Original Research

Perceptions of Motivational Climate, Goal Orientations, and Light- to Vigorous-intensity Physical Activity Engagement of a Sample of Finnish Grade 5 to 9 Students

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ABSTRACT

International Journal of Exercise Science 9(3): 291-305, 2016. The aim of this study was the examination of relationships between children's perceptions of motivational climate, goal orientation, and their engagement in light- to vigorous-intensity physical activity. The sample comprised 585 school children at age of 11 to 16-year-old from three small cities located in Northeast-Finland. The cross-sectional data was collected using online questionnaires in April 2014. The findings indicated that the higher task-involving motivational climate in physical education the children reported, the higher total light- and moderate-intensity levels they accumulated. Task-involving climate also indicated higher task orientation and ego-involving climate higher ego orientation. Additionally, the more children accumulated light-intensity physical activity, the more they engaged in moderate and vigorous physical activity. No indirect paths were observed from task- and ego-involving climate to light- and moderate- or vigorous-intensity activity via task or ego orientation. The current low level of time spent undertaking physical activity in all categories should be considered as a matter of common concern, particularly amongst the most inactive students. Limitations in school curriculum scheduling options restrict the opportunity for substantially increasing the number of timetabled physical education classes. Therefore, developing content and pedagogical practice in physical education represents a viable to increase children's total physical activity. Schools need to place a higher priority on encouraging children and adolescents to participate in daily physical activity and to provide guidance to identify engaging activities, particularly of moderate or vigorous-intensity. For example, class teachers and physical educators could encourage their students to be physically active in terms of transportation to school and by participating in out-of-school sport and recreational leisure activities as options to increase total physical activity.

KEY WORDS: Achievement goal theory, motivation, intensity, physical activity, physical education

INTRODUCTION

Engaging in physical activity is beneficial to general health for individuals at all ages, but it is particularly important to the physical development and well-being of children and young people (70). Schools can provide an important venue for children and youth to address international physical activity guidelines (70), as these institutions are capable of promoting knowledge, skills, recess activities, bodily and social awareness, personal interaction linked to team effort, and health education at minimal additional cost to the community (20, 38, 42). These types of objectives are challenging to achieve in the school environment if children are not motivated to participate actively in their physical education classes (45).

Student motivation within physical education is a complex and dynamic process which means that it is reasonable to take into consideration more than one point of view to examine the process of motivation (50). Physical education teachers can knowingly influence students' physical activity through the management of the motivational climate in physical education classes via feedback, reinforcement, modelling, and organizing of physical activity engagement conditions (69). Motivation within the physical education context has been shown to transfer to motivation to participate in recreational physical activity (28). Previously, several achievement goal models of motivation that consider self-reported physical activity have been proposed (e.g. 7, 37, 50, 64, 67). However, none of the studies investigated the relationships of motivational climate, goal orientations, and intensity levels of physical activity. In addition, only limited research has been carried out in order to examine determinants of light-intensity physical activities (61). The present study endeavors to supplement previous findings by examining the links between Finnish school-aged children's perceptions of motivational climate, goal orientations, and their engagement in light- to vigorous-intensity physical activity.

The Achievement Goal Theory (AGT) provides a suitable model from which to consider the role of motivation in physical education and activity (44). Previously, the AGT has been considered in the applied contexts of education (63) and physical education (25, 26, 46, 56). A major premise of the theory is that there are two elements for defining competence and success in activity, specifically *task* (learning) and *ego* (performance) *orientation* (43, 44). Task-orientation represents perceptions of ability which are self-referenced, for instance, learning new skills. The emphasis of activity is in understanding the current tasks and personal improvement, thus, contributing to increased motivation (15, 44). This denotes that an individual has embraced their own development as condition for competence and success (3). Task goal orientations also play an important role by influencing the children's motivated behavior, cognitions or beliefs by controlling situational motivation toward activities in educational settings (44, 50). In contrast, ego-orientation describes experiences of subjective success when children have a better performance than others and the central goal of participation in an activity is to display normative competence (44, 50, 55). An important assumption of the theory is that achievement goals are orthogonal. This means that a child can be high in one orientation and low in another, or high or low in both when participating in achievement-related activities such as physical education (50). However, to optimize motivation as a support characteristic in facilitating physical activity engagement, task orientation should be promoted, regardless of whether the child has high or low ego orientation (19, 50). Gender contrasts in relation AGT typically reveal that girls tend to score higher on task orientation, whereas boys score higher than girls on ego orientation (2, 31, 71). Previous research has consistently shown the positive relationship between task orientation and physical activity behavior (21, 48, 60, 69). However, the role of goal orientation has yet to be empirically tested to clarify the determinants of light-intensity physical activity levels.

In addition to the goal orientations, another essential element of the AGT is described as motivational climate (3). Ames proposed that two types of motivational climates exist, *task-involving climate* and *ego-involving climate* (4). Task-involving motivational climate is representative of conditions that support effort and cooperation; emphasize learning and task orientation; and promote student reflection based on self-referenced criteria (3, 4). Ego-involving motivational climate denotes circumstances that stimulate normative comparisons and competition (4, 17). Previous studies have consistently shown that perceptions of task-involving climate in physical education positively influence students' experiences of task orientation (21, 26, 35, 69), and that an ego-involving climate stimulates ego orientation and social comparison (18, 26, 35, 47). Gender contrasts in perceived motivational climate have also been identified with boys scoring higher than girls in ego-involving climate (53) and girls scoring higher than boys in perceptions of task-involving climate (34).

Several AGT based investigations identified that teachers who create a (task) motivational climate that nurtures a self-referenced definition of success are likely to positively influence students' task orientation (16, 32, 40, 68), physical activity in physical education (9), leisure time physical activity (65), and total moderate to vigorous physical activity (26). In contrast, students' perceptions of an ego-involving climate in physical education negatively related to the same set of physical activity outcomes (57). For instance, ego-involving climate was related to higher ego orientation in Greek secondary (16) and English elementary school children (66). The positive facilitation of motivation within physical education is expected to occur when task orientation is emphasized either through enhancing socialization experiences or through structuring the motivational climate so that it promotes task-involvement (3, 50). Despite the identified link between the motivational climate and participation in physical education, it is still unclear if school-aged children's light- to vigorous-intensity physical activity levels within physical education are connected with their perceptions of motivational climate via goal orientations.

The aim of the study was to examine the model including perceptions of motivational climate, goal orientations, and light- to vigorous-intensity physical activity levels. The central assumption of the current theoretical model was that physical education motivational climate would have been linked to physical activity intensity levels through goal orientations. First, the factor model including motivational climate, goal orientation, and light- to vigorous-intensity activity was tested, under the assumption that task-involving motivational climate was positively related to task orientation (21, 26, 35, 69) and light to vigorous physical activity level (21, 48, 60, 69). In contrast, ego-involving climate was expected to be linked positively to ego orientation and negatively to light to vigorous physical activity levels (18, 26, 35, 47). The indirect effects of motivational climate on light- to vigorous physical activity levels via goal orientations were also examined. Finally, gender, grade, and school were added into the model as covariates, since age- and gender-related differences have previously been found in motivational climate (34, 53), goal orientation (2, 31, 71) and physical activity (24, 71).

METHODS

Participants

The sample comprised 585 school children (293 girls, 292 boys) at age of 11 to 16-year-old (M = 13.27, SD = 1.53) from three small cities located in Northeast-Finland. All Grade 5 to 9 students were invited to participate through a direct contact with school principals. Eleven percent of all school-aged children in the region participated in the study. The human participants' approval statement was obtained from the ethics committee of the local university. Permission to conduct the study was also obtained from all children and their parents by a written request. Students' participated as volunteers, and received no direct benefit from their involvement in the project.

Protocol

The cross-sectional data was collected using online questionnaires in April 2014. Children completed the questionnaires and provided background information details (i.e., gender, grade, school) under the supervision of the teachers during 45-minute classes in the schools' computer labs. The participants were advised to seek assistance if they had concerns regarding the instructions or the clarity of a particular item. The children were asked to answer honestly and were assured that their responses were confidential. Children were aware their involvement was voluntary and could cease their participation at any time. To improve the reliability of the present self-reported physical activity scores, the maximum levels for light, moderate, and vigorous activity were estimated using an accelerometer data (1) as a comparative data base on the cut-off points presented by Freedson, Pober, and Janz (23). The accelerometer-determined data was collected across three phases from the smaller sample (n = 76) among the same children as in the present study. Participants had the procedures explained to them verbally, including a brief overview of possible physical discomfort that could be caused from wearing an accelerometer. They were asked to wear accelerometers for waking hours across a seven-day period. The devices were collected by the teachers and the data was processed by the researchers.

Perceptions of motivational climate in physical education were measured using the Motivation Climate in Physical Education Scale (54), which consists of four subscales representing task-, ego-involving, autonomy and social relatedness climates. For the purpose of the current study only the task- and ego-involving climate dimensions were used. The commencing stem for all items in the measure was "In my physical education class…" The task-involving climate dimension consisted of five items (e.g. "It is important for students to try their best in physical education classes"), and the ego-involving climate dimension included four items (e.g. "It is important for students to succeed better than others in physical education classes"). Responses were recorded on a five-point Likert-scale ranging from strongly disagree (1) to strongly agree (5). Previous research demonstrated that confirmatory factor analysis supported the construct validity (TLI = 0.96, CFI = 0.98, RMSEA = 0.059) and internal consistency (composite reliability ≥ 0.86) of the scale for Finnish secondary school students was acceptable (24).

Goal orientations were analyzed using the children's version of the Perception of Success Questionnaire (51). The questionnaire used in the current study had the individual item stem of "I feel most successful in PE classes, when…" The scale consists of twelve items, six measuring task orientation (e.g. "I feel most successful in physical education classes, when I really improve") and six assessing ego orientation (e.g. "I feel most successful in physical education classes, when I do better than others"). Items were rated on a five-point Likert-scale ranging from strongly disagree (1) to strongly agree (5). Mean scores were calculated and used as goal orientation values for both subscales. Gråstén (24) presented the results of a confirmatory factor analysis that supported the construct validity (TLI = 0.94, CFI = 0.95, RMSEA = 0.073, and internal consistency results that endorsed the composite reliability (r = ≥ 0.93) of the scale for Finnish secondary school students.

Light- to vigorous-intensity physical activity levels were determined using the International Physical Activity Questionnaire Short Form (IPAQ-SF; 14). This version records the activity of four intensity levels: 1) vigorous physical activity (VPA) such as high-intensity running, aerobics, or cross-country skiing, 2) moderate physical activity (MPA) such as jogging or cycling, 3) light physical activities (LPA) such as walking, and 4) sedentary behavior or sitting. For the purpose of the current study, sedentary behavior was excluded, since the study was targeted to investigate the determinants of activity levels. The scale consisted of the last seven-day recalls for light, moderate, vigorous activity (days/ week and minutes e.g. "On how many days per week did you engage in light/ moderate/ vigorous physical activities such as walking for at least 10 minutes at a time?" and "How many minutes per day did you engage in particular physical activities?"). The number of days was multiplied by the minutes, and the outcomes were used as participants' LPA, MPA, and VPA scores. Rangul and group (49) reported that for a sample of 71 Norwegian students with a mean age of 14.9 years, the IPAQ-SF had a moderate correlation between maximum volume of oxygen (VO_{2max}) and physical activity in three levels (r = 0.32). The IPAQ instruments have acceptable measurement properties, at least as good as other established self-reports (14).

Statistical Analysis

First, normal distribution, outliers, and missing values of the data were examined.

No modifications due to normality were required. Some outliers were identified (LPA 31, MPA 61, VPA 35) based on the Mahalanobis distance test ($p < 0.001$) of standardized values (± 3.00) (58). The accelerometer-determined reference data indicated that the outliers mainly occurred because some children strongly over-estimated their daily minutes of MVPA (over 1800 minutes per week). Therefore, the outliers were removed. The final data included 2.3% of missing values. Little's MCAR -test ($\chi^2 = 204.833$, $df = 184$, $p = 0.140$) indicated that the missing values were not systematic. Hence, the missing values were assumed to be missing completely at random (MCAR) (36). Second, correlations, Cronbach alphas, means, and standard deviations for study variables were determined.

Finally, associations between motivational climate, goal orientations, LPA, MPA, and VPA were tested using the path model. The Chi-square test ($\chi 2$) was used as a test of the model's overall goodness-of-fit to the data. To determine the appropriateness of the model the standardized root mean square residual (SRMR) and the root mean square error of approximation (RMSEA), the comparative fit index (CFI), the Tucker-Lewis index (TLI) were also examined (5). A value less than 0.10 for SRMR are generally considered favorable (8, 33), and a value of 0.08 or less for the RMSEA indicate a reasonable error of approximate fit (12). The CFI and TLI indices range from 0 to greater than 1. Fit indices greater than 0.95 are indicative for an excellent and values of 0.90 or greater for an acceptable model fit (12). In order to test the differences between girls and boys, age-, and school-related differences, gender, grade, and school were added into the model as covariates. The proportion of variance predicted by motivational climate, goal orientations for physical activity levels were investigated using squared multiple correlations (R^2). Figure 1 presents the theorized model of task-, ego-involving motivational climate, task orientation, ego orientation, LPA, MPA, and VPA. The missing value analysis was performed using SPSS Version 22.0 (30) and all subsequent analyses including multiple imputation using Mplus Version 7.11 (41).

RESULTS

Correlation coefficients, means, and standard errors, composite reliability, and intraclass correlation coefficients of the study variables were determined (Table 1). Descriptive statistics highlighted that the strongest correlations existed between children's perceived task-involving motivational climate and task orientation, and between ego-involving-climate and ego orientation. Overall, the strongest association between variables was found between MPA and VPA (see also Figure 1). All observed variables were assumed to be valid and reliable, since both composite reliability scores and intraclass correlations were relatively high. The mean scores indicated that participants reported motivational climate in physical education to be more task-involving than ego-involving, and task orientation higher than ego orientation. Children accumulated an average of 18 minutes of VPA, 20 minutes of MPA, and 37 minutes of LPA on the daily basis (Table 2).

Table 1. Correlations and Cronbach alphas of the study variables for girls (n = 293) and boys (n = 292).

	Task-involving climate	Ego-involving climate	Task orientation	Ego orientation	LPA	MPA	VPA	α
Task-involving climate	-	-0.17**	0.50***	-0.01	0.09	0.15*	0.05	0.79
Ego-involving climate	0.16**	-	0.10	0.47***	-0.03	0.04	0.05	0.80
Task orientation	0.58***	0.18**	-	0.23***	0.14*	0.10	0.01	0.81
Ego orientation	0.30***	0.57***	0.55***	-	-0.04	0.01	0.06	0.91
LPA	0.18**	0.04	0.11	0.09	-	0.51***	0.37***	
MPA	0.19**	0.01	0.20**	0.05	0.44***	-	0.65***	
VPA	0.06	-0.03	0.05	0.02	0.49***	0.70***	-	
α	0.87	0.79	0.90	0.91				

Note 1. Correlations and Cronbach alphas for girls are presented above the diagonal and for boys below the diagonal. Note 2. *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$.

Table 2. Means and standard deviations (in parentheses) of the study variables.

Gender	Grade	N	Task-involving climate	Ego-involving climate	Task orientation	Ego orientation	LPA	MPA	VPA
Girls	5	59	4.33 (0.63)	2.38 (0.85)	4.04 (0.69)	2.95 (1.01)	281.24 (235.87)	168.27 (134.74)	154.48 (136.09)
	6	58	4.24 (0.71)	2.52 (0.77)	3.88 (0.73)	2.99 (0.86)	285.77 (227.61)	146.25 (121.52)	133.80 (115.38)
	7	64	4.21 (0.64)	2.90 (0.99)	3.99 (0.71)	3.11 (0.99)	276.67 (261.71)	138.52 (118.08)	124.75 (117.41)
	8	50	4.31 (0.60)	2.64 (0.90)	3.94 (0.75)	2.68 (0.86)	268.83 (226.28)	122.93 (102.04)	142.70 (115.81)
	9	62	4.17 (0.63)	2.82 (0.84)	4.02 (0.59)	3.05 (1.01)	229.70 (201.08)	135.62 (112.32)	128.41 (106.75)
Boys	5	70	4.49 (0.61)	2.86 (1.11)	4.12 (0.89)	3.28 (1.17)	261.88 (276.15)	151.40 (138.51)	122.14 (127.85)
	6	57	4.22 (0.74)	2.70 (0.88)	3.98 (0.87)	3.41 (0.85)	307.19 (280.85)	139.04 (142.76)	125.09 (121.86)
	7	62	4.00 (0.91)	2.98 (0.85)	3.92 (0.88)	3.39 (0.88)	161.32 (197.76)	113.12 (108.45)	90.04 (92.11)
	8	52	4.15 (0.80)	3.04 (0.86)	3.85 (0.91)	3.33 (0.86)	255.48 (185.52)	178.74 (136.63)	142.00 (120.24)
	9	51	4.10 (0.88)	3.27 (0.81)	3.74 (0.96)	3.34 (1.01)	285.02 (281.28)	136.55 (140.49)	129.46 (107.17)

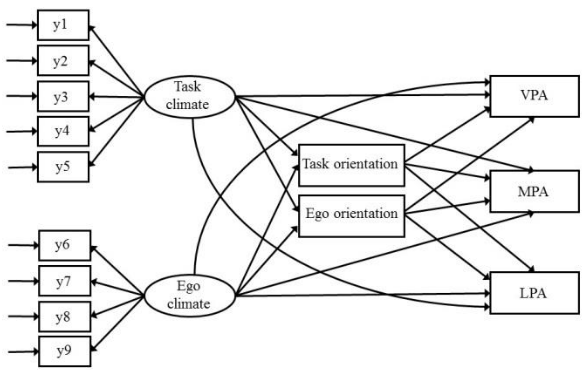

Figure 1. The theorized model of motivational climate, goal orientations, and physical activity levels. Variables: y1 = It is important for students to try their best during physical education classes, y2 = The most important is that we progress every year in our own skills, y3 = Learning new skills makes me want to learn more, y4 = It is important for students to show that they are better in physical education than others, y5 = During physical education classes students compare their performance mainly to that of others, y6 = It is important for students to try improve their own skills, y7 = It is important to keep trying even though you make mistakes, y8 = It is important for students to succeed better than others, and y9 = During physical education classes students compete with each other in their performance

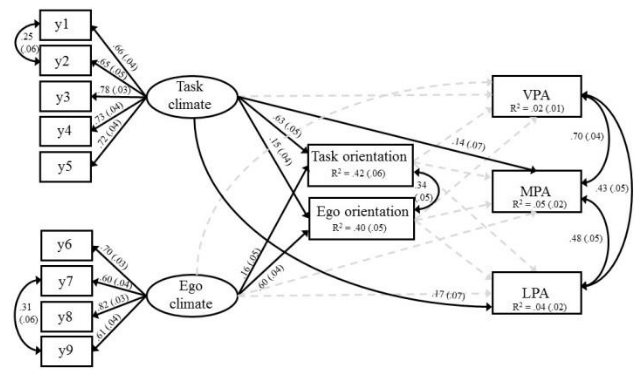

Figure 2. The standardized estimates for the model including task- and ego-involving climate, task and ego orientation, and light- to vigorous-intensity physical activity levels. All paths are significant at p < 0.05 level, standard errors in parentheses. For the sake of clarity, the covariate effects of gender, grade, and school are not shown.

The factor model was implemented in order to analyze the associations of task and ego-involving motivational climate; task and ego orientations; and light- to vigorous-intensity physical activity (see Figure 1). The theorized model revealed an acceptable overall fit for the data (χ^2 (82) = 171.295, p < 0.001, CFI = 0.96, TLI = 0.93 RMSEA = 0.043, 90% CI [0.03, 0.05], SRMR = 0.030). However, the model was modified based on the modification indices. The residuals of the items y1 and y2 in addition to y7 and y9 were allowed to correlate. The modified model (Figure 2) revealed an excellent model fit (χ^2 (80) = 113.160, p < 0.01, CFI = 0.99, TLI = 0.98, RMSEA = 0.027, 90% CI [0.01, 0.04], SRMR = 0.026). Statistically significant values for the Chi Square -test are typical in case of large sample sizes (12).

The standardized results showed that task-involving climate in physical education related to task orientation, ego orientation, LPA, and MPA. Ego-involving motivational climate showed significant paths to ego orientation and task orientation. In addition, task orientation and ego orientation showed to have a significant association. Similarly, light-intensity level of physical activity related to moderate- and vigorous-intensity, and moderate-intensity to vigorous activity. No statistically significant indirect paths were observed from task- and ego-involving climate to LPA, MPA, or VPA via task or ego orientation. Statistically significant covariance effects of gender were found in ego-involving climate (p < 0.001) and ego orientation (p < 0.05) with boys scoring higher than girls. The effect of grade were observed in terms of task-involving climate (p < 0.01) ego-involving climate (p < 0.001), and ego orientation (p < 0.01). Elementary school children scored higher in task-involving climate and lower in ego-involving climate and ego orientation than secondary school students. School had an effect on perceived task-involving climate ($p < 0.01$). No other covariance effects were found. The model also demonstrated effect sizes that ranged from strong to weak, explaining 42% and 40% of the variance of task and ego orientation, and 2% to 5% of the variance of physical activity levels. Overall, the findings indicated that the higher the children scored for task-involving motivational climate in physical education, the higher total LPA and MPA levels they reported accumulating. High scores for task-involving climate were also indicative of higher task orientation, whereas higher ego-involving climate was linked with higher ego orientation. Additionally, the more children accumulated light-intensity physical activity, the more they reported participating in MPA and VPA.

DISCUSSION

The aim of the study was to examine the links between children's perceptions of motivational climate, goal orientations, and light- to vigorous-intensity physical activity levels. Firstly, the results indicated that task-involving motivational climate positively related to LPA, and MPA. This particular finding was expected, because previous AGT based studies reported that task-involving motivational climate encouraged students to be more physically active in physical education classes (9), leisure time (65), and both contexts (26). In addition, this finding supported the notion that motivation in physical education transferred to participation in leisure time physical activity (Hagger, 2014). Task-involving climate, however, was not directly related to VPA. It may be that children and youth accumulate most of their physical activity out-of-school, because they spend only a limited number of their waking hours at the school (27). For instance, the present participants engaged in 18 minutes of VPA, 20 minutes of MPA, and 37 of LPA minutes per day. Similarly, Tammelin and colleagues (59) reported that Finnish elementary school children participated in only 22 minutes, and secondary school students 25 minutes, of VPA on the daily basis. Currently, Finnish comprehensive schools have 90 minutes of physical education per week including active and non-active periods (42). Thus, school physical education classes are more likely to provide light- and moderate-intensity physical activities, because vigorous activity is mainly accumulated during leisure time. The direct association between task-involving climate and VPA could have materialized, if physical activity had been measured using segmented study design. For example, the adoption of the procedures of Brooke and colleagues (11) could be useful, as they reported the physical activity levels for weekdays and weekends using the segments of before-school, physical education classes, recess, and after-school activities. Nevertheless, the strong relationship between VPA and MPA, and the moderate relationship of VPA and LPA in the current data implied that the more children accumulate light and moderate activity, the more they engage in vigorous-intensity activities. From this perspective, physical education teachers could have a substantive impact on children's total physical activity levels through the regulation of motivational climate in physical education classes (69).

The current findings highlighted that both task-involving climate and ego-involving climate related to task orientation and ego orientation. This was expected, since previous studies have consistently shown that task-involving climate in physical education positively influences students' perceptions of task orientation (6, 21, 26, 35, 69), and in turn, an ego-involving climate promotes ego orientation (18, 26, 35, 47). For example, students in the experimental group reported higher levels of task orientation and lower levels of worry after the seven-month intervention implemented for secondary school-aged students in Greece (6). Students were permitted to complete activities at their own level (i.e. shooting in basketball from different distances), to choose their teammates and opportunities were generated for students to manage an activity, and commended for exerting effort and engaging in both the class and out-of-school physical activities. In addition, the formation of small teams during the classes was encouraged in order to promote students' social interaction, and students were encouraged to evaluate themselves based on self-referenced criteria. Teachers used students' self-evaluations for grading. Students were also able to direct the tempo of learning based on their abilities and interests, that is, opportunities were provided for the students to determine when commence the next drill. Similarly, in the intervention of Digelidis et al (16) involving the promotion of a task-involving climate within secondary school's physical education classes, students in the experimental group had higher task orientation, lower ego orientation and more positive attitudes toward exercise than the control students.

No indirect paths were observed from task- and ego-involving climate to LPA, MPA, or VPA via task or ego orientation. This was not assumed, because both task-involving motivational climate (9, 26, 65) and task orientation (21, 48, 60, 69) have been revealed to be positively linked with physical activity behavior. It must be recognized that school physical education classes are not limited to training physical skills, because involvement in many physical activities generates knowledge and insight centered on concepts such as rules, fair play, respect, tactics, bodily and social awareness, and personal interaction linked to team effort (20). This means that either high task and low ego orientation or high ego and low task orientation may lead to positive engagement in physical education (50), although the participation does not appear as physical activity. Additionally, it may be that present categorizations of physical activity did not produce such indirect paths. Perhaps, the theorized model should be extended by adding contextual physical activity into the model following the procedures of Vallerand and Lalande (62), since the current physical activity scores represented total activity.

The findings revealed also that boys scored higher than girls in ego-involving climate. Gender differences in motivational climate have previously been found with boys scoring higher than girls in ego-involving climate (53). Additionally, school had an effect on children's task-involving climate and the grade effects were detected in task-involving climate and ego-involving climate, with elementary school children ranking task-involving climate higher and ego-involving climate lower than secondary school students. In Finland, all schools follow a national core curriculum (42) that frames the objectives and core contents of physical education. Individual education settings are responsible for practical teaching arrangements, the effectiveness and quality of its education, are free to determine how to group pupils (39), and typically have single gender groups in physical education classes. Based on this, it is clear that not all children and youth perceive the motivational climate in physical education in the same way. In general, the participants reported the motivational climate in physical education to be more task-involving than ego-involving. This was not surprising, since task-involving teaching methods have been considered through the Finnish physical education curriculum and teacher training for at least 20 years (42).

Finally, significant gender and grade effects were found in ego orientation with boys scoring higher than girls, and Grade 7 to 9 students scoring higher than Grade 5 to 6 children. Previously, girls have been found to score higher on task orientation, whereas boys scored higher than girls on ego orientation (2, 31, 71). In addition, Simmons and Blyth (52) argued that socio-cultural changes often associated with the transition from elementary to secondary school can be detrimental due to an increased emphasis on competition, social comparison, performance goal orientation and self-assessment of ability within the secondary setting. Perhaps, secondary school students' ego orientation increased after transitions to another school and transforms in their social and environmental networks. Wallhead and Ntoumanis (66) proposed that physical education curriculum should facilitate positive perceptions of the motivational climate, therefore, promoting task orientation within physical education at the secondary school level.

The key strength of the study was that the theoretical framework has previously been widely used in context of education (63) and physical education (25, 26, 46, 56). In general, the usefulness of self-report measures may be limited because certain health and well-being behaviors such as physical activity are difficult to recollect and perceived as sensitive by respondents, leading to reluctance to respond honestly (10). In the current study, upper and lower scores for the self-reported physical activity levels were determined using accelerometer-determined scores as a comparative data. The results provided important insights into the school-aged students' physical activity, especially LPA participation, since only a limited number of studies have been carried out in order to examine determinants of light-intensity physical activities (61). The limitations are mainly related to the study design and cultural issues. First, the present study was a cross-sectional and correlational and, therefore, the associations identified should not be interpreted as cause-effect relationships (29). Second, the study took place in Finland. The possibility for a cultural differentiation, especially in the presence of separated ego and task goal orientations has been proposed previously (13). Therefore, additional studies should be undertaken regarding the generalizability of measures assessing goal orientation and perceptions of motivational climate in other countries (22). Future research would also benefit from investigations the incorporate the use of a control group design and objective physical activity measures.

The outcomes of this study support the notion that the higher the level of task-involving motivational climate in physical education perceived by the children, the higher the levels of total LPA and MPA in which they reported undertaking. Further, the more children accumulated light- to moderate-intensity physical activity, the more they participated in VPA, respectively. The current low minutes of LPA, MPA and VPA should be considered as a matter of common concern, especially among the most inactive students. It is clear that the amount of time allocated to school based physical education programs cannot be markedly increased. Therefore, developing curriculum content and re-considering the pedagogy of delivery may serve as possible strategies to implement in physical education as strategy to enhance children's LPA, MPA, and further VPA and total physical activity. Schools need to place a higher priority on encouraging children and young people to engage in daily physical activity and to provide guidance that make it easy to find activities, especially vigorous-intensity activities. For instance, class teachers and physical educators could encourage their students to be physically active in terms of transportation to school and out-of-school activities by suggesting physically active options to increase total physical activity.

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