulations, basic  
19 psychological need satisfaction, and need frustration, as well as positive and negative  
20 outcomes in PE. Structural equation modeling was used to investigate our objective.

21 **Results:** We found that a task-oriented climate had a strong and positive relationship  
22 with basic psychological need satisfaction, eliciting a bright pathway to autonomous  
23 motivation and affective attitude. An ego-oriented climate was positively related to  
24 basic psychological need frustration, eliciting a dark pathway to amotivation and  
25 boredom. A negative cross-path from task-oriented climate to basic psychological need

1 frustration was also found, while no significant cross-paths were found from ego-  
2 oriented climate to basic psychological need satisfaction.

3 **Conclusions:** This study provides a better understanding of the mechanisms that  
4 explain why task- and ego-oriented climates shape students' motivational experiences in  
5 PE lessons. It is suggested that a task-oriented climate elicits a bright pathway towards  
6 more optimal functioning, because it fosters experiences of need satisfaction and buffers  
7 against experiences of need frustration. In contrast, an ego-oriented climate is primarily  
8 positively related to feelings of need frustration and negative motivational outcomes.  
9 Practical implications for PE teacher training are discussed.

10  
11 **Keywords:** Achievement goal; self-determination; motivational climate; motivation;  
12 basic psychological need.

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1 Teachers varying ways of delivering a physical education (PE) lesson can play a  
2 pivotal role in determining students' motivational experiences (Braithwaite, Spray, and  
3 Warburton 2011). When teaching and interacting with students, some teachers  
4 concentrate more clearly on the students' personal learning progress. Others, however,  
5 focus more explicitly on normative comparisons, thereby focusing on students' abilities  
6 in relation to other students' performances (Ames, 1992). One theory that helps to  
7 conceptualize and understand such differences between **teaching strategies** is  
8 Achievement Goal Theory (AGT; Nicholls, 1989).

### 9 **Motivational climate in PE.**

10 According to **the** AGT, two types of motivational climate can be distinguished.  
11 In a task-oriented climate, the teacher focuses on students' self-referenced or intra-  
12 individual progress and effort. In contrast, in an ego-oriented climate, the teacher  
13 focuses on social or normative comparison, inter-individual performance (i.e., social  
14 comparison), and public recognition of success and failure (Nicholls, 1989). For  
15 example, a teacher could assess the performance of his/her students in a 400-meter race  
16 by assessing their improvement and comparing it to their own prior performances, (i.e.,  
17 task-oriented climate) or by comparing the final time between students (i.e. ego-oriented  
18 climate).

19 In the extant literature grounded in AGT (Nicholls, 1989), a task-oriented  
20 climate has been related to adaptive outcomes such as more positive attitudes toward PE  
21 (Erturan-İlker and Demirhan 2013), more enjoyment (Jaakkola et al. 2017), and greater  
22 intention to be physically active (Di Battista et al. 2018). On the other hand, an ego-  
23 oriented climate has been linked to negative and maladaptive outcomes such as  
24 boredom and anxiety (Braithwaite et al. 2011).

### 25 **Basic psychological need satisfaction and need frustration**

1           In the present study, the distinct underlying motivational processes explaining  
2 the positive and negative effects of both motivational climates are further unraveled  
3 from the perspective of Self-Determination Theory (SDT; Deci and Ryan 2000). Central  
4 within SDT is the idea that students will thrive and learn most when teachers manage to  
5 create a learning climate that supports their three basic psychological needs (BPN):  
6 autonomy (e.g., students feel psychologically free and can actively participate in  
7 decision-making), competence (e.g., students feel that they are effective) and  
8 relatedness (e.g., students feel connected and experience a sense of belongingness with  
9 their classmates or the teacher; Deci and Ryan 2000). In contrast, students will be  
10 hampered in their learning when teachers create performance-oriented climates in which  
11 students experience explicit feelings of need frustration (Haerens et al. 2015;  
12 Vansteenkiste and Ryan 2013). Need frustration relates to feeling pressured or forced to  
13 do things one would not choose to do (i.e., autonomy need frustration), feelings of  
14 inferiority and failure (i.e., competence need frustration), and loneliness and alienation  
15 (i.e., relatedness need frustration).

16           Recent evidence in PE indicates that teachers can catalyze a ‘bright’ pathway  
17 toward more optimal functioning if they effectively nurture students' BPN for  
18 relatedness, competence, and autonomy (e.g., Haerens et al. 2015; Sánchez-Oliva et al.  
19 2014), while they can also elicit a ‘dark’ pathway if their teaching strategies induce  
20 feelings of need frustration (e.g., Haerens et al. 2015; Haerens et al. 2018; Liu,  
21 Bartholomew, and Chung 2017). Moreover, need satisfaction and need frustration have  
22 been found to be associated with different antecedents (e.g., need-supportive or need-  
23 thwarting teaching behavior) in PE lessons (Haerens et al. 2015; Haerens et al. 2018),  
24 suggesting that considering them as separate constructs is highly relevant. Related to  
25 task- and ego-oriented climates, we therefore hypothesize in the current study that

1 experiences of need satisfaction will explain why a task-oriented climate relates to more  
2 adaptive outcomes, while experiences of need frustration will account for the  
3 maladaptive effects of an ego-oriented climate.

4 We specifically suggest that a focus on intra-individual progress, which is  
5 characteristic of a task-oriented climate, provides opportunities to nurture the need for  
6 autonomy because a focus on detecting and honoring personal progress may lead  
7 students to more strongly endorse a personally meaningful learning trajectory. In  
8 addition, competence satisfaction is likely to be higher in a task-oriented climate,  
9 because a focus on progress better guarantees that all students, even those who are less  
10 capable than their peers, can improve their personal skills. Finally, if the main purpose  
11 is intrapersonal improvement, regardless of the ability of the class group, the need for  
12 relatedness is more likely to be satisfied. In contrast, relying on an inter-individual or  
13 performance-oriented approach (i.e., ego-oriented climate) may provide experiences of  
14 BPN frustration because students may be more likely to feel pressured to satisfy the  
15 teachers' expectations to perform well (i.e., autonomy frustration), because only a few  
16 students can be the "best" performers (i.e., competence frustration), and because social  
17 comparison can elicit negative interpersonal dynamics among students (i.e., relatedness  
18 frustration) (Holt et al. 2018). In support of our premises, previous studies have shown  
19 that a task-oriented climate positively relates to autonomy, competence, and relatedness  
20 need satisfaction in PE (Di Battista et al. 2018) and in the sport context (Álvarez et al.  
21 2012). Associations between an ego-oriented climate and need frustration, however,  
22 have largely remained understudied so far.

23 Furthermore, the few studies focusing on the relationship between an ego-  
24 oriented climate and the separate needs for autonomy, competence, and relatedness have  
25 reported inconsistent and mixed results. Specifically, in the study of Ommundsen and

1 Kvalø (2007), an ego-oriented climate did not relate to perceived autonomy and  
2 competence need satisfaction, yet relatedness satisfaction was not measured. Recently,  
3 Cera et al. (2015) did not find any relationship between ego-oriented climate and  
4 autonomy, competence, and relatedness need satisfaction, either. A previous study  
5 conducted by Álvarez et al. (2012) in a sports setting showed that ego-oriented climate  
6 was negatively related to perceived relatedness satisfaction, but it was not related to  
7 perceived autonomy or competence satisfaction in a sample of young athletes.

### 8 **Students' motivation and outcomes in physical education**

9       According to **the** SDT, a better understanding of the antecedents of need  
10 satisfaction is important, because the satisfaction of BPN fosters more self-determined  
11 forms of motivation, whereas feelings of need frustration are suggested to be associated  
12 with less self-determined forms of motivation in the PE domain (Sun, Li, and Shen  
13 2017). Indeed, SDT distinguishes different forms of motivation on a continuum from  
14 more to less self-determined forms of motivation (Deci and Ryan 2000). Intrinsic  
15 motivation (e.g., students participate in an activity for the feeling of enjoyment and  
16 pleasure) and identified regulation (e.g., students participate in an activity because it is  
17 important or useful to them) represent the most self-determined or autonomous forms of  
18 motivation (Deci and Ryan 2000). SDT also differentiates between introjected  
19 regulation (e.g., students participate in an activity in order to avoid feelings of guilt and  
20 shame) and external regulation (e.g., students participate in an activity to obtain rewards  
21 or to avoid punishment) as two less self-determined or controlled forms of motivation.  
22 Finally, amotivation refers to a lack of motivation or intentionality to take up an activity  
23 (Deci and Ryan 2000).

24       In the specific context of PE, studies have demonstrated that autonomous  
25 motivation is related to positive outcomes, such as enjoyment (Jaakkola et al. 2017),

1 positive attitudes toward PE (Säfvenbom, Haugen, and Bulie 2015), future intentions to  
2 exercise outside PE (Chen et al. 2014), and physical activity (PA) levels inside  
3 (Aelterman et al. 2012) and outside PE (Haerens et al., 2010). Less self-determined  
4 forms of motivation, on the other hand, were found to be negatively related to adaptive  
5 outcomes such as rated class engagement (Aelterman et al. 2012), and positively related  
6 to maladaptive outcomes such as boredom (Sánchez-Oliva et al. 2014). Further,  
7 amotivation was found to be positively associated with maladaptive outcomes such as  
8 boredom (Sánchez-Oliva et al. 2014) and unhappiness (Standage, Duda, and Ntoumanis  
9 2005), while being negatively related to adaptive outcomes such as rated engagement  
10 (Aelterman et al. 2012). Together, these studies show that students thrive when they are  
11 autonomously motivated, while the opposite is true when they are motivated or  
12 amotivated in a controlled manner.

### 13 **The present study**

14 Up until today, no studies in the context of PE have investigated the differential  
15 role of task- and ego-oriented climates in relation to need frustration and students'  
16 motivational experiences or affective outcomes in PE. The primary aim of the present  
17 study was, therefore, to investigate whether processes of need satisfaction and  
18 frustration can explain why task- and ego-oriented climates elicit distinct motivational  
19 processes. As depicted in Figures 1 and 2, it was hypothesized that students' perceived  
20 task-oriented climate would primarily relate to more self-determined forms of  
21 motivation and positive affective outcomes via experiences of need satisfaction  
22 (Hypothesis 1a), while perceived ego-oriented climate would primarily relate to less  
23 self-determined motivation and amotivation, and negative affective outcomes via need  
24 frustration (Hypothesis 1b). We also considered specific cross-path relationships (i.e.,  
25 the relationship between one variable belonging to the bright pathway and another

1 variable belonging to the dark pathway). It was specifically hypothesized that a  
2 perceived task-oriented climate would be a buffer against need frustration (Hypothesis  
3 2a), and also that a perceived ego-oriented climate would prevent experiences of need  
4 satisfaction (Hypothesis 2b) (Vansteenkiste and Ryan 2013) (See Figures 1 and 2).  
5 Consistent with previous studies in the PE context (Haerens et al. 2015; Liu et al. 2017),  
6 we expected the theoretical symmetrical paths (e.g., between task-oriented climate and  
7 need satisfaction), to be more strongly significant than the hypothetical cross-paths  
8 (e.g., between task-oriented climate and need frustration) (Hypothesis 2c).

9 Finally, because an ego-oriented climate was found to be unrelated to autonomy  
10 and competence satisfaction across studies (e.g., Álvarez et al. 2012; Ommundsen and  
11 Kvalø 2007; Reinboth and Duda 2006; Smith et al. 2015), while one study found a  
12 negative relationship to relatedness satisfaction (e.g., Alvarez et al. 2012), we also  
13 wanted to investigate relationships between an ego-oriented climate and each of the  
14 separate psychological needs for autonomy, competence, and relatedness (See Figure 2).

15 [INSERT FIGURE 1, HERE]

16 [INSERT FIGURE 2, HERE]

## 17 **Method**

### 18 19 *Participants and procedure*

20 Participants were 524 students (51.1% were males) from 22 classes taught by 9  
21 different teachers (each teacher taught between 1 and 5 classes) across 5 different  
22 secondary schools in Spain. All participating teachers were full-time certified PE  
23 teachers with a Master's degree in PE pedagogy. Students of these teachers filled out a  
24 set of questionnaires at the end of a teaching unit. Questions concerned students'  
25 perceptions of the motivational climate and their motivational experiences during the  
26 teaching unit (e.g., rope skipping, acrosport, soccer, athletics, badminton) they had just

1 participated in. The topic of the teaching unit was determined by the PE teacher, and the  
2 duration of the teaching units was between 8 to 10 sessions. Students' ages ranged  
3 between 12 and 19 years ( $M = 14.51$ ;  $SD = 1.81$ ). Class sizes ranged between 21 and 30  
4 students per class. A specific active consent to participate in the study was obtained  
5 from each student's parents. An introductory letter explained the nature and objectives  
6 of the study with a final agreement that was signed by the parents. Participation was  
7 voluntary and student responses were anonymous and confidential. The University  
8 Ethics Committee approved the study protocol.

#### 9 10 *Measures*

11 All questionnaires were administered in paper-pencil format on a 5-point Likert  
12 scale ranging between 1 (*strongly disagree*) to 5 (*strongly agree*).

#### 13 *Motivational climate.*

14 Students completed a Spanish version (Gutiérrez, Ruiz, and López 2011) of the  
15 Perception of Motivational Climate Scale (PMCS; Biddle et al. 1995) to assess their  
16 perceptions of task- and ego-oriented climates in PE. For purposes of the present study,  
17 this scale was slightly adjusted to the specific teaching unit taught in each class (e.g.,  
18 “In the acrosport teaching unit, our PE teacher...”). This statement was followed by 19  
19 items divided into two factors: 9 items for task climate (e.g., “The PE teacher is pleased  
20 when everyone makes progress by putting effort into tasks”) and 10 items for ego-  
21 oriented climate (e.g., “The PE teacher only bothers with those who do well in sport”).  
22 Confirmatory Factor Analysis (CFA) showed good fit of the data to the two-factor  
23 structure ( $\chi^2(8) = 20.273$ ,  $p < .01$ ;  $\chi^2/df = 2.53$ ; RMSEA = .05; SRMR = .03; CFI = .99;  
24 TLI = .98). The reliability analysis reflected Cronbach's alpha values of .90 for task-  
25 oriented climate and .88 for ego-oriented climate.

#### 26 *Basic psychological need satisfaction.*

1           The Spanish version (Moreno et al. 2008) of the Basic Psychological Need in  
2 Exercise Scale (BPNES; Vlachopoulos & Michailidou, 2006) was used to assess  
3 students' experienced need satisfaction in PE. This instrument was adjusted to the  
4 context of the study by modifying the stem and items to each teaching unit (e.g., "In the  
5 skipping rope unit..."). This questionnaire comprises 12 items, grouped into 3 factors (4  
6 items per factor) to measure: autonomy satisfaction (e.g., "I feel that I have the  
7 opportunity to make choices with respect to the way I practice rope skipping"),  
8 competence satisfaction (e.g., "I feel that rope skipping is an activity that I can do  
9 well"), and relatedness satisfaction (e.g., "I feel that my peers interact with me in a  
10 friendly way when I carry out the rope skipping unit"). CFA showed good fit of the data  
11 to the three-factor structure ( $\chi^2(51) = 152.88, p < .001; \chi^2/df = 2.99; RMSEA = .06;$   
12  $SRMR = .05; CFI = .94; TLI = .92$ ). The values of Cronbach's alpha coefficient were  
13  $.75, .77$  and  $.81$  for autonomy, competence, and relatedness need satisfaction,  
14 respectively.

15 *Basic psychological need frustration.*

16           Students' need frustration was measured by means of the Psychological Need  
17 Thwarting Scale (PNTS; Bartholomew et al. 2011), which was translated into Spanish  
18 (Sicilia, Ferriz, & Sáenz-Álvarez 2012) and adjusted to the PE context. The stem of the  
19 scale was adjusted to each teaching unit (e.g., "In the soccer unit..."). The instrument  
20 consisted of 12 items distributed across 3 factors: (4 items per factor): autonomy  
21 frustration (e.g., "I feel pushed to behave in certain ways"), competence frustration  
22 (e.g., "Situations occur in which I feel incapable"), and relatedness frustration (e.g., "I  
23 feel other people dislike me"). CFA showed good fit of the data to the three-factor  
24 structure ( $\chi^2(51) = 110.78, p < .001; \chi^2/df = 2.17; RMSEA = .05; SRMR = .04; CFI =$   
25  $.96; TLI = .95$ ). Internal reliability analysis showed acceptable alpha Cronbach values of

1 .76, .82, and .80 for autonomy, competence, and relatedness need frustration,  
2 respectively.

### 3 *Motivational regulations.*

4 The different motivational regulations were assessed using the Spanish version  
5 (Martín-Albo, Nuñez, & Navarro 2009) of the Situational Motivation Scale (SIMS;  
6 Guay, Vallerand, & Blanchard 2000). The stem “Why did you engage in this activity?”  
7 was slightly adjusted to “Why did you engage in the teaching unit of...?”. The scale has  
8 14 items distributed into 4 factors: intrinsic motivation (4 items, e.g., “Because this  
9 activity is fun”), identified regulation (3 items, e.g., “Because I believe that this activity  
10 is important for me”), external regulation (3 items, e.g., “Because I am supposed to do  
11 it”) and amotivation (4 items, e.g., " I do this activity, but I am not sure it is a good thing  
12 to pursue it”). Based on previous research (e.g., Haerens et al. 2015) autonomous  
13 motivation was computed by obtaining the average from the subscales of intrinsic  
14 motivation and identified regulation. Because this questionnaire did not include  
15 introjected regulation it was not possible to calculate the broader dimension of  
16 controlled motivation (sum of introjected regulation and external regulation) in the  
17 current study. CFA showed good fit of the data to the four-factor structure ( $\chi^2(71) =$   
18  $199.73, p <.001; \chi^2/df = 2.81; RMSEA = .06; SRMR = .06; CFI = .96; TLI = .95$ ). For  
19 the current study, Cronbach’s alpha values were .91 for intrinsic motivation, .84 for  
20 identified regulation, .79 for external regulation, and .87 for amotivation.

### 21 *Affective outcomes.*

22 In this study, boredom and affective attitude were measured as negative and  
23 positive affective outcomes, respectively. The affective attitude subscale of the Physical  
24 Education Predisposition Scale (PEPS; Hilland et al. 2009) was used to measure  
25 affective attitude. This instrument contains 4 items (e.g., “The things I learn make

1 lessons interesting for me”) and was translated into Spanish following the guidelines of  
2 the International Test Commission (Muñiz, Elosua, and Hambleton 2013). Boredom  
3 was measured by a subscale of the Sport Satisfaction Instrument (SSI; Duda and  
4 Nicholls 1992) validated in Spanish in the context of PE (Baena-Extremera et al. 2012).  
5 Boredom was comprised of 3 items (e.g., “In Physical Education classes, I am usually  
6 bored”). The statement of both instruments was adapted to each teaching unit. CFA  
7 showed good fit of the data to the two-factor structure ( $\chi^2 (13) = 24.95, p < .001; \chi^2/df =$   
8  $1.92; RMSEA = .04; SRMR = .02; CFI = .99; TLI = .98$ ). Cronbach’s alpha values were  
9  $.81$  for boredom and  $.92$  for affective attitude.

#### 10 *Statistical analysis*

11 Means, standard deviations, and latent correlations were calculated as a first  
12 step. CFA using maximum likelihood estimation and internal consistency analysis were  
13 performed in order to test validity and reliability of the measures. Structural Equation  
14 Modelling (SEM) was used to test the hypothesized models (see Figures 1 and 2). The  
15 first model tested two symmetrical paths from task- and ego-oriented climates, via need  
16 satisfaction and need frustration, to motivational experiences and affective outcomes. It  
17 also tested specific hypothetical cross-paths (e.g., between task-oriented climate and  
18 need frustration or between ego-oriented climate and need satisfaction; for further  
19 detail, see Hypothesis 2a and 2b). In a second follow-up model, we tested two paths  
20 from task- and ego-oriented climates to each of the BPN, separately, to obtain a more  
21 fine-grained insight into different manifestations of motivational climate. Comparative  
22 Fit Index (CFI), Tucker Lewis Index (TLI), and the Root Mean Squared Error of  
23 Approximation (RMSEA) were used to evaluate the model fit. Following Hu and  
24 Bentler (1999) recommendations, cut-off values close to  $.95$  for CFI and TLI, and close  
25 to  $.06$  for RMSEA indicated good model fit. Latent constructs for task- and ego-oriented

1 climates, need satisfaction and need frustration, as well as for autonomous motivation  
2 were estimated based on three parcels calculated by the mean of each one. Latent  
3 constructs for external regulation, amotivation, affective attitude, and boredom were  
4 comprised of the items representing each scale. Data analyses were conducted by Mplus  
5 7 and SPSS 20.0.

## 6 **Results**

7  
8 In a first step, we investigated the role of task and ego-oriented climate in  
9 relation to need satisfaction and need frustration, and how these climates can elicit  
10 different motivational processes following a bright and dark pathway. Descriptive  
11 statistics and latent correlations between the variables of the first model are presented in  
12 Table 1. Correlations were in the expected direction with a task-oriented climate being  
13 significantly and positively related to BPN satisfaction, autonomous motivation, and  
14 affective attitude, **while negatively related to BPN need frustration, amotivation, and**  
15 **boredom.** An ego-oriented climate was significantly and negatively related to  
16 autonomous motivation and affective attitude, while being positively related to BPN  
17 frustration, external regulation, amotivation, and boredom.

18 As observed in Figure 3, results of the SEM analysis revealed that a task-  
19 oriented climate was strongly and positively related to BPN satisfaction, eliciting a  
20 bright pathway from BPN satisfaction to autonomous motivation. This bright pathway  
21 also continues with a positive relationship from autonomous motivation to affective  
22 attitude, and with a negative relationship from autonomous motivation to boredom. We  
23 also found evidence for a dark pathway, with an ego-oriented climate that was  
24 positively related to BPN frustration, which in turn related positively to amotivation.  
25 This dark pathway continues with a positive relationship between amotivation and  
26 boredom, and a negative relationship between amotivation and affective attitude. In

1 addition, although a task-perceived oriented climate was primarily related to need  
2 satisfaction, results showed a negative cross-path from a task-oriented climate to BPN  
3 frustration. In contrast, no relationship was found between an ego-oriented climate and  
4 BPN satisfaction. The tested model fit the data sufficiently ( $\chi^2/\text{gl.} = 3.35, p < .001$ ;  
5 RMSEA = .07; 90% CI = .06-.07; CFI = .93; TLI = .92) (Marôco 2014).

6 [INSERT TABLE 1, HERE]

7  
8 [INSERT FIGURE 3, HERE]

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10  
11 In a second step, we aimed to gain a deeper insight into the relationships  
12 between motivational climates and the three separate needs (i.e., autonomy,  
13 competence, and relatedness). Descriptive statistics and latent correlations among the  
14 variables of the second model are presented in Table 2. The results of these  
15 supplementary analyses, which are displayed in Figure 4, showed that a task-oriented  
16 climate was strongly and positively related to the satisfaction of all three BPN, and  
17 moderately and negatively related to the frustration of all three BPN. A perceived ego-  
18 oriented climate was positively related to the frustration of all three BPN and was  
19 negatively related to relatedness satisfaction. The results of the structural model  
20 indicated a good data fit ( $\chi^2/\text{gl.} = 3.09, p < .001$ ; RMSEA = .06; 90% CI = .06-.07; CFI  
21 = .93; TLI = .92) (Marôco 2014).

22 [INSERT TABLE 2, HERE]

23  
24 [INSERT FIGURE 4, HERE]

## 25 26 **Discussion**

27 This study aimed to understand why task- and ego-oriented climates exert a  
28 different motivational impact on the PE context by investigating their relationships with  
29 students' experiences of need satisfaction and need frustration.

1 *The “bright” side of motivation.*

2           A task-oriented climate is characterized by teachers using statements such as  
3 “You have to try to improve our own performance”, “I am going to evaluate your  
4 progress”. In task-oriented climates teachers will more likely rely on private feedback  
5 and an evaluation focused on progress and self-referenced standards (e.g., “Sarah, well  
6 done, you managed to jump higher than last week. You are really improving your  
7 skills”). We hypothesized that students' perceived task-oriented climate would be  
8 primarily related to autonomous motivation and affective attitude via experiences of  
9 need satisfaction (Hypothesis 1a). Consistent with previous studies in PE lessons (Di  
10 Battista et al., 2018) and with our expectations, the present findings showed that  
11 students' perceived task-oriented climate was primarily and positively related to  
12 autonomy, competence, and relatedness need satisfaction. When students reported that  
13 their teacher put stronger emphasis on effort and personal improvement in the teaching  
14 units, they were also more likely to report that they were allowed to select the degree of  
15 difficulty of their activities, and to work at their own pace (autonomy satisfaction), that  
16 they were provided with opportunities to perform according to their capacities and  
17 individual skills (competence satisfaction), and to cooperate and share their own  
18 progress with their classmates (relatedness satisfaction).

19           Moreover, in line with SDT, and previous studies on PE (Haerens et al., 2015;  
20 Holt et al., 2018; Säfvenbom et al., 2015; Sánchez-Oliva et al., 2014), our results  
21 revealed that BPN satisfaction was positively related to autonomous motivation, which  
22 in turn was positively related to affective attitudes. The results suggest that self-  
23 determined reasons to participate in PE lessons play a significant role in the interest and  
24 usefulness of PE. BPN satisfaction was also negatively related to amotivation, which is  
25 consistent with SDT and most of the studies (e.g., Standage et al. 2005). Additionally,

1 we found a significant cross-path between autonomous motivation and boredom, which  
2 agrees with previous studies in the PE context (Sánchez-Oliva et al. 2014), and between  
3 amotivation and affective attitude (Aelterman et al., 2012). However, we did not find a  
4 significant cross-path between BPN satisfaction and external regulation. The absence of  
5 a relationship between BPN satisfaction and external regulation is not in line with  
6 previous studies on PE lessons (Haerens et al. 2015; Standage et al. 2005). A possible  
7 explanation could be that, although the BPN were satisfied, attending PE lessons could  
8 be perceived by students as a mandatory requirement.

9 *The “dark” side of motivation.*

10 An ego-oriented climate is characterized by teachers using statements such as  
11 “You have to perform better than your classmates”, “The best track train will obtain the  
12 best grades”. In ego-oriented climates, teachers will more likely rely on public feedback  
13 and evaluation in front of the whole class, which will probably produce social  
14 comparison (e.g., “Sarah, you were the last to arrive”), and will generate excessive  
15 competition among students. They also **tend to spend** more time with students who  
16 perform better. No studies to date have analyzed the relations between an ego-oriented  
17 climate and need frustration. In the current study, we found that an ego-oriented climate  
18 related primarily to amotivation and negative affective outcomes via need frustration,  
19 hereby confirming Hypothesis 1b. When students reported that their teacher emphasized  
20 normative comparison and doing better than others, and displayed conditional regard  
21 (i.e., spending more time with students who perform better), students were more likely  
22 to feel pressured or pushed to satisfy the teacher’s expectations (autonomy frustration),  
23 to feel incompetent and unsuccessful (competence frustration), and to experience  
24 alienation from others (relatedness frustration) (Holt et al. 2018). Moreover, congruent  
25 with prior studies in PE lessons, BPN frustration was positively related to amotivation

1 (Haerens et al. 2015), which in turn was positively related to boredom (Sánchez-Oliva  
2 et al. 2014). Students, who feel pressured to participate, incompetent in their abilities  
3 and that their classmates are cold and distant, are likely to consider the teaching units as  
4 a waste of time and boring.

5         In addition, consistent with the findings reported by Martinent, Guillet-Descas,  
6 and Moiret (2015) in a sample of adolescent athletes, we found a null-relation between  
7 BPN frustration and external regulation. This could be explained because experiencing  
8 need frustration in a specific teaching unit does not immediately seem to translate into  
9 pressured functioning (i.e., participating in the unit because it is mandatory, to get good  
10 grades, to please the teacher or to avoid punishment, etc.). Further, more recurrent  
11 experiences of need frustration are needed to elicit controlled functioning. More studies  
12 are required to discern the role of different motivational subtypes, distinguished in SDT,  
13 with BPN frustration in PE lessons. Finally, contrary to previous studies in the PE  
14 setting (Sánchez-Oliva et al. 2014), the students' external regulation was negatively  
15 related to boredom. One possible reason for this unexpected result is that the present  
16 work, unlike other studies, has focused on the students' perception of motivational  
17 climate and motivational experiences during a specific teaching unit (e.g., rope  
18 skipping, acrosport, soccer, athletics, badminton). To illustrate this, students sometimes  
19 engage in PE teaching units because it is something that they have to do, but when they  
20 participate in the unit activities or tasks, they may feel less bored if the activities were  
21 attractive.

22 *Cross-paths in the “bright” and “dark” side of motivation.*

23         We also explored the possibility of specific cross-paths between motivational  
24 climates, students' BPN, and motivational outcomes. The hypothesized negative cross-  
25 paths from task-oriented climate to autonomy, competence, and relatedness frustration

1 were fully supported (Hypothesis 2a). This suggests that a task-oriented climate could  
2 also act as a buffer against need frustration. As pointed out by Vansteenkiste and Ryan  
3 (2013), need-supportive environments can also play a buffering role against  
4 malfunctioning and ill-being. Nevertheless, the symmetrical relationship between task-  
5 oriented climate and need satisfaction was stronger than the cross-path relationship  
6 between task-oriented climate and need frustration (see also Haerens et al. 2015; Liu et  
7 al. 2017). The cross-path relationship between an ego-oriented climate and need  
8 satisfaction was not significant (Hypothesis 2b), suggesting that to foster need  
9 satisfaction, more is needed than just refraining from installing an ego-oriented climate.  
10 Teachers probably need to actively install a task-oriented climate.

11 Finally, when inspecting the relations with each of the needs separately, students'  
12 perceptions of ego-oriented climate were only negatively related to relatedness  
13 satisfaction while no significant relationships were found with autonomy and  
14 competence satisfaction (see also Álvarez et al., 2012; Reinboth and Duda, 2006). In an  
15 ego-oriented climate, success in the task is defined in terms of outperforming others.  
16 This likely generates an atmosphere of individual comparison among students where  
17 students are no longer cooperating to achieve the objectives, which would not only lead  
18 to alienation among students (i.e., relatedness frustration), but would also prevent them  
19 from building positive relationships among each other (i.e., relatedness satisfaction).  
20 Regarding the lack of relationship with the need for competence, it is possible that  
21 students do not feel less or more effective when there is an ego-oriented climate. Yet,  
22 the functional significance of an ego-oriented climate may also differ depending on  
23 students' personal traits such as their actual motor competence. Because students with  
24 high motor competence get more positive attention from the teacher, they may feel more  
25 competent in an ego-oriented climate, competence satisfaction may be hampered

1 (Álvarez et al. 2012; Reinboth and Duda 2006), particularly for less skilled students.  
2 Similarly, some students, particularly those who are favored by the teacher, may  
3 experience more autonomy to make decisions and provide input, while others might not  
4 have their need for autonomy fulfilled. However, at this stage, these assumptions are  
5 highly speculative and warrant further investigation. Nevertheless, it is not  
6 recommended to install an ego-oriented climate since most studies, so far (Braithwaite  
7 et al. 2011), display its detrimental effects, as was also the case in the current study, as  
8 positive relations with need frustration and negative outcomes were found.

### 9 *Practical implications*

10 This study points to the importance of creating a task-oriented climate because  
11 of the positive effects it can have on students' motivational experiences and learning in  
12 PE lessons. According to Ames (1992), a task-oriented climate can be created when  
13 teachers rely on the TARGET dimensions (i.e., task, authority, recognition, grouping,  
14 evaluation, and time). Each of these dimensions can indeed be linked to BPN  
15 satisfaction (for a further review, see Morgan 2017). For example, when teachers offer  
16 students task choices (e.g., the task difficulty level) or provide opportunities for  
17 decision-making and leadership during the teaching units (i.e., authority), students will  
18 more likely experience autonomy satisfaction. Moreover, when evaluation includes  
19 positive and individual feedback about the progress students have made, or a private  
20 evaluation focused on progress and self-referenced standards (i.e., evaluation), and  
21 students receive sufficient time to learn (i.e., time), their feelings of competence will be  
22 nurtured. Finally, teachers can create heterogeneous and cooperative groups where each  
23 student performs a defined role to help the other students to improve their abilities (i.e.,  
24 grouping). This would then foster relatedness satisfaction. As such, the development of  
25 interventions grounded in the six TARGET areas proposed by Ames (1992) could help

1 to create a task-oriented climate in different teaching units (see Abós et al. 2017; Sevil  
2 et al. 2016, for a further review). Hastie, Johnson, and Rudisill (2018) also provided  
3 practical implications or elements (e.g., novelty, variety, progress point outs,  
4 complexity, etc.) on how to design activities in task-oriented climates in PE classes. For  
5 example, according to these authors, task complexity needs to be organized  
6 hierarchically by the teacher and his/her students (e.g., Sarah could modify the  
7 complexity of a task because her skills were below those demanded by the task).

8 This study also expands findings of previous studies, showing that task-oriented  
9 climate could act as a buffer against BPN frustration. Moreover, it seems crucial that  
10 teachers not only implement strategies to support a task-oriented climate, but also avoid  
11 creating an ego-oriented climate in PE lessons (for a further review see Rudisill 2016).  
12 For example, a competition where students are challenged to compete against each other  
13 is inherent to a PE context, yet, there is no need for teachers to overemphasize who has  
14 won the game or pay more attention to students who perform best.

#### 15 *Limitations and directions for future research*

16 The present study has several limitations, and future research directions follow  
17 from this study. First, this study involved 22 classes taught by 9 different teachers.  
18 Some of the teachers taught only 1 class, while others taught 5 classes. Future studies  
19 should increase the number of teachers involved and unify the number of classes taught  
20 by the same teacher to increase external validity. Second, these findings have to be  
21 interpreted with caution because all the data were based on students' self-reported  
22 questionnaires. Future research using a mixed-methods approach to triangulate results  
23 (i.e., teachers' and students' perceptions of task and ego-oriented climate, and  
24 motivational climate observation) is needed. The inclusion of systematic observation  
25 instruments to assess teachers' behavior in terms of motivational climate would be

1 helpful to gain more insight into the frequency and intensity at which task- and ego-  
2 oriented climates occur (Milton et al. 2018). Third, as the study was cross-sectional, no  
3 causality can be inferred from the findings. Experimental or longitudinal designs are  
4 needed in order to test the directional and bidirectional nature of the proposed  
5 relationships. Fourth, the questionnaire to assess situational motivation did not include  
6 introjected regulation. As in previous studies (Haerens et al. 2015), it might be  
7 interesting to integrate this type of regulation to permit the calculation of a composite  
8 score for controlled motivation.

9 Finally, previous studies suggested that perceived task- and ego-oriented  
10 climates are two independent dimensions (Soini et al. 2014). It would be interesting to  
11 establish motivational climates profiles to analyze how retained profiles (e.g., low or  
12 high scores in both climates, high task-oriented climate and low ego-oriented climate, or  
13 vice-versa) differ in BPN satisfaction and frustration, and students' motivation. In  
14 addition, there might be other social factors that influence students' "dark" and "bright"  
15 experiences in PE. For example, the inclusion of students' perception of peer  
16 motivational climate in PE lessons might help to distinguish the role of teachers and  
17 peers, separately.

## 18 **Conclusions**

19 The present study showed that experiences of need satisfaction and frustration  
20 may explain why a task-oriented climate elicits positive outcomes, and that experiences  
21 of need frustration account for the negative motivational impact of an ego-oriented  
22 climate. The study highlights the importance of creating a task-oriented climate in PE  
23 lessons due to its dual role in students' BPN satisfaction and frustration.

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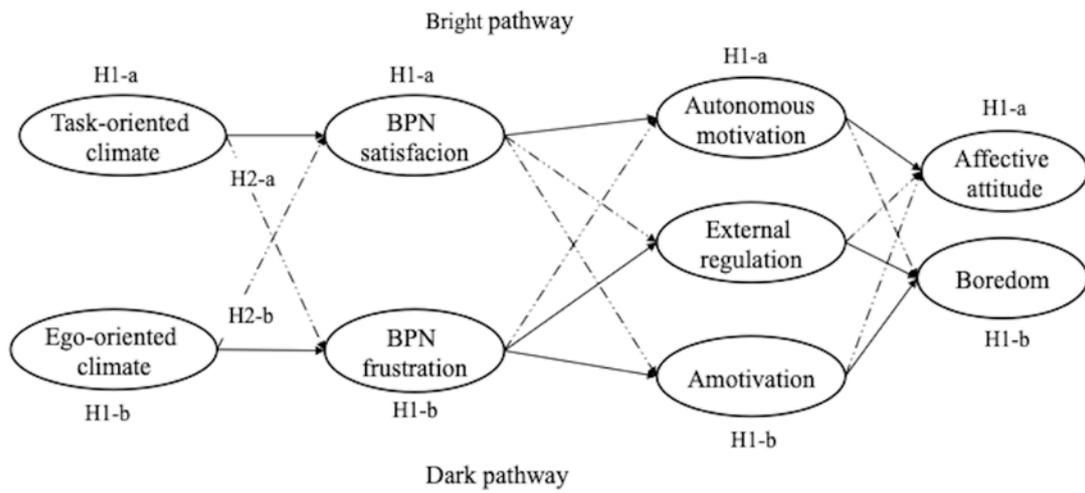


Figure 1. Hypothesized model of task- and ego-oriented climates, BPN satisfaction and frustration, motivational regulations, and affective outcomes. Continuous arrows showed positive relationships. Discontinuous arrows showed negative relationships.

Note: H1-a = Hypothesis 1a; H1-b = Hypothesis 1b; H2-a = Hypothesis 2a; H2-b = Hypothesis 2b.

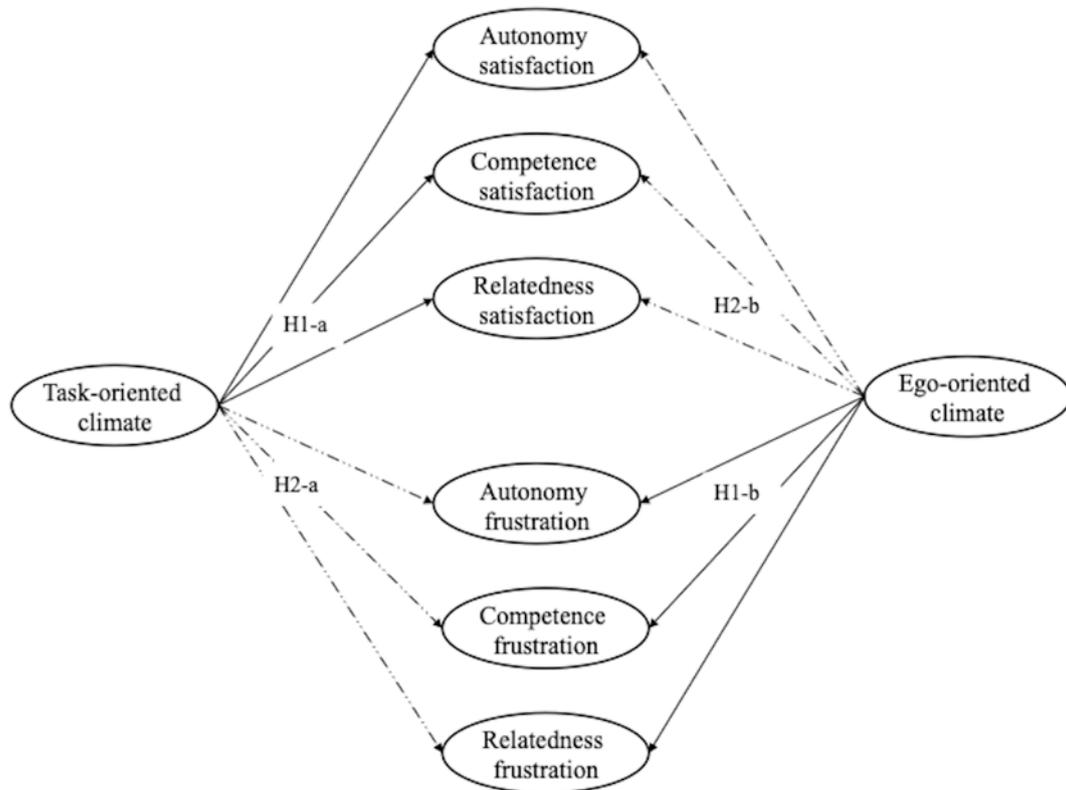


Figure 2. Hypothesized model of task- and ego-oriented climates and autonomy, competence, and relatedness satisfaction and frustration. Continuous arrows showed positive relationships. Discontinuous arrows showed negative relationships.

Note: H1-a = Hypothesis 1a; H1-b = Hypothesis 1b; H2-a = Hypothesis 2a; H2-b = Hypothesis 2b.

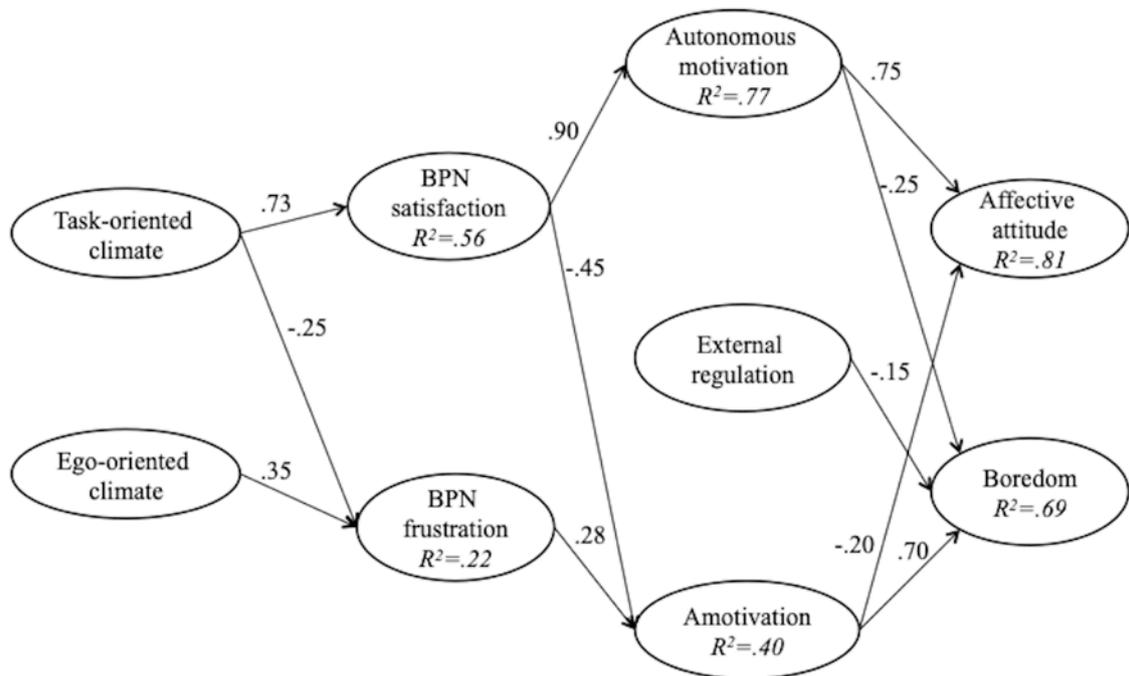


Figure 3. Structural equation model of task- and ego-oriented climates, BPN satisfaction and frustration, motivational regulations, and affective outcomes.

Note: Only significant paths are shown. All coefficients are significant ( $p < .05$ ). Standardized coefficients are reported

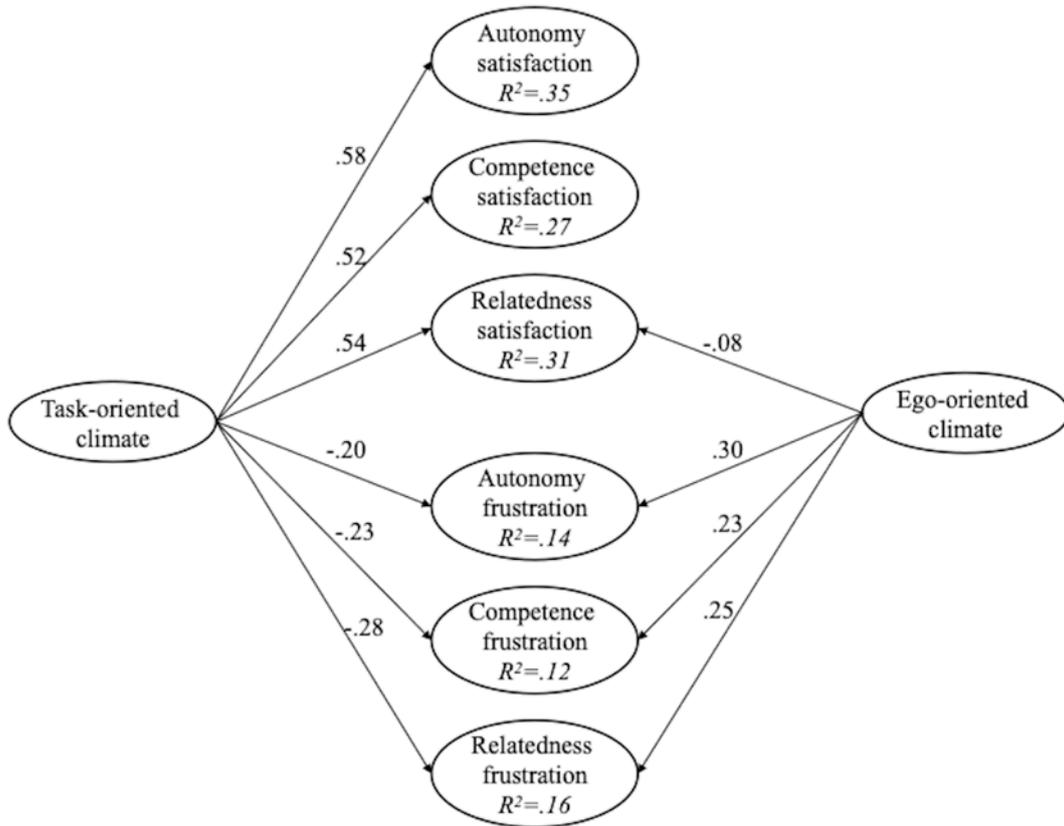


Figure 4. Structural equation model of task and ego-oriented climates and autonomy, competence, and relatedness satisfaction and frustration.

Note: Only significant paths are shown. All coefficients are significant ( $p < .05$ ). Standardized coefficients are reported.