

Motivational Climate and Attitudes Towards Exercise in Greek Senior High School: A Year-Long Intervention

**Triantafylos Christodoulidis, Athanasios Papaioannou,
and Nikolaos Digelidis**

The purpose of this study was the application of a year-long intervention program, in typical Greek physical education school classes, which aimed to change motivational climate, goal orientations, motivation, and students' attitudes toward exercise and nutrition. Participants in the intervention program included 105 Grade-10 students, and 529 students of the same age took part as a control group. Immediately after the intervention, students in the experimental group compared to the control group: (a) had more positive attitudes toward exercise, participation in sports, and eating fruit; (b) perceived the motivational climate of the class as more task involving and less ego involving; and (c) spent more time exercising per session. The small significant effects that disappeared 10 months after the intervention imply that further theory development and interventions are needed.

Key Words: motivational climate, physical education, attitudes, goal orientations, intervention

Key Points:

- Introduction: Few interventions aiming to change motivational climate have been reported, and most were conducted for a short period of time.
- Results: The intervention affected students' attitudes towards exercise but not their goal orientations.
- Discussion: Future interventions should strengthen personal improvement goals in all domains of student action.

Introduction

Since the establishment of the health benefits of exercise (39), one of the major goals of physical education (PE) has been to promote physical activity across the life span. PE lessons in school could play an important role in the promotion of regular involvement in physical activities and a healthy lifestyle in general. According to social cognitive theories, attitudes are important predictors of human behavior (1). Attitudes represent people's perceptions, beliefs, judgments, and cognitions (38). Attitudes can be altered through information, knowledge, and experiences (31, 36). Attitude toward exercise is a positive predictor of exercise behavior (35). Hence, the formation of positive attitudes toward exercise should be considered a major goal of PE (5). Today we know that a PE lesson providing knowledge about the relationship between health and physical activity results in the formation of more positive attitudes toward exercise (12, 13).

Even though a major purpose of PE is the promotion of students' exercise behavior, this purpose remains largely unachieved. Many studies report that young people's after-school physical activity is rapidly diminishing (32). The more children grow up, the less they exercise. In fact, exercise behavior gradually decreases even during the school years (33). In Greece, studies report that during high school, students' effort and enjoyment in PE is gradually diminished (7, 24). These findings imply that the quality of students' participation in PE should be seriously considered because it pictures the effectiveness of a PE program.

In the last two decades, the explanation of youngsters' involvement in physical activity settings was largely based on goal perspectives theory (2, 11, 19). According to this theory, in achievement settings like PE, two goals predominate: task and ego. When children set task goals, they try for personal improvement, feel satisfaction when they develop new skills, attribute success to effort, feel challenged when they learn new or difficult skills, and are not afraid of making mistakes -- because mistakes are considered to be part of the learning process. When an ego goal is salient, children are concerned with their competence in a normative way. They try either to outperform others or to demonstrate high normative performance. Satisfaction is derived from the demonstration of high ability. It is believed that ego goals are particularly detrimental for students with low ability, because these youngsters fail to exhibit high normative performance (11).

Today, it is widely believed that goals vary as a function of individual differences and situational demands (2). High task oriented students experience more positive emotions in physical activity contexts than their low task oriented peers (8). The perception of a task-involving climate is considered adaptive in PE and physical activity in general (8, 23). On the other hand, there is no evidence of positive effects of ego orientation or ego-involving climates on students' motivation (8). The adoption of an ego goal cultivates antisocial tendencies, such as aggressiveness and cheating (10, 25).

Obviously, PE teachers should promote task involvement and discourage ego involvement in their classes. Nevertheless, despite the availability of relevant instructions (28, 37), few interventions have been reported, and most of those that have were short term (5, 15, 34). Although these studies are important, one could possibly argue that the effectiveness of short-term interventions is due to their novelty, which is unsustainable over time. None of these studies reported follow-up assessments. Papaioannou and Digelidis applied a year-long PE program in one elementary school, which aimed to increase students' task involvement and decrease ego involvement (27). The results were small but significant. The intervention also had positive effects on attitudes toward exercise.

The present paper reports the effects of a one academic-year intervention on motivational climate and students' attitudes towards exercise. This study was conducted at the first grade of senior high school (age 16 ± 0.5). It is well known that senior high school students' motivation in PE is particularly low and that the task-involving climate at its worse (7, 24). Discussions with PE teachers in Greek senior high schools give the impression that some feel hopeless about creating a positive motivational climate. Hence, an intervention aiming to strengthen task involvement in Greek senior high school PE is of particular importance. Also informing this study, a follow-up

assessment was conducted 10 months after the end of the intervention. The study sought to discover whether any positive effects could be sustained post intervention.

In addition to attitudes, behaviors and intentions towards behaviors were also assessed. According to planned behavior theory (1), intention is the prime cognitive element predicting behavior. Hence, the assessment of intention was considered important.

Method

Participants

One hundred five students (47 boys, 58 girls) of the 10th grade (15-16 years old) participated in the intervention program. The program took place in two senior high schools, one from Northern Greece (Thessaloniki) and one from Southern Greece (Athens). Two regular PE teachers, who voluntarily agreed to participate, taught the program to six different classes. Their students came from junior high schools and were unknown to the teachers prior to the beginning of the academic year. Five hundred twenty-nine students (189 boys, 340 girls) of the 10th grade formed the control group. None of them was studying in the experimental group's schools, and they were selected from schools of nine different towns in Greece. The classes, in accord with the national curriculum, were taught twice a week in winter and once a week in spring; however, due to a large number of lost dates (caused by labor strikes) during the intervention year, 25 PE lessons were taught in total during the entire academic year. The study was approved and permitted by the Greek Ministry of Education.

Procedure

The intervention program lasted one academic year (1998-1999). Twenty-five analytic daily lesson plans were developed. Five of them included both theory and practice about health and exercise issues. No theory about the health benefits of exercise is included in the formal curriculum. Both groups were measured three times: at the beginning of the academic year (September -- 3 weeks after the beginning of the year), at the end of it (May), and 10 months after the intervention (close to the end of the next academic year). It should be mentioned that students participating in the intervention changed PE teachers in the next academic year.

Main Characteristics of the Intervention

The design of the program was based on the following characteristics:

1. The practice teaching style was used (18) in order to maximize students' active participation and learning time. Students were organized into small groups of 3-6 persons and were introduced to the use of protocols. Task cards were used for every "station."
2. An essential part of the intervention was the use of the inclusion style (18). The games and activities chosen were inclusive, and the design of the lessons allowed every student to choose a level of difficulty in skill learning and practicing.
3. The reciprocal teaching style was used (18) in some lessons in order to enhance learning through cognitive functioning and to promote cooperation.
4. Usually, goal oriented activities were used, establishing a certain learning or improvement target.
5. Cooperative activities were preferred over competitive activities.

6. An individualized goal-setting program was used. The students were measured in the beginning of the school season in the 20-m shuttle run test, the sit and reach test, and a modified sit-up test. All tests were derived from the Eurofit Test Battery. The students kept notes of their performance and set personal improvement goals. The measurements were repeated three more times throughout the year.

7. Part of each lesson was a 3-min talk that described the relationship between health and exercise. Verbal reminders, connected with personal improvement values, were also used.

8. Health related information was provided through short lectures about the positive effects of physical activity on health -- specifically, the basic principles of health-related fitness that students need to develop a simple personal fitness program, and basic information about proper nutrition.

Regular PE teachers were not trained to use the above mentioned teaching styles and techniques, and observations imply that they do not use them in their classes (21).

The Physical Educators. The two PE teachers carrying out the intervention received the intervention program from the researchers and adapted it appropriately for their schools (facilities, courts, teaching material). The teachers had the autonomy to change or modify the lesson when necessary, and in order to improve it, without changing its philosophy. The teachers were informed about the philosophy of the intervention in several meetings before the beginning of the school year. They were instructed about the procedures, the fitness measurements, even how to construct instruments for some measurements. In these meetings, the facilities, the teaching material, the number of students, and the school schedule were also checked. A regular communication was established for briefing and problem solving. Although it would have been extremely interesting, no intervention concerning students' grading was conducted because the Ministry of Education would not permit it.

Measures

Teacher-Initiated Motivational Climate in PE Questionnaire. A short version (26) of the Learning and Performance Orientations in PE Classes Questionnaire (LAPOPECQ) developed by Papaioannou (22) was used to measure students' perceptions of the motivational climate of the lesson. This instrument consists of two scales referring to teacher-initiated motivational climate, which assesses perceptions of teachers' emphasis on task and ego involvement.

Responses to 13 items under the heading *In this PE class . . .* were indicated on a 5-point Likert-type scale ranging from 1 (*absolutely disagree*) to 5 (*absolutely agree*).

Goal Orientations. The Task and Ego Orientation in PE Questionnaire (9) was used. This instrument consists of two factors assessing task orientation and ego orientation, respectively, and has been appropriately adapted for Greek PE (29). Under the heading, *I feel most successful in PE when...*, the students indicated their responses to 13 items on a 5-point scale ranging from 1 (*I absolutely disagree*) to 5 (*I absolutely agree*).

Perceived Effort and Enjoyment. Two subscales of the Intrinsic Motivation Inventory (17) were used to measure students' effort and enjoyment in the PE class. The students responded to 10 items on a 5-point scale ranging from 1 (*I absolutely disagree*) to 5 (*I absolutely agree*). The validity of these scales in a Greek PE context has been consistent in the past (e.g., 29).

Attitudes. Students responded in four scales (good-bad, healthy-unhealthy, pleasant-unpleasant, useful-not useful) assessing their dispositions toward exercise, sports participation, and consumption of fruit over the upcoming 12 months. The responses were indicated on 7-point semantic differentiation scales (1 = *very bad*, 2 = *bad*, 3 = *rather bad*, 4 = *neither good nor bad*, 5 = *rather good*, 6 = *good*, and 7 = *very good*).

Intentions. Students responded to two questions assessing their intentions to exercise, participate in sports, and consume fruit in the next 12 months. The questions were, *I intend to . . . during the next 12 months (impossible = 1, possible = 7)*, and *I am determined to . . . during the next 12 months (absolutely no = 1, absolutely yes = 7)*.

The questionnaires assessing attitudes and intentions have been shown to be reliable and valid (30, 35).

Behavior. Students indicated how often they performed vigorous exercise during the previous month on a 6-point scale (0 = *none*, 1 = *1-5 times*, 2 = *5-10 times*, 3 = *10-15 times*, 4 = *15-20 times*, 5 = *over 20*), how long they exercised every time, if they ate fruit (2-point scale, 0 = *no*, 1 = *yes*), and how many pieces of fruit they ate last week (0 = *none*, 1 = *1-5 times*, 2 = *5-10 times*, 3 = *10-15 times*, 4 = *15-20 times*, 5 = *over 20 times*). Vigorous exercise was defined as the type of activity that substantially increases one's pulse rate, usually to more than 120 beats per minute, and lasts an hour or more. Students were told that this happens when they participate in activities such as basketball, football, or aerobics.

Results

Factor and Reliability Analyses

Using Amos 4 (3), Confirmatory Factor Analyses (CFAs) were conducted on adolescents' responses to the instruments assessing goal orientations and perceptions of teacher's emphasis on goal orientations in waves 1 and 2, respectively. In all CFAs, the two-factor structure of these instruments was examined. In each CFA, the variables assumed to assess the hypothesized factor were freed to one latent variable and the other fixed to zero. No correlated residuals were permitted. The goodness of fit indices, which are considered to be relatively unaffected by sample size, such as the Tucker Lewis Index (TLI) and Comparative Fit Index (CFI), were considered (4, 16). For the goal orientation instrument, TLI = .91 and .93 and CFI = .92 and .94, for waves 1 and 2, respectively. For the instrument assessing teacher's emphasis on task-involvement and ego involvement, TLI = .87 and .90 and CFI = .89 and .92, for waves 1 and 2, respectively. These findings support the two-factor structure of these two measures. For all scales administered prior to and after the intervention, the alpha reliability was between .71 and .93 (Table 1). One scale, used in wave 1, was below this range; the alpha reliability for the scale assessing attitudes towards exercise prior to the experiment equaled .57. The sum of these findings support the good psychometric properties of the instruments used in the present study.

Relationships Among Measures

Pearson product moment correlations were computed among scale scores. The results appearing in Table 1 imply that both prior to and after the intervention, there was a positive association among scales assessing perception of teachers' emphasis on task-involvement, task orientation, enjoyment and effort in the lesson, attitudes and intentions towards exercise and sport

Table 1 Correlation Among Measures Prior and After the Intervention and Scale Alpha Reliabilities (on the Diagonal)

Measure	1	2	3	4	5	6	7	8	10	11	13
1 Perceived teachers' emphasis on task-involvement	.80										
2 Perceived teachers' emphasis on ego-involvement	-.03	.77									
3 Task orientation	.48	.00	.79								
4 Ego orientation	-.03	.24	.10	.77							
5 Enjoyment	.50	-.01	.40	-.03	.80						
6 Effort	.45	-.01	.42	.02	.51	.71					
7 Attitudes towards exercise	.12	-.10	.30	.02	.19	.26	.57				
8 Intentions towards exercise	.19	.05	.35	.05	.25	.27	.29	.83			
10 Attitudes towards sport involvement	.16	-.05	.27	.04	.17	.17	.46	.27	.75		
11 Intentions towards sport involvement	.23	.09	.33	.09	.27	.31	.27	.63	.35	.89	
12 Frequency of sport/exercise involvement	.20	.08	.31	.07	.24	.25	.22	.50	.17	.50	
13 Hours per exercise/sport training session	.13	.06	.17	.00	.24	.20	.10	.36	.05	.38	.54
	.19	.09	.22	.00	.24	.25	.19	.38	.18	.39	.46

Note. In the first row appear correlation coefficients prior to the intervention, and in the second row, correlation coefficients after the intervention. All correlation coefficients larger than .13 were statistically significant at $p < .001$.

involvement, frequency of exercise/sport involvement, and hours spent for exercise/sport training per session. On the other hand, perception of teachers' emphasis on ego involvement and ego orientation had no relationship with any measure suggesting a positive stance towards exercise and sport involvement. These findings support the construct validity of the measures used in this study.

Differences Between the First and Second Measurement

Intervention effects were examined through covariance analyses. These analyses were chosen in order to control possible initial differences in the first measurement. In each analysis, the score of the first measurement was used as the covariate, and the score of the second measurement was used as the dependent variable. Thus, examining the intervention effects on attitudes towards exercise, the scale score on attitudes towards exercise at wave 1 was used as the covariate, the group (experimental or control) was the independent variable, and the scale score on attitudes towards exercise at wave 2 was used as the dependent variable. As individualized teaching is the principle of task-involving programs, each student was used as the unit of analysis.

In exercise attitudes, results revealed that after adjusting for differences in the first measurement ($F_{1,622} = 93.3, p < .001$), there were statistically significant differences between the two groups ($F_{1,622} = 9.27, p < .01$). The adjusted means show that the students involved in the experimental

groups ($M = 6.67$, $SE = .06$) had more positive attitudes toward exercise than the students participating in the control group ($M = 6.46$, $SE = .03$).

For students' attitudes toward participation in sports, the results revealed that, after adjusting for differences in the first measurement ($F_{1,622} = 63.3$, $p < .001$), there were statistically significant differences between the two groups ($F_{1,622} = 5.3$, $p < .05$). The adjusted means of the second measurement revealed that the students participating in the experimental classes ($M = 6.52$, $SE = .07$), compared to the students involved in control classes ($M = 6.34$, $SE = .03$), had more positive attitudes toward participating in sports.

As for the attitudes toward fruit consumption, the results revealed that after adjusting for differences in the first measurement ($F_{1,622} = 53.3$, $p < .001$), there were statistically significant differences between the two groups ($F_{1,622} = 4.54$, $p < .05$). The adjusted means of the second measurement imply that students in the experimental groups ($M = 6.84$, $SE = .06$) had more positive attitudes toward fruit consumption than students in the control groups ($M = 6.69$, $SE = .02$).

No differences were observed between the two groups in regard to intentions.

As for the behavior variables, no significant differences appeared between the two measurements in the variable frequency of sport/exercise involvement. However, in regard to time spent on sport-exercise participation per session, and after adjusting for differences prior to the intervention ($F_{1,543} = 63.5$, $p < .001$), there were statistically significant differences between the two groups ($F_{1,543} = 11.03$, $p < .001$). Students in the experimental group reported that they spent more time involved when they performed sport training/exercise ($M = 1.68$, $SE = .09$) than students in control groups ($M = 1.37$, $SE = .04$). No differences between experimental and control groups emerged in the fruit consumption variable.

Using perceptions of teachers' emphasis on task involvement as the dependent variable, the results of the analyses of covariance showed that, after adjusting for initial differences ($F_{1,566} = 122.3$, $p < .001$), there were statistically significant differences between the two groups ($F_{1,566} = 4.72$, $p < .05$). Students in the experimental groups had higher scores ($M = 3.95$, $SE = .07$) than students in the control groups ($M = 3.75$, $SE = .03$).

The analysis of covariance using perception of teachers' emphasis on ego involvement revealed that, after adjusting for differences prior to the intervention ($F_{1,566} = 121.4$, $p < .001$), there were statistically significant differences between the two groups ($F_{1,566} = 6.87$, $p < .01$). Students in the experimental groups reckoned that their teachers place less emphasis on social comparison ($M = 2.59$, $SE = .08$) than students of the control groups ($M = 2.83$, $SE = .03$).

No significant differences between the two groups appeared for ego orientation, task orientation, effort, and enjoyment in the lesson.

Differences Between the First and Third Measurement

Similar analyses as the above were repeated after the third measurement. The scores at the first measurement were used as covariates, the group (experimental or control) was the independent

variable, and the scores at the third measurement were used as dependent variables. No statistically significant difference between the two groups emerged.

Discussion

The present results caused mixed feelings. On the one hand, they showed that our instructions to the PE teachers -- about how to enhance students' positive attitudes towards exercise and healthy diet, and how to create a positive motivational climate -- were in the right direction. On the other hand, any effect was weak and disappeared 10 months after the intervention. Disappointing is the failure of the intervention to affect students' goal orientation, enjoyment, and effort in the lesson.

The positive effects of the intervention on all attitudinal measures support the effectiveness of the applied program. In accordance with previous studies, teaching students about the health benefits of exercise and proper nutrition had positive effects on students' attitudes towards exercise and proper nutrition (12, 13). The lack of significant effects on intentions, frequency of sport/exercise involvement, and fruit consumption could be partly ascribed to the absence of goals to facilitate involvement in out-of-school sport and exercise. The Greek PE curriculum has no link at all with students' involvement in extracurricular physical activities, and we had no permission from the Greek Ministry of Education to change the goals of the curriculum. Moreover, Greek senior high school is a preparatory period for entry into the higher education system, and thus most students are overloaded with homework and tend to participate in extracurricular-preparatory classes aimed at facilitating academic achievement, acquiring foreign languages, training on computers, and the like. We predicted that several parents would consider extracurricular goals for sport/exercise involvement would infringe on students' homework time and other extracurricular activities. Hence, we did not ask the PE teachers to set goals for out-of-school physical activity involvement.

The positive influence of motivational climate was encouraging. Our guidelines, regarding the development of a positive motivational climate, appear to be in the right direction. Nevertheless, the weak effects and the lack of influence on students' goal orientations, effort, and enjoyment in the lesson were rather disappointing findings. Part of the problem could be ascribed to a long teacher strike and student opposition to a new evaluation system. This led to several weeks of lost lessons, large-scale violence, and police repression, causing student disturbance during the whole academic year. In what remained of the academic year, and in only 45 min per week of lessons, any teacher would find it difficult to persuade these students about the importance of effort, enjoyment, and personal improvement in school.

On the other hand, it could be argued that the intervention would have no effects on goal orientations and student motivation in PE even if things were normal. So far, no study reported strong effects on goal orientations and motivation through participation in year-long PE classes. Goal orientations and intrinsic motivation generalize across different life settings (9, 40). Goal orientations in sport are closely connected with goal orientations in school (9). Based on the hierarchical model of intrinsic motivation (40), one could expect that effort and enjoyment in PE should be positively linked with effort and enjoyment in other academic subjects. It could be argued that strong effects on goal orientations, effort, and enjoyment in one school subject could emerge when the intervention takes place at a school level. Alternatively, it could be hypothesized that strong effects on students' goal orientations and motivation in PE could

emerge if we strengthen their importance in all domains of student action. Only in this case could high school students possibly perceive that serious involvement in PE is meaningful. At present, this is an assumption for further research.

The disappearance of the intervention's positive effects 10 months after the intervention should be considered rather expected, given the weak effects of the intervention and the fact that the intervention classes did not continue with the same teachers in the next academic year. This finding could lead to the suggestion that intervention programs for attitude-behavior change should last more than 1 year in order to achieve more permanent effects.

One unexpected finding was the increase in time spent for exercise/sport involvement per session for students participating in experimental groups. There is no definite interpretation for this finding. It could be caused by the information offered to the experimental classes concerning the appropriate time/intensity of physical activity for fitness improvement. Undoubtedly, any interpretation should be cautious, and further interventions measuring this variable are needed prior to any conclusion.

An important limitation of this study was the lack of systematic observations in experimental classes. This was partly due to the lack of an established observational system to assess motivational climate in PE. Nevertheless, one of the researchers visited the experimental classes several times and took interviews from students and teachers. This anecdotal evidence implies that the two teachers implemented the experimental program, and several times they actually imposed it. Although students acknowledged the usefulness of the intervention, they would prefer more time for play instead of participating in a structured lesson with theory and goals. The PE curriculum in Greek senior high school suggests that students choose 2-3 sports based on their own preference, and they are trained on these (14). No particular goals are suggested, and no evaluation of student learning-achievement is proposed. The combination of this curriculum with high school students' low motivation usually results in a rather loose situation. One has the impression that in senior high school, the PE lesson is time for relaxation and rest from cognitive involvement in other school classes. It was hard for the teachers implementing the intervention to change this view. Possibly the results would be different if the intervention lasted more than 1 year or if it started with earlier grades.

In any case, one could hardly expect clear-cut findings through a year-long intervention study. Several factors that are unknown to the researchers can possibly intervene and influence the results. From a strict methodological point of view, one can hardly control all possible influences. Nevertheless, the artificial environment of a laboratory study is far away from real life. Intervention studies are badly needed in order to test the effectiveness of our theories. Although better results were expected, this study offered important lessons to the researchers. Investigators interested in intervention studies should take notice of the present findings and make adjustments to their programs as needed. In the end, it could be argued that mixed findings from intervention studies should be more welcomed than no findings, due to lack of intervention studies.

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About the Authors

T. Christodoulidis <fillis@internet.gr>, P. Athanasios <sakispap@otenet.gr>, and N. Digelidis <nikdig@phyed.duth.gr> are with the Department of Physical Education and Sport Science at the Democritus University of Thrace, Komotini, 69100, Greece.

Triantafylos Christodoulidis received his diploma in physical education (Aristotle University of Thessaloniki), his Msc in sport science, and is currently a PhD candidate (Democritus University of Thrace). He has several years of experience as a handball athlete and coach, and as a physical education instructor. His major research interest is in the area of student and teacher motivation.

Athanasios Papaioannou received his diploma in physical education (Aristotle University of Thessaloniki), his Mphil, and his PhD (University of Manchester). Currently he is an assistant professor at the Democritus University of Thrace. His major publications are in the area of motivation in sport and physical education. He is a member of the managing council of the International Society of Sport Psychology.

Nikolaos Digelidis received his diploma in physical education (Aristotle University of Thessaloniki), his Msc, and his PhD (Democritus University of Thrace). He has several years of experience as a volleyball athlete and coach, and as a physical education instructor. His major research interests are in the areas of student motivation and physical education curriculum analysis.

