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INVESTIGATING THE ROLE OF PHYSICAL EDUCATION IN PHYSICAL ACTIVITY PROMOTION: AN ITALIAN MULTICENTER STUDY

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Abstract

Background. Physical education (PE) can be considered an instrument for active lifestyle promotion, and PE teachers can motivate youths to continue their studies in the field of Movement Sciences (MS).

Methods. To evaluate the role of PE in higher secondary school in promoting physical activity (PA) and MS career, previous PE experiences and current PA practice were investigated in a sample of Italian freshmen enrolled in different university degree courses.

Results. A total of 7,033 questionnaires were completed by students from 14 universities (41.3% **males**, mean age 20±2.76). Recreation seems to be the principal aim (42.2%) pursued during PE lessons, which are based mainly on practical activities (51.7%). 67.2% of respondents were satisfied with the PE received during higher secondary school and 51.6% participated in extra-curricular PA. Current practice of PA was reported by 58.1% of the sample. Extracurricular activities were associated with choice of MS curricula (OR 2.15, IC95% 1.85-2.50) and with current practice of PA (OR 1.68, IC95% 1.51-1.87). Geographical differences concerning lessons organization and satisfaction were registered ($P<.01$).

Conclusions. To enhance its role in health promotion, PE teaching should be improved by increasing the time allocated to PE and by strengthening the provision of school-based extra-curricular PA.

Introduction

There is significant evidence that numerous physical and mental health benefits are associated with physical activity (PA) and exercise. Many studies have documented that PA improves health status, playing a preventive role in cardiovascular diseases, cancer, diabetes and other chronic conditions.[1-5] In a large review, PA has been found to decrease the incidence of type 2 diabetes of 6%, the risk of colon cancer and breast cancer of 30-40% and 20-30%, respectively, contributing to reduce the relative risk of death from any cause by about 20-35%.[1]

Although it has been widely demonstrated that PA can have many protective effects, only few people **are aware of this and meet the guidelines** that recommend the daily movement pattern of moderate to vigorous activity to benefit health.[6-10]

Children and adolescents, in particular, frequently do not meet the recommended amount of 60 minutes of PA every day,[11-13] and PA levels decrease from youth to adulthood.[14,15] Data reported by the World Health Organization's cross-national survey on Health Behaviour in School-aged children (HBSC) show that in Italy the percentage of youths aged 11-15 years who meet these recommendations ranges from 6.9 to 8.2%.[16] In addition, the experience of PA is frequently confined to participation in a few training sessions of sport, which is not enough to ensure the daily requirement of PA.[17,18]

The health benefits of regular PA during adolescence are well known and include a better cardiovascular health and musculoskeletal fitness. PA can also facilitate weight control, prevent or treat symptoms of depression and anxiety, and reduce the likelihood of developing risk factors for chronic disease in adulthood.[19] Several studies suggest that physically active adolescents often become active adults.[20,21]

Schools are widely recognized as important institutions for the promotion of PA and fitness in children and adolescents.[22] By providing students with skills to engage in PA and contributing

to their weekly PA levels, physical education (PE) can play an important role in active lifestyle promotion, as well as providing **an instrument to improve motor skills and school performances.**[14,23-27] Furthermore, PE is the only venue where the least active children can experience PA at higher intensities.[28] It has been shown that positive PE experiences are associated with higher levels of leisure-time PA in young adolescents.[29,30] **In 2012, Sallis et al. coined the term "HOPE – Health Optimizing Physical Education" to highlight the role of PE in reaching public health goals. In this perspective, the school represents the most cost-effective public health resource to fight inactivity and the PE teacher has the opportunity to provide and promote PA.[19] Moreover, due to their unique position, physical educators can represent good or bad examples of healthy lifestyles for the students and also a role model to choose studies in Movement Sciences (MS) for their future career path.[31]**

Although PE is included in the formalized school curriculum worldwide, time and resources allocated to this teaching are frequently inadequate to promote PA in school-age and lifelong.[32,33] Where interventions aimed to enhance the role of PE were carried out, benefits for both students and community were registered.[34,35] Many of these interventions were also carried out in Italy, above all **in primary schools where the figure of PE teacher is lacking and the need for an external support in PE is higher.[36,37] In fact, in Italian primary schools, children aged 6-11 years participate in 1 or 2 hours of curricular PE lessons per week, supported by generalist teachers, while in secondary schools, students (11-19 years) participate in two hours of compulsory PE per week with teachers who have a specific curriculum and training in PE.[38]** In addition, national and local sport institutions and associations promote many school-based initiatives of extracurricular PA, in order to introduce different sports and increase the participation in organized sport outside the school.

However, little is known about the features of PE teaching and its efficacy in promoting **an active lifestyle** in our country.

In order to characterize PE teaching in Italy and to investigate its role in promoting PA and an MS career, the Working Group "Movement Sciences for Health" of the Italian Society of Hygiene launched a survey among university students aimed to investigate their previous PE experiences in higher secondary school and their motivations and satisfaction in PE participation. A pilot study was previously carried out involving freshmen in the city of Naples.[39] The present paper reports the results of the multicenter study aimed to extend the PE evaluation to the whole national area and to highlight possible geographical differences.

The aim is to draft a picture of the current organization of PE in the Italian higher secondary schools and to point out the weaknesses and strengths of PE, as resulting from the **beliefs** of the students, in order to evaluate whether PE in the Italian school system represents an instrument to enhance active lifestyles or whether substantial changes need to be addressed. Furthermore the study aims to analyze PE as a motivational factor for choosing MS curricula at university level.

Methods

Participants

A convenience sample of 7,087 freshmen was recruited from different degree courses of 14 universities distributed on the whole Italian territory (Figure 1). Students were selected on the basis of accessibility and proximity with Working Group researchers.

Questionnaire

An anonymous, self-administered questionnaire was used. Questions included demographic data and information about the current degree course and the secondary school attended

before university enrollment. In order to ensure an accurate recollection of participants' experience, only information about PE undertaken in the last two years of secondary school was collected. This information regarded the type and the main contents of PE lessons, the personal participation in extracurricular PA offered by schools, and the availability of gyms and equipment. **For the purposes of this study, the term "recreational activity" indicates any type of non-structured PA performed without the guidance of a teacher or a coach, and "sport activity" indicates structured and supervised PA. Beliefs** about PE teaching and personal PE experience were also asked, regarding the aim and the importance attributed to PE and the satisfaction perceived. **Furthermore, the current practice of PA was investigated: type of PA, average minutes and number of sessions per week.** On the basis of WHO recommendations, a student was defined active if he/she reported at least 150 min of moderate PA or 75 min of vigorous PA per week.[9] **Beliefs** about the influence of PE on the current practice of PA were also investigated.

Data collection procedure

The questionnaire was previously tested during the pilot study.[39] In the present study, it was administered during the first semester of the 2013-2014 academic year. At the moment of administration, a researcher explained the purpose of the study and emphasized the anonymity of the responses. Since the questionnaire was anonymous and self-completed, ethical approval was not required. Only the permission of the degree course director was obtained.

Data analysis procedures

A descriptive analysis was carried out to show the main features of the whole sample. Furthermore, data related to the PE personal experiences of the students and their **beliefs** about PE were also described and differences among groups coming from North, Center and

South regions of Italy were analyzed; comparisons were performed using the chi-square test with $P < .05$ as significance level.

In order to verify if some variables related to the PE received in the secondary school influenced the choice of university course and current PA practice, a multivariate logistic regression analysis was performed. The outcome variables were as follows:

- Choice of education area (Outcome 1): a binary variable was built by attributing the value 1 if the students belonged to MS degree courses, and the value 0 otherwise;
- PA practice at the time of the investigation (Outcome 2): a binary variable with the value 1 if the answer was "yes" and 0 otherwise.

All the outcomes were investigated separately using all the explanatory variables regarding PE experience (type of lessons, availability of gym/equipment, participation in extracurricular activities). The explanatory variables were selected by backwards selection using a limit value of $P < .05$ as significance level. Odds Ratios (ORs) and 95% Confidence Interval (CI) of differences between groups were considered. ORs were weighted for gender and age.

All the statistical analyses were performed with the SPSS software version 21.0 for Windows.

Results

A total of 7,033 (99.2% response rate) questionnaires were completed by freshmen of 14 universities. **Table 1** describes the distribution of some individual variables of the sample. Participants (41.3% males) reported a median age of 19 **years** (mean value 20±2.76 **years**) and came from five education areas. Almost half of the sample was enrolled in Universities from Northern regions of Italy (49.4%) and came from public secondary schools (94.8%), mainly from a lyceum (75.6%).

Table 2 summarizes the information regarding the organization of PE received at school. Answers are stratified by geographical area (North, Center, South) and p-values achieved by

comparing the sub-groups are reported. Overall, in the opinion of the students, the principal aim pursued during PE lessons was mainly recreation and, to a lesser extent, introduction to sports, but the students from central regions reported the achievement of psycho-physical wellbeing as the second main aim ($P < .01$). More than half of the sample reported practical activities only during PE lessons and another high percentage of respondents (>40%) declared both practical and theoretical lessons, with a similar pattern across the whole Italian territory. However, a higher proportion of students who did not report any type of lessons was registered in Southern regions compared to the others ($P < .01$). Volleyball is the most frequent activity practised during lessons, both in the whole sample and in the three subgroups, while differences were registered in the distribution of other sports ($P < .01$). Similarly, theoretical lessons regarded mainly anatomy in all the geographical areas, while other items were differently distributed ($P < .01$). About 90% of respondents reported the presence of a gym in the school, with no differences among the three areas ($P = .087$). Instead, while equipment was also present in the majority of schools, it appeared to be less frequently available in Southern than in Central and Northern regions ($P < .01$). More than half of the students declared their participation in PA proposed in extra-school time, with no geographical differences ($P = .074$) (**Table 2**).

Approximately 60% of the sample reported current practice of PA, independently of the place of origin ($P = .201$) (**Table 3**). However, in Central and Southern Italy, higher percentages of students reported practising sport at agonistic level, compared with Northern areas ($P < .01$) and this is reflected by the number of hours per week of PA ($P < .01$). Regarding their **beliefs**, more than half of the sample reported no or a modest influence of PE on their current personal PA practice, with some differences among areas ($P < .01$) (**Table 3**). However, the majority of the sample considered PE learning highly/moderately important, especially in

Southern regions ($P < .01$). More than two thirds of respondents were satisfied with the PE received, mainly in Northern regions ($P < .01$).

The multivariate regression models built to study the role of high school PE on the subsequent choice of education area and on the participation in PA, showed that, excluding gender, only extracurricular activities performed during the attendance of the secondary school were associated with the choice of MS curricula at university level (OR 2.15, IC95% 1.85-2.50) and with the current practice of PA (OR 1.68, IC95% 1.51-1.87) (**Table 4**). The models were fitted on 6,425 and on 6,355 complete observations, respectively.

Discussion

The present study was carried out to draft a picture of PE teaching in the Italian higher secondary school, as resulting from the **beliefs** of the students. **A first aim was to highlight possible geographical differences in equipment availability, teaching conditions and students' perceptions. Furthermore, the role of PE in determining the choice of future university studies and PA practice was evaluated.**

The very high response rate of the survey (99.2%) was probably favored by the active participation of the investigators, constantly present in the classroom during the questionnaire administration in order to explain the aims of the study.

The picture of PE that emerges from the study shows some differences within the country. **In general, PE lessons are seen as a moment of recreation in all the geographical areas, with percentages higher in the Center and South in comparison with the North. This can not be considered a negative aspect, but represents a limitation of PE teaching which should also provide information regarding the benefits of PA and the knowledge useful to introduce students to sports and PA outside the school context. In many cases teachers leave students free to undertake non structured physical activities during PE**

hours, without the recommended integration between theory and practice, thus failing in part to fulfil their important role as motivators of young people to the practice of PA.[22] Students from Southern areas declared higher levels of missing PE lessons, in accordance with a lower availability of equipment; this is probably related to the lower satisfaction declared. Nevertheless, this group considers PE highly important, also in addressing the choice to practise PA outside the school context.

The greater part of the respondents are currently engaged in PA, although the percentage of active students (58.1%) is not consistent with the data provided by the Italian Institute of Statistics in the investigation carried out in 2014 (www.istat.it/it/archivio/128694), which is around 74% for persons aged 18-24 years. However, in our sample, females, who always show lower levels of PA compared to their male counterparts, are more represented and, in addition, only students enrolled at University are included. Interestingly, although the declared PA participation is about the same in the different areas of the country, the practice of agonistic activities is significantly higher in the Center and South than in the Northern areas. This could be related to the higher number of students from Movement Sciences courses belonging to the Center and Southern subgroups (data not shown), who could be more inclined to practise agonistic PA.

Modalities of PE teaching in the higher secondary school partly affect the behaviors and choices of students; in fact the extracurricular activities offered by schools proved to be related to the choice of University course and to the current practice of PA. This result is in line with what was previously observed in the pilot study and highlights the role of school setting in movement promotion.[39] On the contrary, the role played by the curricular PE teaching does not seem as important, since it was not associated either with the choice of degree course or with the current participation in PA. **In accordance with Sanchez Oliva et al. and Meng et al., PE teaching could be an important tool to promote PA in young**

people in relation to the type of the learning environment created by PE teachers, who should favor the motivational processes to determine enjoyment and interest in PA, and stimulate students to increase autonomy, competence and, consequently, satisfaction in PE.[40,41]

The results of this study therefore point to the need to enhance PE teaching in the Italian school. This enhancement should be obtained through an increase of the time allocated to PE lessons and through their assignment to well-trained teachers, while extracurricular PA programs should be maintained and enhanced as a useful tool for PA promotion. Sallis et al. highlight that the quality of school PE can be improved through policies, teacher training, use of activities-focused "enhanced" curricula, and small class sizes.[19] **Hills et al. recognize the physical educators as key drivers of physical behavior change of youth, through an interactive teaching style, involving students, families and school staff.**[22] At the same time, our findings show that links with sport societies, sport promotion associations and institutions represents a good strategy and should be strengthened in order to promote sport participation in students and to increase their weekly PA levels. The high participation in school PA, including team and individual sports, academic clubs, and PE, is associated with adulthood PA.[42] Furthermore, scientific evidences show a positive association between academic performance and PA, with a positive influence on concentration, memory and classroom behavior.[43]

All these aspects have been considered in the recent Government Decree of the Italian Ministry of Education (www.labuonascuola.gov.it/) which resulted from a public consultation about the Italian school system. As regards PE teaching, this document foresees the introduction of the PE teacher with specific curriculum even in primary schools as a health policy, in order to increase social inclusion and promote the healthy and balanced growth of children and teens.[44] It is, in fact, well established that the expertise of PE staffing is

positively associated with better school PE and PA practices, including those outside the school.[45] The document has been recently approved by the Italian Parliament and it is hoped that its application will improve PE teaching in Italian schools.

Limitations of the study

This investigation involved only university students, and degree courses were chosen not randomly, but on the basis of availability in the Universities participating in the study. Moreover, we did not consider the social and economic conditions of the students. Finally, a part of the freshmen included in the North and Center subgroups may come from Southern regions, which is a common occurrence in Italy, and females were more represented. However, the large size of the sample may have reduced the effects of confounding and bias.

Conclusions

The study analyzed PE teaching in the higher secondary school and its possible influence on lifestyles and study choice in young adults. It was carried out on a wide sample recruited on the whole Italian territory and geographical differences were examined.

Our findings showed that PE is still not always considered and endorsed as an instrument for health promotion by students and, apparently, also by teachers. In addition, the lack of time and resources contribute to weaken its role, especially in the Southern area of the country.

In anticipation of the desired forthcoming innovations in the Italian school, extra-curricular school-based PA activities, by extending the time and effects of PE, seem to be a useful way to address youths toward active habits and professions.

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VARIABLES		N (%)
Gender	Male	2896 (41.3)
	Female	4117 (58.7)
Mean age (range)		20 (17-25)
Geographical area	North	3476 (49.4)
	Center	1153 (16.4)
	South	2404 (34.2)
Education area	Movement Sciences	1227 (17.4)
	Economics	581 (8.2)
	Sciences	2470 (35.1)
	Medicine	1414 (20.1)
	Liberal arts	1341 (19.0)
Higher secondary school type	Public	6632 (94.8)
	Private	362 (5.2)
Higher secondary school qualification	Lyceum	5297 (75.6)
	Technical school	1363 (19.5)
	Professional school	272 (3.9)
	Other	72 (1.0)

Table 1. Descriptive analysis of the freshmen sample.

VARIABLES		NORTH N (%)	CENTER N (%)	SOUTH N (%)	χ2 (*P*)	TOTAL
PE aim	Recreation	1,094 (34.8)	463 (46.7)	1,084 (51.3)	< .01*	2,641 (42.2)
	Sport introduction	838 (26.7)	198 (20.0)	401 (19.0)		1,437 (23)
	Wellbeing	497 (15.8)	280 (28.2)	403 (19.1)		1,180 (19)
	Acquisition of knowledge	496 (15.8)	32 (3.2)	96 (4.5)		624 (10.0)
	Physical aspect improvement	142 (4.5)	13 (1.3)	77 (3.6)		232 (3.7)
	Other	73 (2.3)	6 (0.6)	53 (2.5)		132 (2.1)
PE teaching	Practical lessons	1,792 (52.4)	573 (50.4)	1,210 (51.1)	< .01*	3,575 (51.7)
	Theoretical lessons	17 (0.5)	7 (0.6)	34 (1.4)		58 (0.8)
	Practical/Theoretical	1,517 (44.4)	509 (44.8)	956 (40.4)		2,977 (43)
	None	94 (2.7)	48 (4.2)	169 (7.1)		311 (4.5)
Activities	Volleyball	639 (30.0)	338 (48.8)	768 (50.0)	< .01*	1,745 (40.1)
	Football	495 (23.3)	33 (4.8)	113 (7.4)		641 (14.7)
	Basket	308 (14.5)	90 (13)	217 (14.1)		615 (14.1)
	Gymnastics	176 (8.3)	142 (20.4)	269 (17.5)		587 (13.5)
	Athletics	173 (8.1)	81 (11.7)	87 (5.7)		341 (7.8)
	Fitness	206 (9.7)	4 (0.6)	22 (1.4)		232 (5.3)
	Other	131 (6.1)	5 (0.7)	59 (3.8)		195 (4.5)
Theoretical lessons	Anatomy	778 (31.3)	241 (40.2)	538 (40.6)	< .01*	1557 (35.3)
	PE/sport history	573 (23.0)	109 (18.2)	103 (7.8)		944 (21.4)
	Nutrition	416 (16.7)	117 (19.5)	245 (18.5)		778 (17.6)

	Technical issues	377 (15.2)	40 (6.7)	262 (19.7)		595 (13.5)
	Physiology	342 (13.8)	92 (15.4)	178 (13.4)		537 (12.2)
Presence of a gym	No	323 (9.4)	116 (10.2)	278 (11.7)	.087	717 (10.3)
	Yes	3,113 (90.6)	1,027 (89.8)	2,097 (88.3)		6,237 (89.7)
Equipment availability	No	128 (4.0)	100 (9.4)	388 (17.8)	< .01*	616 (9.6)
	Yes	3,033 (96.0)	958 (90.6)	1,794 (82.2)		5,785 (90.4)
Participation in extra-curricular activities	No	1,716 (49.8)	536 (46.5)	1,126 (47.4)	.074	3,378 (48.4)
	Yes	1,732 (50.2)	616 (53.5)	1,251 (52.6)		3,599 (51.6)

Table 2. Information about personal PE experience of freshmen in higher secondary school. χ^2 test was used to compare subgroups from the three areas.

PE= Physical Education; * = p value less than significance level assumed.

VARIABLES		NORTH N (%)	CENTER N (%)	SOUTH N (%)	χ2 (*P*)	TOTAL
Current PA	No	1,479 (42.8)	449 (38.8)	1,002 (42.2)	.201	2,930 (41.9)
	Yes	1,978 (57.2)	709 (61.2)	1,372 (57.8)		4,059 (58.1)
	Agonistic level	984 (50.0)	418 (59.5)	929 (67.7)	< .01*	2,331 (57.6)
	Recreational level	986 (50.0)	284 (40.5)	443 (32.3)		1,713 (42.4)
	< 3 day/week	802 (40.4)	201 (28.7)	335 (24.4)	< .01*	1,338 (33.0)
	≥ 3 days/week	1,184 (59.6)	499 (71.3)	1,036 (75.6)		2,719 (67.0)
PE motivated current PA level	Highly	197 (9.0)	73 (9.6)	251 (15.5)	< .01*	521 (11.4)
	Moderately	524 (24.1)	202 (26.6)	475 (29.3)		1,201 (26.4)
	Modestly	765 (35.1)	257 (33.8)	463 (28.6)		1,485 (32.6)
	No	692 (31.8)	228 (30.0)	430 (26.6)		1,350 (29.6)
Importance attributed to PE	High	663 (19.2)	231 (20.2)	722 (30.2)	< .01*	1,616 (23.2)
	Moderate	1,224 (35.6)	395 (34.5)	830 (34.8)		2,449 (35.1)
	Low	1,172 (34)	395 (34.5)	639 (26.8)		2,206 (31.6)
	None	387 (11.2)	123 (10.8)	195 (8.2)		705 (10.1)
Satisfaction with PE learning	No	930 (27.2)	405 (35.7)	933 (39.7)	< .01*	2268 (32.8)
	Yes	2,492 (72.8)	731 (64.3)	1,415 (60.3)		4,638 (67.2)

Table 3. Current PA practice and **beliefs** about personal PE experience of freshmen in higher secondary school.

χ^2 test was used to compare subgroups from the three areas.

PE= Physical Education; **PA** = Physical Activity; * = p value less than significance level assumed.

		Dependent variables	
Independent variables		**Outcome 1 OR (IC95%)**	**Outcome 2 OR (IC95%)**
Gender	**Female**	*Reference*	*Reference*
	Male	.29 (.25 –.34)	.45 (.41 –.51)
Geographical area	**North**	*n.s.*	*n.s.*
	Center		
	South		
Higher secondary school qualification	**Other**	*n.s.*	*n.s.*
	Lyceum		
	Technical school		
	Professional school		
PE teaching	**None**	*n.s.*	*n.s.*
	Practical lessons		
	Theoretical lessons		
	Both		
Presence of a gym	**No**	*n.s.*	*n.s.*
	Yes		
Equipment availability	**No**	*n.s.*	*n.s.*
	Yes		
Practice of extracurricular activities	**No**	*Reference*	*Reference*
	Yes	2.15 (1.85 – 2.50)	1.68 (1.51 – 1.87)

Table 4. Results of the logistic regression analysis. **Outcome 1:** Choice of education area; **Outcome 2:** PA/sport practice.

Figure 1. Locations of the universities participating in the study.

REVIEWER RESPONSE

Manuscript number: JPAH.2015-0452

Manuscript title: INVESTIGATING THE ROLE OF PHYSICAL EDUCATION IN PHYSICAL ACTIVITY PROMOTION: AN ITALIAN MULTICENTER STUDY

Reviewer 1 comment	Author response	Modification
The article was insightful and provided necessary information about PE in Italy. My major concern with the paper overall is the language. It could use editorial review for sentence structure, grammar, and english translation.	We regret for these shortcomings. The paper has been professionally revised for structure, grammar and English translation.	Corrections have been made throughout the whole text.
Introduction: The opening sentence is misleading. Physical inactivity and physical activity are two separate variables and it cannot be assumed that the lack of physical activity = physical inactivity. Please provide a stronger opening that focuses on physical activity or the lack there of. Throughout the introduction, please use stronger statements with data to portray the need for this study and your research question. For example, newer information and statistics about physical activity and its benefits has been published since 2009. Providing newer information with percentages strengthens your argument.	In order to avoid confusion, we have modified the introduction and we have provided new references and data to strengthen the importance of physical activity and the motivations for our research.	The previous opening sentence has been deleted. New sentences regarding the benefits of physical activity providing more recent epidemiological data have been included at the beginning of the introduction (page 3, lines 2-8; page 4, lines 5-12).
Methods: Opinions or beliefs? Beliefs is the more common term used for variables such as motivation, satisfaction, etc. Throughout this section, there are a lot of misused english language terms/phrases making it a bit confusing.	We have replaced “opinions” with “beliefs” and we have reviewed the English language.	The term “opinion” has been replaced with “belief” and corrections to English translation have been made throughout the whole methods section.
Results: Great response rate. Oddly high - maybe provide a sentence in the discussion about why this is so high.	We have motivated this rate in the discussion.	A sentence regarding the high response rate has been added in the discussion (page 9, lines 14-16)
Please provide more information on your definition of recreation vs. sport and how did you represent the two on your survey. For example, you can play volleyball	To avoid misleadings, the two definitions have been clarified in the Methods section.	A sentence explaining the difference of the terms “recreational activities” and “sport activities” has been added in the methods section (page 6, lines 3-

for recreation or as a sport. If you play volleyball in PE directed by the teacher, is that a sport?		5).
Again, the misuse of the english language terms/phrases makes this section difficult to read and interpret. The necessary results appear to be included, but it would be helpful to review once this has been re-written.	As yet reported, the manuscript has been entirely checked for English grammar and translation. We hope that now it could be more clear.	Modifications have been made throughout the entire Results section.
Discussion: In reading the discussion, it provides a lot of information, but in some parts, it reads more like an extension of the results rather than digging in and explaining context, importance, and how other could use this information in their own studies/programs. I would also suggest choosing a few key findings to discuss rather than trying to cover all of them extensively. Write a statement about your key finding in the first line of the paragraph and then use the rest of the paragraph to explain. Please also present more information about other studies and their findings that are similar and dissimilar to yours as well. Do the same for each paragraph thereafter. It will help provide a concise view of why this is important and actionable.	Thank you for all these improving considerations. The discussion has been reviewed and the suggested modifications have been made.	A sentence reporting the main aims of the study has been added at the start of the discussion section (page 9, lines 10-13). Then, findings have been explained following this first statement throughout the section. Reference to other studies have been added (page 10, line 24 and 25; page 11 lines 1-4 and 10-12).

Reviewer 2 comment	Author response	Modification
Abstract: line 9: M has been used as abbreviation but it has not been yet introduced in the text	Thank you; The abbreviation has been eliminated.	"M" has been replaced with "males" (page 2, line 9).
Introduction: p.3 line 6: In the second sentence is written that "only few people know and meet..." It is not clear what do you mean, please explain.	Right, it was confusing. We have changed the sentence.	The term "know" has been replaced with "are aware of this". (page 3, line 10).
p.3 lines 22-24: The authors in the sentence started as: "by providing students..." concluded that it is "an instrument to progress better in the educational career" and refers to the 5 cited articles. I'm not sure which (if any) is about this issue, because, titles show only connections with first part of those sentence ("important role for active lifestyle promotion").	The term which was used was not correct: it has been replaced.	The term "educational career" has been changed with "school performance" and a more specific reference has been added (page 4, lines 2 and 3).
p.4 line 2-4 I would like to suggest that PE teachers also could be the role models for the students as good or bad examples of healthy lifestyles.	The concept has been included.	The role of PA teachers has been better explained with the help of a new reference (page 4, lines 5-12).
p.4 line 10-11 I'm not sure what for authors mean: "specific traning" for PE teachers. It could mean quite different for specialist from different countries with different PE curriculum; Please specify.	We referred to the lack of the figure of physical education teachers in the primary school. The sentence has been rephrased. We hope that now the concept appears more clear.	The lack of the physical education teacher in the Italian primary school has been highlighted in the sentences at page 4, lines 17-22.
p.4 line 18 I don't understand the phrases: "the culture of PA ...", I couldn't find such connection in literature.	Right, that was a confusing expression.	We have replaced "culture of PA" with "active lifestyle" (page 5, lines 1 and 2)
METHOD p.5 line 20 You mention that you asked in your questionnaire about current PA practice according to WHO recommendation, but in table we have also information about days/week - it was extra added question?	It's right. In the Methods section we have better explained the corresponding items of the questionnaire.	A sentence explaining what was asked to the students about current PA has been added in the Questionnaire section (page 6, lines 9-10).
p.6 line2 I wonder if the month of the academic year (e.g. October - December) plays any role in differentation of the level of PA in Italy, because it is important factor particularly in north part of the Europe?	We carried out the investigation in the first semester of the academic year to collect among freshmen information about their recent experiences at school. In the questionnaire we asked information about their general PA levels, without seasonal differences. Moreover, this item is interesting and could be examined in further studies.	
RESULTS Generely comment: The authors built the multivariate	We used as explanatory variables only those related to PE experiences in order to evaluate	

logistic regression model without satisfaction and importance of PE as explanatory variables; I wonder if you thought about adding, in my opinion, those two important factors? If not - why?	the effect of the learning on current lifestyle and educational choices. In our opinion also the asked beliefs, such as importance attributed to PE and satisfaction perceived, are a result of PE and not a determinant for adulthood decisions. Therefore, we did not include them in the analysis.	
P.7 line 10 "yrs" has been used twice as abbreviation or it is spelling mistake?	The abbreviations have been eliminated.	The abbreviations “yrs” have been replaced with “years” (page 7, line 20).
DISCUSSION p.9 lines 8-10 Why do the authors conclude that the recreational circumstance is not good for PE? It seems that you suggest that this is wrong direction. I understand that you try to underline that this is not enough, but I don't think that this is a wrong direction. p.9 lines 10 I don't know exactly what do you mean "lack of theoretical issue in many situations" - do you prefer theoretical PE classes? Or maybe classes based on interactive teaching and learning style, where students are the partners and they are responsible for the learning process too (constructivist teaching methods).	Thank you for these considerations. Our intention was to underline that frequently students live PE lessons as leisure time and do not receive the notions useful to sport introduction. The sentences have been motivated in the text. We hope that now the meaning of the term “recreation” does not appear negative and that the importance of theoretical issues seems to be well explained.	The meaning of the terms “recreational activity” and “sport activity” have been explained in the methods section (page 6, lines 3-5). In the discussion, the finding has been extensively explained (page 9, lines 19-25 and 10, lines 1-3).