

EFFECTIVENESS OF ‘TARGET’ STRATEGIES ON PERCEIVED MOTIVATIONAL CLIMATE IN PHYSICAL EDUCATION

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ABSTRACT

Grounded in Achievement Goal Theory of Nicholls (1989), the aim of this study was to assess the development of four teaching interventions based on the TARGET areas of Ames (1992) and verify their effect on the perceived motivational climate at situational level in Physical Education (PE) classes. Participants were 580 secondary education students aged between 11 and 15 (12.46±1.15) years. A quasi-experimental design was utilised for four teaching units, each lasting for 10 sessions. The intervention programme was applied in the four experimental subgroups (n=263) by means of motivational strategies to generate a task-oriented climate. In the four control subgroup (n=317), students received conventional PE classes. The perceived motivational climate of each unit was evaluated at the end of the intervention for the different contents. Results showed significantly higher values for the experimental subgroups, in terms of perceived task-oriented motivational climate for the four teaching units, than in the control subgroups. These findings highlight the need to generate specific intervention strategies in order to generate an optimal motivational climate in PE classes.

Keywords: Teaching intervention; TARGET areas; Adolescence; Task-oriented climate; Motivational climate; Physical education.

INTRODUCTION

Much of the existing scientific evidence today points out the numerous health benefits of regular physical activity (PA) in school-aged children and youth. Guidelines established by the World Health Organisation (WHO, 2010) recommended at least 60 minutes of moderate to vigorous physical activity (MVPA) per day. However, an international systematic review throughout adolescence (10–19 years old) evidenced a progressive decline in PA levels (Dumith *et al.*, 2011).

Specifically, the subject Physical Education (PE) can be a tool to promote PA in children and adolescents in a direct (helping students to accumulate MVPA levels in the classes) and an indirect way (promoting PA outside school hours) (Slingerland & Borghouts, 2011; Sallis *et al.*, 2012). To achieve this objective, PE teachers can play a role by motivating students regarding both PE and PA (Gao *et al.*, 2013; Van den Berghe *et al.*, 2014) by transmitting an optimal motivational climate through specific interventions for each teaching unit (Gillison *et al.*, 2013). Thus, positive experiences in PE classes could contribute to developing more

adaptive behaviours (Barkoukis *et al.*, 2010) and the levels of engagement in PA, both inside and outside the PE context, can be increased (Jaakkola *et al.*, 2008; Aelterman *et al.*, 2012).

Despite the large amount of research that associates motivation in PE classes with adherence to engaging in out-of-school PA, following the trans-contextual model of motivation (Hagger & Chatzisarantis, 2012; Standage *et al.*, 2012), some qualitative studies found evidence that many students have negative experiences in PE classes (Mitchell *et al.*, 2015; Beltrán-Carrillo *et al.*, 2016). Similarly, a series of longitudinal studies indicate that the perceived task-oriented motivational climate, more self-determined motivation levels and enjoyment experienced in PE classes, decrease during adolescence, whilst the ego-oriented motivational climate and amotivation increase (Ntoumanis *et al.*, 2009; Yli-Piipari *et al.*, 2012). Thus, the negative experiences accrued in PE and in sporting activities could foster physical inactivity in adolescence (Beltrán-Carrillo *et al.*, 2012).

It becomes essential, therefore, to study teaching intervention via the management of the motivational climate in the classroom. The theoretical framework used in this work is the Achievement Goal Theory (Nicholls, 1989). This social-cognitive theory is comprised of different constructs (goal orientation, motivational climate and state of goal involvement) that are used to explain the relationship between the teaching intervention and the motivational processes that are triggered both inside and outside the classroom. In this sense, teachers can manipulate the motivational climate (perceptions or attributions for success or failure are defined in accordance with the demonstration of ability) towards the task (evaluating self-referenced improvement, personal achievement, without taking into account social comparison in the mastery of the task) or towards the ego (comparative criteria are used to assess the mastery of the tasks, linking success with greater inter-individual skill) (Braithwaite *et al.*, 2011).

One of the main didactic tools that teachers have to generate positive experiences in PE classes is to generate a task-oriented motivational climate. There are many studies in the scientific literature that have shown that task-oriented motivational climate is associated with other variables and consequences that affect the motivation of students in PE classes. Some cross-sectional studies indicate the relationship of task-oriented motivational climate with task-oriented motivational orientation (Bakirtzoglou & Ioannou, 2011; Granero-Gallegos & Baena-Extremera, 2014), with the satisfaction of basic psychological needs (Sánchez-Oliva *et al.*, 2014; Soini *et al.*, 2014), with more self-determined motivation forms (Moreno-Murcia *et al.*, 2011; Bryan & Solmon, 2012) and with affective consequences such as enjoyment (Gråstén *et al.*, 2012).

There are different tools to generate a task-oriented climate in PE classes, such as manipulation of the different dimensions based on TARGET areas (Task, Authority, Recognition, Grouping, Evaluation and Time) (Ames, 1992). In this sense, the teacher can design strategies related to the structure (design of the session) and teaching intervention (activity during the session) related to six learning scenarios: task (design and adaptation of the activities), authority (participation of students in teaching-learning process), recognition (feedback of progress and effort), grouping (association, communication and belonging to the group), evaluation (participation in the evaluation and qualification process and cognitive involvement) and time (adaptation of the length of the unit to the proposed objectives).

Many international research studies have been applied to these strategies in different units in the context of PE. For example, González-Cutre *et al.* (2011) conducted an experimental study (26 sessions) based on TARGET areas with 56 high school students in collective sports and gymnastics. The results showed higher scores in the experimental group for the perception of the task oriented climate, autonomous motivation and lower scores in ego oriented climate in PE. Recently, Cecchini *et al.* (2014) conducted another study during 12 consecutive weeks with a total of 447 secondary education students, 12-17 years old, from eight different high schools. The results of the latter study revealed a higher perception of intentions to be physically active. There are a few studies in the educational literature that have examined the effects of an intervention programme based on TARGET areas at the end of a specific unit. For example, a quasi-experimental study of Abós *et al.* (2016) evaluated the effectiveness of a teaching intervention programme based on TARGET areas in 12 sessions of acrosport. The experimental group showed higher values than the control group in the perceived task-oriented motivational climate in the acrosport unit. Therefore, the objective of the current study focuses on evaluating the effectiveness of four teaching interventions based on the development of intervention strategies via the manipulation of the TARGET areas for four different PE units. It was hypothesised that the development of intervention strategies based on the TARGET areas, specific to each unit, will generate a greater perceived task-oriented motivational climate by the students.

METHODOLOGY

Research design

A quasi-experimental design was applied using four units presented to two groups (experimental and control group for unit). The classes were established by the schools and these whole classes were randomly assigned to a control or experimental group.

Participants

The sample of the present study consisted of eight (8) PE teachers and 580 of their students from three secondary schools (age: 12.46 ± 1.15). Students were in the 1st grade (age range: 12-13; 71.20%), 2nd grade (age range: 13-14; 10%) and 3rd grade (age range: 14-15; 18.79%). Class sizes ranged from 25 to 30 students per class.

Table 1. DISTRIBUTION OF PARTICIPANTS

Units	Year	Experimental group	Control group	Total
Long-distance running	1 st Grade	71	123	194
Movement expression	1 st Grade	108	111	219
Sport orienteering	3 rd Grade	44	65	109
Volleyball	2 nd Grade	40	18	58
Total		263	317	580

Of the total number of students involved, 263 belonged to the experimental group and 317 to the control group. They were assigned to the four units taught, as indicated in Table 1. The inclusion criteria for selecting the study participants were to adequately complete the instrument related to the study variable, and continuously and actively attend the sessions (over 90% of the total number of sessions) in each unit. Seven of the teachers were male and one was female. The criteria for school selection included: (1) at least two PE teachers in the same grade; (2) high school from the same region with the same official curriculum. Each unit was taught by two different PE teachers. The criteria for teacher selection included: (1) qualification in Sport and Exercise Science for experimental and control group teachers; (2) knowledge of the Achievement Goal Theory and motivational strategies based on TARGET areas for experimental group teachers.

Instruments

To measure the perceived motivational climate at situational level, the Perceived Motivational Climate Scale (PMCS) of Biddle *et al.* (1995) was used and translated into Spanish and adapted to PE (Gutiérrez *et al.*, 2011). This instrument was modified, adapting the initial sentence to each of the curricular contents (“In the *** classes our PE teacher ...”). It is comprised of 19 items, grouped into two factors that measure perceived task-oriented motivational climate (nine items like “The teacher feels satisfied when they all improve”) and perceived ego-oriented motivation climate (ten items, like “The teacher only pays attention to those who do the exercises well”). The response format used in the measurement instrument was indicated on a Likert scale, with a response ranging from 1 to 5, where ‘1’ corresponds to totally disagree and ‘5’ corresponds to totally agree with the statement. The reliability analysis obtained from Cronbach’s alphas values in each one of the Teaching Units for perceived task- and ego-oriented climate were 0.80 and 0.80 for the long-distance running unit, 0.85 and 0.73 for the movement expression unit, 0.84 and 0.71 for sport orienteering and 0.75 and 0.80 the volleyball unit, respectively.

Procedural and ethical considerations

The study received ethical approval from the University of Zaragoza. To develop the study, firstly, the different secondary schools that participated in the study were approached to approve involvement in the research. The PE teachers were informed of the objectives of the study and their consent was requested to present the unit (long-distance running, movement expression, sport orienteering or volleyball) to the experimental subgroups. The parents/tutors passive consent was obtained through the different schools.

The units were developed with two weekly sessions lasting 50 minutes, as established by the secondary schools, with a total of 10 sessions for each unit. The research was conducted by applying the four units integrated into the annual didactic programmes of four PE teachers, while respecting the official curriculum in operation regarding the content and evaluation criteria level for Compulsory Secondary Education (Spanish Organic Law of Education, 2006). The questionnaire aimed at evaluating perceived motivational climate developed in each TU (Teaching Unit) was handed out in the classroom after the last session of each one of the units and completed in the presence of one of the study researchers and without the PE teacher present, who had developed the unit. The time required to complete the questionnaire was less

than 10 minutes. With respect to ethics, the guidelines of the Declaration of Helsinki (2008) were applied.

Intervention programme

The intervention programme to generate a greater task-oriented climate was developed by four of the PE teachers through specific strategies for each unit, based on the guidelines of the six TARGET areas (task, authority, recognition, grouping, evaluation and time) established by Ames (1992). To this end, a specific training programme was presented to the four teachers of experimental groups by means of four sessions lasting a total of 30 hours. It was aimed at understanding the theoretical background and motivational strategies that can be implemented in PE classes for each one of the units.

To develop the unit on long-distance running, the work carried out was based on the proposal of Julián *et al.* (2012). The guidelines established by Almolda *et al.* (2014) were used as support in the orienteering unit and the proposal of Peiró-Velert *et al.* (2012) for the skipping rope unit. The recommendations made by Báguena-Mainar *et al.* (2014) were applied for the volleyball unit. The main researcher and a team of experts supervised the planning of each one of the sessions and monitored the development of the unit to ensure that the intervention programme was being implemented correctly. The strategies applied, in general terms, for the different contents are summed up below, giving some specific examples for each of the units.

With regard to the “Task” area of the TARGET, a large variety of teaching-learning situations were designed and adapted to the different levels of skill, therefore representing a continuous personal challenge for all students (example: in the long-distance running unit, the time and distance to run were progressively increased in each one of the work groups, varying the design of the routes and the environments for the sessions). During the development of the different units, students were given the opportunity to design and to present some warm-ups/activities/sessions to achieve the proposed objectives (example: in the orienteering unit, the students evolved from a known and familiar space of the classroom, to a known and nearby space of the school playground and then to a known and distant space being a nearby park). In all the units, the benefits and objectives pursued for their development were underlined by explaining the importance of each one of the activities proposed and its relationship with a series of healthy living habits (example: in the volleyball unit, students learned to do specific warm-up sessions for this type of activity).

In the area of “Authority”, students were progressively involved in decision-making and in responsibility within their teaching-learning process (example: in the movement expression unit, students could select the different challenges in each one of the modalities and to adapt them to their level of competence in the task; they could also choose aspects related to the choreography, such as the number of repetitions, links used, music, clothing, etc.). Likewise, different roles were established throughout the sessions, to involve the students in the different types of leadership (example: in the volleyball unit, the role of scorer, player and referee were established). Finally, student self-management was fostered, providing practice spaces and didactic resources to reach the proposed objectives (example: in the long-distance running unit, a didactic book was provided with the different running spaces in the city).

In the “Recognition” dimension, individual and group progress was reinforced at all times, rewarding aspects achieved with respect to the didactic objective, commitment to the activity, management of the material, etc., and avoiding between-student comparisons (example: in the long-distance running unit, by way of the curricular material handed out during each session, the teacher provided emotional and learning feedback to each of the level groups). Likewise, interrogative feedback was used to involve students cognitively in their teaching-learning process, and draw internal logic from the different bodies of knowledge of the activity (example: in the movement expression unit the teacher asked all the students questions related to the action rules of this activity, “how to turn the rope, how to enter on the good side and on the bad side, how to jump, how to get out, etc.” adapted to the different exercise levels).

Regarding to the “Grouping” dimension, the teacher made it possible to form different types of groups during the session throughout the unit, using different criteria, such as ability (example: in the long-distance running unit, a study was conducted by level group based on the initial reference situation), social proximity (example: in some sessions of the movement expression unit, students could freely form groups), heterogeneity (example: in the orienteering unit, the work groups had to contain students of both genders), randomisation (example: random assignment by numbers or colours to form a team of four in volleyball). The aim of these strategies was for the students to continuously work with different companions in order to improve social relations, group membership and motor competence. Group changes could only be justified due to a lack of adaptation of the task level or incorrect functioning of the group work (example: in the long-distance running unit, students could change the level if the rhythm did not adapt to their level, either due to excess or the contrary).

Insofar as “Evaluation” is concerned, diagnostic situations were designed to discover the students’ initial level and propose the different learning activities based on the needs that arose (example: in the movement expression unit, the initial test provided information about the challenges that they were able to or not able to cope). Based on this, the self-referential improvement was evaluated, as well as the acquisition of the different skills and competences (example: in the long-distance running unit, the initial evaluation referring to rhythm was taken into account via the five-minute test). The teacher involved students in the evaluation process by providing them with the option of participating in choosing the percentages of their evaluation, and proposing a co-evaluation of their companions and a self-evaluation of the unit (example: in the orienteering unit, students were allowed to weigh up the different evaluation tests, respecting some margins established by the teacher). A private and significant evaluation was used at individual and group level, during the entire teaching-learning process (example: in the volleyball unit, the teacher periodically informed the students about the progress made, justifying the different qualifications obtained and re-orienting their action in order to achieve the objectives proposed).

Finally, in the dimension related to “Time”, at least 10 sessions were reserved in all the units to reach the different didactic objectives, respecting the individual and group learning rhythm in each one of the activities proposed (example: in the movement expression unit, students could add another session to rehearse the final choreography). On the other hand, the teacher helped students establish the planning and structuring of their learning (example: in the long-distance running unit, the teacher provided the work programme in each one of the sessions, both inside and outside the classroom).

Statistical analysis

To analyse the reliability of the factors of the questionnaire, the Cronbach's Alpha coefficient was used. Mean and standard deviation were computed for the descriptive analysis, and a one-factor (Group) MANOVA was performed for the analysis of differences, with the relevant univariate analyses in the different contents derived from this analysis. The partial eta-squared statistic (η_p^2) was used as an indicator of the effect size to evaluate the magnitude of the differences, as it eliminates the effect of the size from the sample. The statistical programme, SPSS 19.0, was used in the different analyses conducted.

RESULTS

Firstly, a main effect of the intervention carried out is observed (Wilks' Lambda=0.982; $F_{2, 571}=1.728$; $p<0.001$; $\eta_p^2=0.074$). Furthermore, to evaluate the differences found in the different variables and in the different contents, the univariate contrasts are presented in Table 2. Regarding, perceived task-oriented climate, significantly higher values were obtained for the experimental group when compared with the control group regarding the four contents. In the perceived ego-oriented climate, significantly lower values were only obtained in the experimental group in the movement expression content.

DISCUSSION

The objective of the study was to evaluate the effectiveness of four teaching interventions based on the development of specific strategies by the manipulation of the TARGET areas. The initial hypothesis postulated that the development of specific intervention strategies for each unit, and based on the TARGET areas (Ames, 1992), would generate a greater perceived task-oriented motivational climate for the students. The findings support the constructs of the Achievement Goal Theory, so the hypothesis can be confirmed.

The results obtained in the analysis of differences, highlight the effectiveness of the four interventions for the experimental subgroups, bringing about significantly higher values in perceived task-oriented climate than the students in the control subgroups. The findings appear to indicate that intervention programmes based on specific intervention strategies are effective to obtain a greater perceived task-oriented motivational climate in PE classes at situational level within different contents. In this regard, the guidelines of the six TARGET dimensions (authority, recognition, grouping, evaluation and time) may be very useful to teaching staff in order to manipulate the motivational climate of the classroom, which is essential to optimise the PE teaching-learning process in general, and the different contents, in particular.

Based on the results of the present study, the findings concur with other intervention studies that have implemented strategies related to the six TARGET areas (Ames, 1992) in a short period of time (10-12 sessions). Recently, Abós *et al.* (2016) and Sevil *et al.* (2016) found that the use of specific strategies based on TARGET areas in acrosport and in rope skipping were effective to generate a greater perceived task-oriented motivational climate within PE teaching units.

Table 2. ANALYSIS OF DIFFERENCES FOR EACH UNIT AFTER INTERVENTION PROGRAMME

Content	Variable	Experimental group	Control group	Difference between groups			
		M±SD	M±SD	F _(1, 572)	p	η _p ²	95% CI diff.
Long-distance running	Task Climate	3.97±0.57	3.74±0.56	10.35	0.001	0.018	[0.09, 0.38]
	Ego Climate	2.86±0.62	2.92±0.57	0.59	0.441	0.001	[-0.23, 0.10]
Movement expression	Task Climate	4.65±0.35	4.34±0.52	22.59	<0.001	0.038	[0.18, 0.44]
	Ego Climate	2.59±0.58	2.93±0.59	20.88	<0.001	0.035	[-0.50, 0.20]
Sport orienteering	Task Climate	4.11±0.53	3.73±0.52	16.36	<0.001	0.028	[0.20, 0.57]
	Ego Climate	2.89±0.39	2.96±0.47	0.41	0.522	0.001	[-0.29, 0.15]
Volleyball	Task Climate	4.56±0.29	4.24±0.30	5.30	0.022	0.009	[0.05, 0.59]
	Ego Climate	2.74±0.61	2.76±0.52	0.01	0.907	0.000	[-0.33, 0.30]

M=Mean

SD=Standard Deviation

CI=Confidence Interval

diff.=difference

However, other quasi-experimental studies did not obtain similar results after an intervention similar to the present study. For example, Cuevas *et al.* (2012) conducted an intervention programme of 16 sessions (6 sessions of games and sports and 10 sessions to dancing and preparing choreography for gymnastics) with 169 high school students. The results of the latter study only showed a significant decrease of the perception of ego oriented-climate. This could be due to the short duration of one of the unit, highlighting the need to carry out prolonged interventions of around 10 sessions in order to obtain significant results (Braithwaite *et al.*, 2011). Likewise, the frequency and intensity with which the intervention strategies have been applied also seem to be important factors to achieve greater optimisation of the motivational climate (Braithwaite *et al.*, 2011).

The effect of specific interventions for different contents, following the Hierarchical Model of Motivation (Vallerand, 2007), is of great importance in PE classes as the development of an optimal motivational climate at situational level (unit in PE) may generate a prolonged effect in the classroom at contextual level (PE classes), maintaining a prolonged effect after the teaching intervention (Digelidis *et al.*, 2003; Valentini & Rudisill, 2004). Furthermore, this greater perceived task-oriented motivational climate may also develop an improvement in the motivational processes, giving rise to positive and more adaptive consequences in PE classes.

Other intervention studies show that task-oriented motivational climate is associated with the improvement of other variables that produce higher levels of self-determination in the PE classes (Wallhead & Ntoumanis, 2004; Jaakkola & Likkonen, 2006), as well as behavioural consequences, such as a greater increase in PA levels (Belton *et al.*, 2014; Cecchini *et al.*, 2014), emotional consequences, such as greater enjoyment (Barkoukis *et al.*, 2008) and cognitive consequences, such as greater learning (Morgan & Carpenter, 2002) or greater perception of skill and effort (Morgan & Kingston, 2008).

Regarding the results associated with perceived ego-oriented motivational climate, significantly lower values are only noticed in the movement expression content. This may be due to the fact that the main objective of the intervention programme of this study was focused on increasing the perceived task climate and not to reduce the perception of the ego climate. The results obtained in current study are in line with a substantial body of research grounded in Achievement Goal Theory, as the relationship between task-oriented and ego-oriented motivational climate is orthogonal (Roberts *et al.*, 2007; Moreno-Murcia *et al.*, 2011; Horn *et al.*, 2012.). This means that the increase in task-oriented motivational climate does not lead to a decrease of the ego-oriented motivational climate.

These results highlight the importance of teaching intervention in the PE context, to achieve an optimal motivational climate. To this end, the implementation of intervention strategies must not only focus on improving the task-oriented motivational climate, but also on a decrease in ego-oriented motivational climate that is vitally important to generate greater optimisation of the teaching-learning processes (Soini *et al.*, 2014).

Finally, the main limitations in this study must be taken into account. Firstly, the absence of pre-test measurement only allows comparing the final scores of control and intervention groups on perceived motivational climate. However, it is problematic to make a pre-test measurement when carrying out an evaluation of the motivational climate associated with a specific content

in which students hardly had any previous experience. Therefore, it could be important to make a preliminary evaluation at contextual level of the perceived motivational climate in PE classes before carrying out interventions in different units. Future intervention studies in PE units could evaluate other variables like satisfaction or frustration of basic psychological needs or self-determined motivation levels experienced by the students. Thus, more comprehensive evaluations of the interventions carried out by the teachers in different contexts would be possible, thus facilitating understanding those elements that determine the motivation of students during PE experiences.

PRACTICAL APPLICATION

The research topic has the potential to add to the existing literature in this domain by detailing specific TARGET strategies that may facilitate students' perception of a task-involving climate across different units. These results highlight the importance of achieving an optimal motivational climate acquired by teaching interventions in the PE context. To this end, the implementation of intervention strategies must not only focus on improving the task-oriented motivational climate, but a decrease in ego-oriented motivational climate that is vitally important to generate greater optimisation of the teaching-learning processes (Soini *et al.*, 2014).

CONCLUSIONS

To conclude, the effectiveness of the use of the TARGET areas regardless of the internal logic of the content (individual actions, cooperation-opposition actions, artistic-expressive actions and actions in the natural environment) of our study. Therefore, it is clear that there is a need to develop specific intervention strategies for each unit, as it is a basic didactic tool to increase the perceived task-oriented motivational climate of students. We believe it can be recommended that work documents and specific curricular materials in the different contents integrated in the PE classes be created to provide teachers with resources to facilitate the development of effective interventions in order to create an optimal motivational climate. Likewise, the teaching discourse must accompany the strategies used, and become the most direct intervention channel that the PE teacher has to promote the desired outcomes for the students.

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