

CHAPTER 4. PHYSICAL ACTIVITY & STUDENTS' MOTIVATION IN IMPACT PROJECT COUNTRIES

Main Study (T1 Measure)

Participants. In main study participants ($n = 12355$) were pupils from France ($n = 1207$), Greece ($n = 3066$), Italy ($n = 2554$), Spain ($n = 1358$), Turkey ($n = 3462$) and UK ($n = 708$), aged 9 to 18 years old (*MEAN* age: 13.75, *S.D.* = 1.96 years). Boys were 5882 and girls were 6297 (42 pupils answered "other", while 134 did not report their gender). We classified them in three age groups: (1) aged 10-12, $n = 1291$, (2) aged 13-15, $n = 6317$, and (3) aged 16-18, $n = 4675$ (72 did not report their age or educational level).

Measures. These pupils completed the invariant online measures stemming from the Pilot study:

- demographics (e.g., birthdate, age, gender, country, ethnicity, school, educational level, class),
- their socio-economic status (SES; FAS Revised; 7 items; Torsheim et al., 2016; FAS III; 1 item; Schnohr et al., 2008),
- the 2-item screening measure for PA (PACE+ Adolescent PA Measure; Prochaska et al., 2001), one item measuring hours per week spent in MVPA (Booth et al., 2001), sport type, days of PE in school per week,
- the Youth Activity Profile (YAP; Saint-Maurice & Welk, 2014; 5 items capturing PA inside school, 5 items capturing PA outside of school and 5 items assessing pupils' sedentary behaviors),
- an open-ended question measuring pupils' sport participation, one item measuring frequency of PE lesson per week (Saint-Maurice & Welk, 2015),
- the perceived motivational climate in PE Questionnaire (Papaioannou et al., 2007; 6 items for mastery climate and 6 items for performance avoidance climate; note: the performance approach scale was excluded due to its low correlation with PA in pilot study),
- the Basic Psychological Needs Satisfaction Questionnaire of Autonomy (Standage et al., 2005; 5 items), Competence (McAuley et al., 1989; 6 items) and Relatedness (Richer & Vallerand, 1998; 4 items),
- the Behavioural Regulation in Exercise Questionnaire 2 (BREQ 2; Markland & Tobin, 2004; 4 items for Intrinsic Motivation, 4 items for Identified Regulation, 4 items for Extrinsic Regulation and 4 items for Amotivation; note: introjected regulation was excluded due to its low correlation with PA in pilot study),
- the Achievement Goals in PE (Duda & Nicholls, 1992; 7 items for Task Orientation and 6 items for Ego Orientation),
- the Physical Activity Enjoyment Scale (PACES; Motl et al., 2001; 6 items for Positive Affect and 6 items for Negative Affect in PE; note: 4 items with lower correlations with other variables were excluded to reduce completion time),
- their Intentions to be active in leisure-time (Standage et al., 2003; 3 items),
- their Perceived Behavioral Control (Hagger et al., 2009; Rhodes & Courneya, 2005); 3 items,
- their Attitudes to be physically active (Hagger et al., 2009; 4 items),
- the Social Support Scale to be physically active (Dewar et al., 2013; 4 items for Friend Support and 4 items for Family Support),
- the Action Planning leisure-time PA scale (based on Dombrowski & Luszczynska, 2009; Nurmi et al., 2016; Sniehotta et al., 2005; 5 items),
- the Self-Monitoring scale (Sniehotta et al., 2005 2 items; Theodosiou & Papaioannou 2 items),
- the Subjective Vitality (Ryan & Frederick, 1997; 5 items) and an open-ended item measuring pupils' most important barrier to be active in their leisure-time. More details about the measures can be found on our website (www.impactpe.eu/site/index.php/en/measure/surveys).

Physical Activity

The present results suggest that the vast majority of the pupils (87.6%) do not meet the latest World Health Organization's (WHO) PA activity recommendations for 7 hours of moderate to vigorous-intensity PA per week (Figure 4.1). Unfortunately, one every three European pupils reported that they were totally inactive (0-1 hours of physical activity per week).

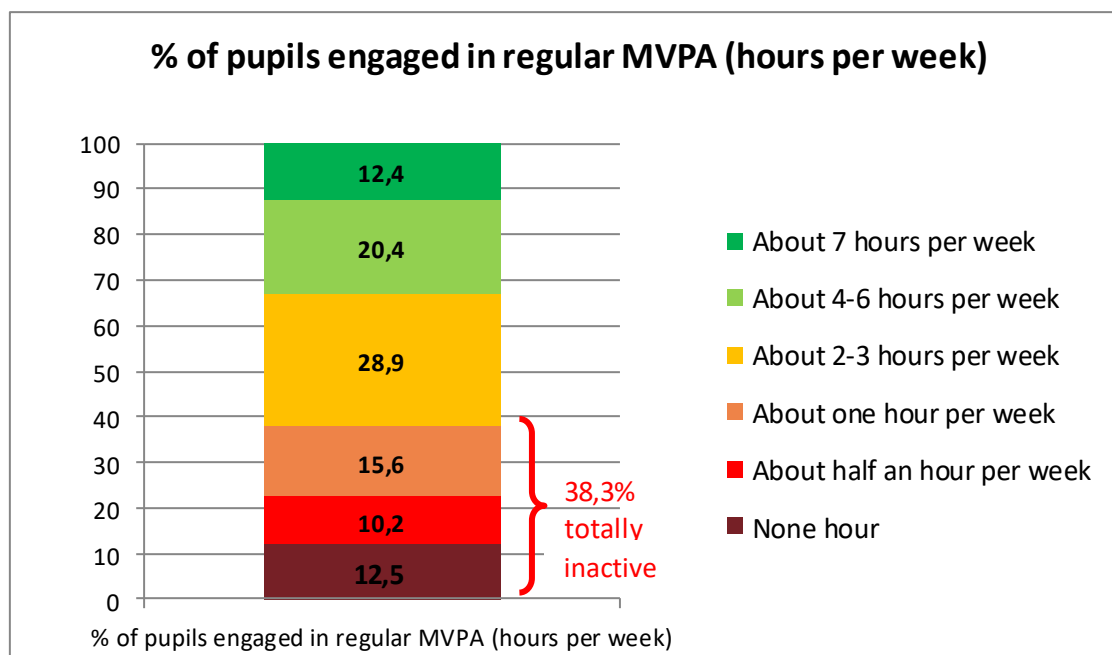


Figure 4.1. T1 Measure - Main Study: Percent (%) of pupils engaged in regular MVPA (hours per week)

Pupils' Sport Participation

Participants responded to an open-ended question (*"Please write in which sports/ physical activities you participate this year?"*). From the total sample responding on T1 Measure, 9615 pupils (aged 9 to 18 years old from 6 European countries, FR, GR, IT, SP, TR, UK), completed this item capturing their sport participation (Table 12). Based on their answers we classified participants to the sports shown in Table 4.1.

Almost 40% of the sample participated in team sports such as football, basketball, volleyball and handball. Football is by far the most favorable sport in adolescence attracting most participants ($N = 1785$; 18.6%), followed by equal numbers of basketball and volleyball young athletes (9.1% in each sport respectively). Regarding individual sports, the most popular are martial arts, gym activities, dance, tennis, gymnastics, and track and field. A large number of the sample reported that they did not participate in any sport ($N = 1375$; 14.3%) while most of the pupils who did not reply to this item ($N = 2740$, 22.2% of the total sample) probably did not participate in any sport too. Moreover, a considerable number of pupils ($N = 555$; 5.8%) did not participate in an organized sport but they reported that they were doing walking, running or exercise in home.

Table 4.1. Pupils' Sport Participation

Sports	Frequency	Percent	Cumulative Percent
Nothing	1375	14.3	14.3
Football, indoor football	1785	18.6	32.9
Basketball, korfbal	871	9.1	41.9
Volleyball	872	9.1	51.0
Swimming, artistic swimming	541	5.6	56.6
Handball	163	1.7	58.3
Martial arts (karate, judo, wrestling, TKD, boxing)	552	5.7	64.1
Track & field	301	3.1	67.2
Dance (ballet, hip hop, Latin)	689	7.2	74.4
Gymnastics (rhythmic, trampoline, acrobatics)	237	2.5	76.8
Tennis (table tennis, badminton, squash)	403	4.2	81.0
Gym (aerobic, Zumba, yoga, Pilates, cheerleading, CrossFit, weight lifting)	638	6.6	87.6
Rowing (canoe kayak)	16	.2	87.8
Cycling	147	1.5	89.3
Climbing	58	.6	89.9
Shooting	4	.0	90.0
Parkour	7	.1	90.1
Water polo	24	.2	90.3
Walking, running, exercise at home	555	5.8	96.1
Sailing	9	.1	96.2
Skating (ice skating, skateboard, roller skating, figure skating)	71	.7	96.9
Fencing	9	.1	97.0
Horseback riding	81	.8	97.8
Archery	33	.3	98.2
Skiing	34	.4	98.5
Baseball, rugby, cricket	74	.8	99.3
Triathlon	13	.1	99.4
Hockey (ice hockey, field hockey)	13	.1	99.6
Dodgeball	20	.2	99.8
Netball	11	.1	99.9
Human Towers	1	.0	99.9
Frisbee	8	.1	100.0
Total	9615	100.0	

Gender and Age groups differences in Physical Activity

All findings concerning Moderate to Vigorous intensity Physical Activity (MVPA) revealed that boys were more physically active compared to girls (Figures 4.1 and 4.2).

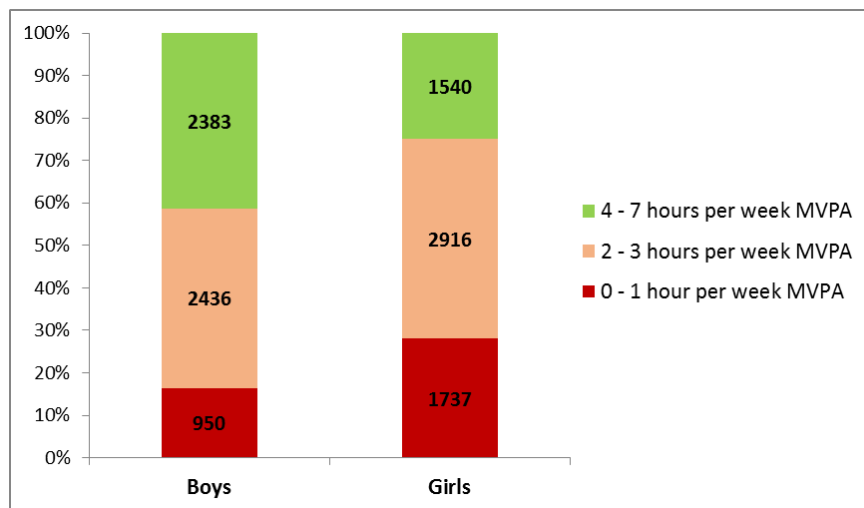


Figure 4.1. Number and percentage of boys and girls who are physically active (MVPA) and inactive out-of-school

After splitting pupils' sample into 3 groups based on their reported age (Group 1: 10 to 12 years old; Group 2: 13 to 15 years old; Group 3: 16 to 18 years old), results showed significant age group differences in all measures of PA, with younger pupils reporting higher levels of PA compared to older pupils.

Girls and older pupils are more inactive outside of school

% boys/ girls who exercise 0-1 or 2-3 or 4-7 hours/week

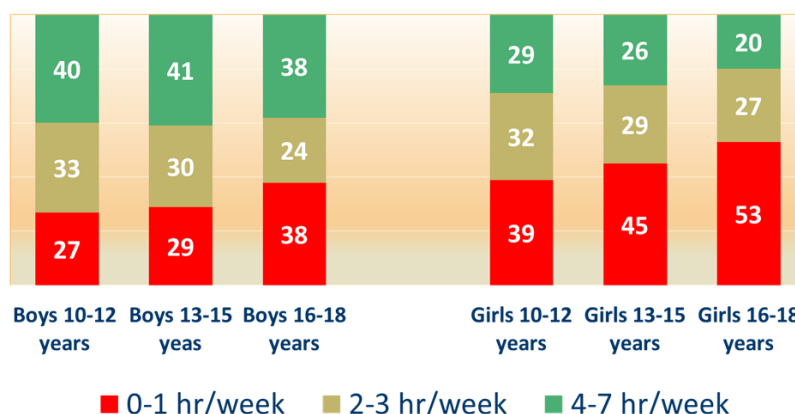


Figure 4.2. Percentage of pupils per age group and gender who are inactive (0-1 hours/week MVPA) or relatively active (4-7 hours/week MVPA) in their leisure time

As shown in Figure 4.2 more than 50% of girls aged 16-18 were totally inactive in their leisure time, while 39% of girls were totally inactive in the age group 10-12 years old. Likewise, 38% of boys 16-18 years old were totally inactive, while 28% of boys 10-15 years old were totally inactive. Only 20% of girls 15-18 years old reported that they were relatively active. Across all age group similar percentage of boys reported that they were relatively active (38%-41%).

Number of Days with Physical Education (PE) classes per week and pupils' PA

Across the six countries most of the pupils (58%) have 2 days with PE per week. A substantial number of pupils (38%) have just one day of PE per week, while a negligible percentage of pupils (4%) reported more than 2 days of PE per week.

Still, there are important differences between countries in the days of PE per week. The least days of PE per week were reported in Italy and Turkey, where the majority of the pupils reported one day of PE per week. The most days with PE per week were reported in Greece, but even here there were just two days per week for 90% of the Greek pupils, while 7% of the Greek pupils reported one hour per week (these were pupils in the 11th grade, aged 16-17).

Table 4.2. Number of days with Physical Education per week

PE days/ Week	UK		France		Greece		Italy		Spain		Turkey		total	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%
1	216	32	201	17	216	7	1498	59	321	24	2068	63	4520	38
2	369	54	934	79	2730	90	993	40	1009	75	951	29	6986	58
3	87	13	27	2	76	3	35	1	7	0	64	2	296	2
4	7	1	20	2	8	0	9	0	12	1	213	6	269	2
TOTAL	679		1182		3030		2535		1349		3296		12071	

Importantly, adjusting for age differences, the number of days of PE per week was positively related to total hours of MVPA in outside school PA. As shown in Figure 4.3 just one additional day per week lead to considerable increase of pupils' MVPA in out-of-school PA.

In the group of 15-17 year old pupils (n = 4266) and more specifically in the subgroup (n= 2069) of pupils reporting one day of PE per week there were more physically inactive pupils in out-of-school PA (0-1 hours/week = 52%) than in the subgroup (n= 2197) reporting 2 days of PA per week (0-1 hours/week = 36%). On the other hand, in the group of 15-17 year old pupils reporting one day of PE per week there were less active or relatively physically active pupils in out-of-school PA (4-7 hours/week = 24%) than in the group reporting 2 days of PA per week (0-1 hours/week = 37%).

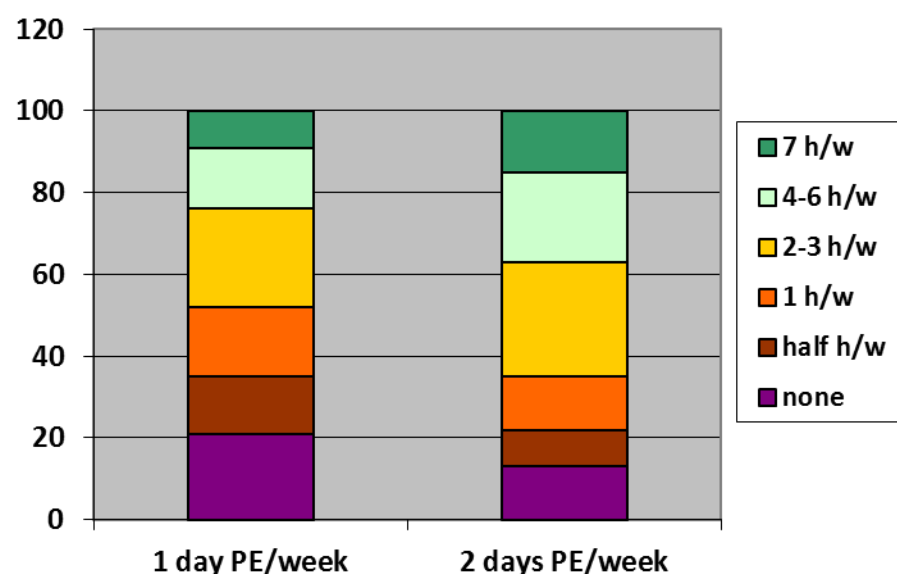


Figure 4.3. Relationship of days of PE per week with out-of-school MVPA for 15-17 year olds

Physical Activity per Country

One should be relatively cautious to make direct comparisons between countries in pupils' levels of self-reported physical activity due to lack of scalar invariance between countries in these measures. The findings are reported here to compare them with objective measures of PA reported later. Together, they imply that Greek pupils might be relatively more physically active than pupils in Italy and maybe in Turkey due to more days of PE per week. Moreover, as is explained below, levels of inactivity are positively linked to pupils' Socio-Economic Status. Hence, the relatively higher level of inactivity in Turkish adolescents shown in Figure 4.4 might be partly ascribed to lower levels of Turkish pupils' SES in relation to other European pupils.

Physical Activity by country

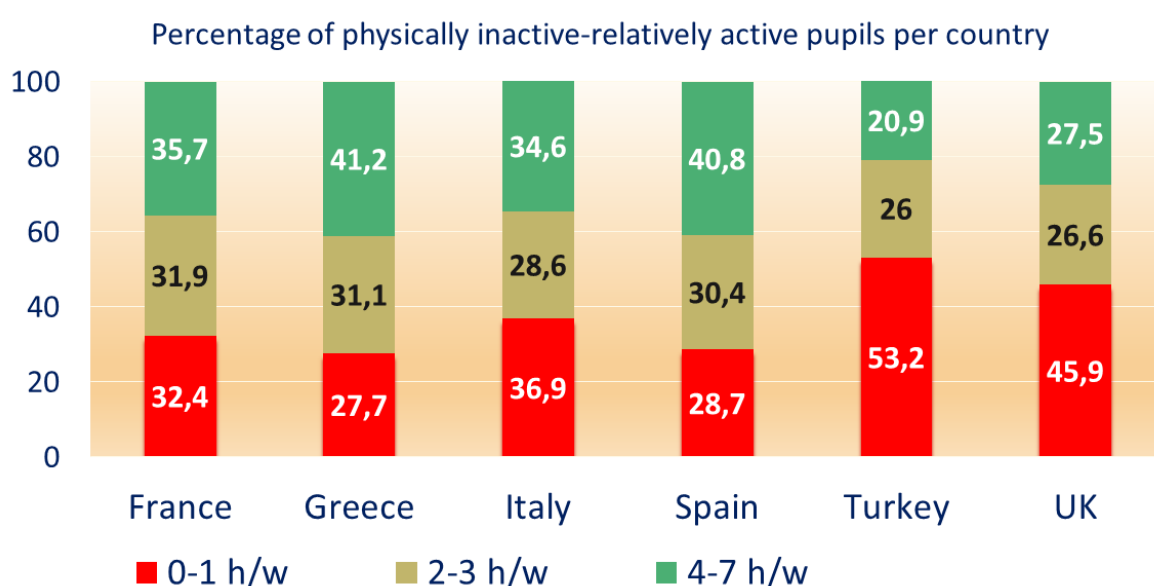


Figure 4.4. Hours of Moderate to Vigorous Physical Activity per week reported by pupils across the six countries

Pupils' Barriers to be Physically Active

Regarding barriers to be physically active, 8857 pupils, aged 9 to 18 years old from the 6 European countries (FR, GR, IT, SP, TR, UK), responded to an open-ended item (*"Write the MOST IMPORTANT reason that prevents you from doing REGULAR SPORT OR EXERCISE. Write it immediately, the first one that comes to your mind"*) in order to capture the most important barrier in order to be physically active (Tables 4.3 & 4.4).

- **Almost half of the pupils** reported that **no free time** (other obligations) and **homework-preparation for school** (reading, out of school classes) were the most important barriers to be physically active ($N = 4000$; 45.2%).
- A large number of pupils (totally 31.6% of the total sample) reported **personal - internal barriers**, such as I do not like sport, I do not want it (4.9%) or I feel boring, tired, lazy (13.1%) or I have motor difficulties, I am injured - ill (11.1%), or use of video games, computers, TV (2.5%).
- A considerable percentage of pupils (**8.7%**) mentioned that the most important barriers for PA were linked to **lack of support and low Socio-Economic Status (SES)**, such as no support from family, no place around for training, lack of vehicle for transportation, expensive for participation and no equipment.

Table 4.3. Pupils' Barriers to be physically active

Barriers	Frequency	Percent
Homework (reading, out of school classes)	2653	30
No free time (other obligations)	1347	15.2
Bored, tired, lazy, sleep	1160	13.1
Motor difficulty, injury, health issues, ill, obesity	985	11.1
Nothing (no barriers)	986	11.1
I do not like it, I do not want, it's hard	434	4.9
No support (family, friends, significant others)	324	3.7
No place around for training, distance, training time	245	2.8
TV, video games, computer, mobile phone	221	2.5
Weather	180	2.0
Bullying, make me shame, anxiety, fear of failure, negative thoughts	93	1.1
No vehicle (car, transportation)	86	1.0
Money-related reasons (expensive)	73	.8
No sport equipment	37	.4
Coaching (emphasis on championship-competition)	16	.2
Food related reasons	11	.1
Religious reasons	6	.1
TOTAL	8857	100.0

Table 4.4. Pupils' Barriers to be physically active per Country

	Country						Total
	U.K.	France	Greece	Italy	Spain	Turkey	
Homework for school	5.9%	10.7%	38.5%	44.4%	23.5%	23.6%	30.0%
No free time	13.8%	24.5%	17.8%	12.1%	21.7%	11.5%	15.2%
Boring, tired, lazy	20.2%	18.9%	7.5%	10.9%	22.8%	14.8%	13.1%
Nothing no barriers	2.6%	6.8%	11.9%	5.4%	5.5%	17.1%	11.1%
Motor difficulty injury health issues obesity ill	16.3%	12.0%	8.8%	12.3%	11.0%	11.5%	11.1%
I do not like, it's hard	4.6%	8.2%	1.2%	8.0%	2.5%	5.8%	4.9%
No support from family, significant others	6.1%	4.1%	5.7%	.6%	4.8%	3.1%	3.7%
No place around for training, distance, training time	1.8%	1.9%	3.0%	.5%	.4%	4.7%	2.8%
TV video-games computer mobile	12.2%	5.0%	1.2%	1.5%	4.8%	1.8%	2.5%
Weather	4.3%	4.3%	1.2%	1.0%	.7%	2.7%	2.0%
Bullying failure, negative thoughts	5.1%	.8%	.3%	1.4%	1.6%	.9%	1.1%
No vehicle no car for transportation	1.0%	1.9%	1.6%	1.1%	0.0%	.3%	1.0%
No money, expensive	1.3%	.7%	.8%	.7%	.5%	.9%	.8%
No equipment	.5%	.1%	.2%	0.0%	.2%	1.0%	.4%
Coaching, too much competition	0.0%	.1%	.3%	0.0%	.2%	.2%	.2%
Food	2.8%	0.0%	0.0%	0.0%	0.0%	0.0%	.1%
Religion	1.5%	0.0%	0.0%	0.0%	0.0%	0.0%	.1%
TOTAL	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Nevertheless, there were important differences between countries in the most important barriers for Physical Activity reported by pupils (Table 4.4). Pupils from Greece and Italy were the most likely to report barriers related to lack of time and homework/preparation for school (56.6%), while UK pupils were the least likely (19.6%) to report lack of time and homework. On the other hand, UK pupils were the most likely to report internal reasons (53.3%), while Greek pupils were the least likely to report internal reasons (18.6%). While about 10%-11% of pupils from Greece, Turkey and UK reported barriers related to low SES as more important reasons for PA, just 3% of Italians reported the respective barrier.

Differences between schools in Physical Activity

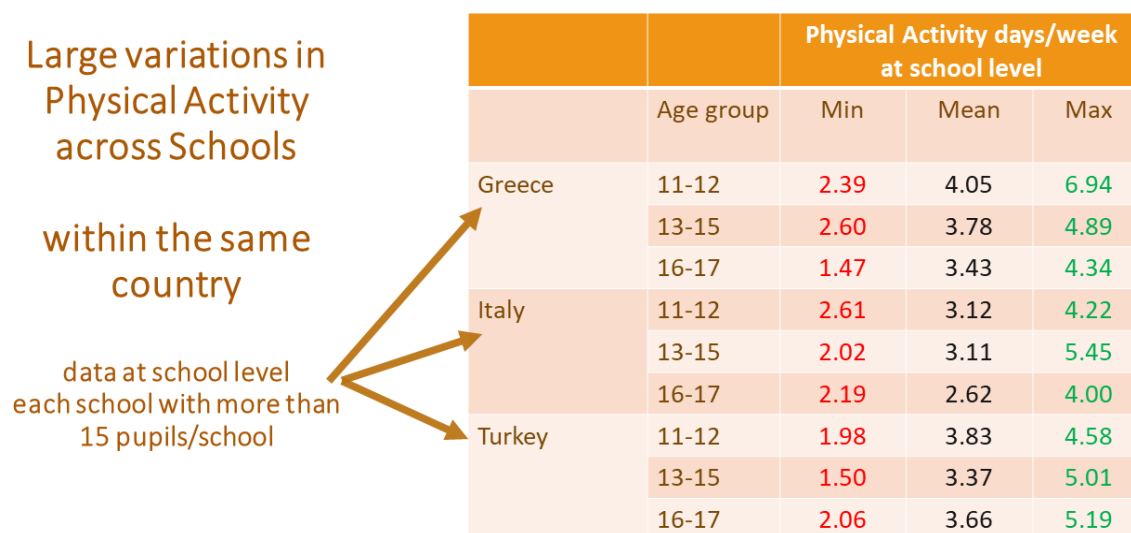
Adjusting for country and age-group differences, large between-school significant differences in Physical Activity (PA) emerged, explaining considerable amount of variance that varied from 12% to 21% due to school differences within the same country and age group.

We focused particularly on school averages in PA stemming from more than 15 pupils from the same school. As shown in Photo 4.1, within the same country and age group there were schools whose average PA varied between 2 and 3 days per week, indicating schools that were characterized by very high levels of PA and school characterized by very low levels of PA.

Pupils in schools with very high levels of PA were very active in sports, while pupils in school with very low levels of PA were not involved in any sport. Following discussions with some PE teachers, it emerged that there were schools in neighborhoods of big towns or villages where no sport clubs were active, thus precluding opportunities for your pupils to participate in sports in these areas.

Another cause of school differences in PA is the different Socio-Economic Status (SES) of pupils across different schools. Some of these schools are located in low SES areas while other schools are located in high SES areas. As shown below, SES differences explain large differences in pupils' PA.

These findings indicate that policy makers can use the short IMPACT measure to monitor schools' PA and support those schools with specific policies to increase pupils' levels of PA.



Within the same country & within the same age group there were schools with less than 2 days of Physical Activity per week at the average school level
...and schools with more than 5 days of Physical Activity per week at the average school level
These schools (and probably their neighborhoods) need different kind of support & resources!!!

Photo 4.1. Between school differences in Physical Activity. Adjusting for age and country differences

Pupils' Self-reported PA Levels and Socio-Economic Status (SES)

Using the FAS Revised version we calculated pupils' Socio-Economic Status (SES) mean score. Then, based on their answers we divided them into three groups according to their SES score:

- low SES = the lowest quartile (n = 2610)
- moderate SES = pupils ranging in SES scores between 24.8%-81.4% (n = 5824)
- high SES = the top 18.6% (n = 1935)

The level of SES was unequally distributed among the six countries. A considerable percentage of Turkish pupils (45%) was classified in the low SES group, while less than 13% was the percentage of French, Spanish and Italian pupils that was classified in this lowest SES quartile.

Table 4.5. Percentage of pupils classified in the three SES groups per country

	country						Total
SES	UK	France	Greece	Italy	Spain	Turkey	
Low	27.6%	7.6%	20.3%	13.1%	12.9%	45.0%	25.2%
Moderate	50.1%	50.0%	64.3%	58.5%	52.3%	50.6%	56.2%
High	22.3%	42.4%	15.4%	28.4%	34.8%	4.4%	18.6%
	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Analyses across all PA measures revealed that the lowest the SES the highest the physical inactivity. As shown in Figure 4.5, low SES pupils were 2,2 times more physically inactive in comparison to high SES pupils. In fact, one in every two low SES pupils (51.4%) was absolutely inactive (0-1 hours per week). Pupils with moderate SES were 1,6 times more inactive in comparison to high SES pupils. Pupils with high SES were (i) 2 times more likely to be relatively active in comparison to low SES pupils, and (ii) 1,4 times more likely to be relatively active in comparison to moderate SES pupils.

Socio-Economic Status and out of school Physical Activity

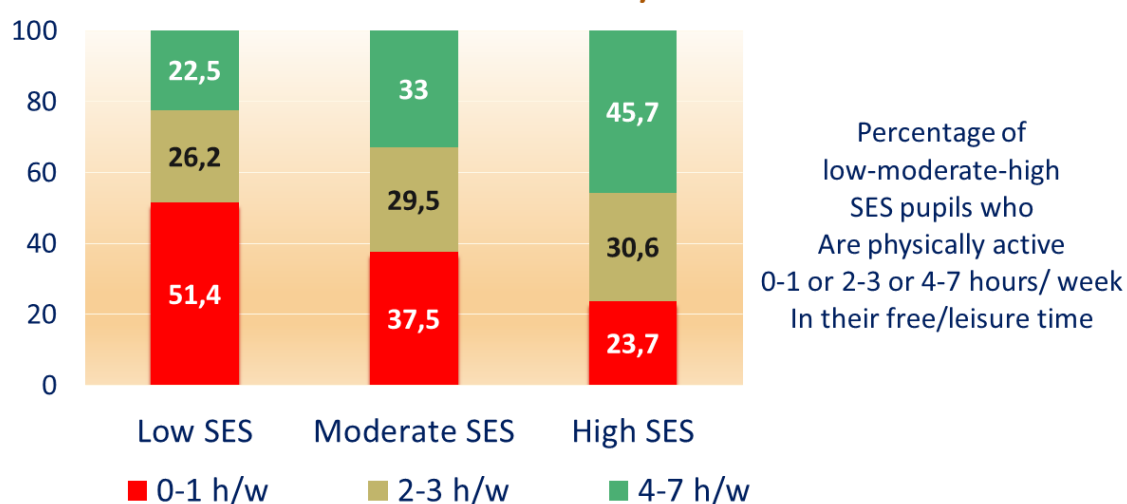


Figure 4.5. Percentage of low-moderate-high Socio-Economic Status (SES) pupils who are physically inactive/active out-of-school

Correlation analysis between pupils' self-reported PA and psychosocial predictors

Psychosocial measures delivered in the main study of this project were significant positive correlates of physical activity according to expectations (Table 4.6). With the exception of performance avoidance climate, all psychosocial variables were positively correlated to PA. Some of these relationships were very low, which was also in line with expectations: PA had very low positive relationship with ego orientation and very low negative relationship with external regulation and amotivation in PE. The findings confirm that interventions targeting these variables, like the intervention reported in this report, are important to promote PA.

Table 4.6. Correlation analysis between pupils' self-reported PA and psychosocial variables

	Youth Activity Profile (YAP)	PACE+ Adolescent PA Measure
Mastery-oriented climate in PE	.17**	.09**
Performance-avoidance climate	.02	.00
Autonomy need support	.16**	.14**
Competence need support	.32**	.29**
Relatedness need support	.22**	.18**
Task Orientation in PE	.24**	.19**
Ego Orientation in PE	.11**	.12**
Intrinsic Motivation in PE	.27**	.24**
Identified regulation in PE	.25**	.20**
External regulation in PE	-.05**	-.07**
Amotivation in PE	-.08**	-.08**
Positive Affect in PE	.27**	.22**
Negative Affect in PE	-.17**	-.15**
Vitality	.35**	.30**
Intention to do PA	.44**	.47**
Perceived Behavioral Control	.42**	.43**
Attitudes towards PA	.32**	.30**
Friend Support	.38**	.33**
Family Support	.39**	.34**
Action Planning	.45**	.42**
Self-Monitoring	.48**	.46**
PA prevention due to barrier	-.20**	-.24**

** $p < .001$; PA: Physical Activity

Gender Differences in motivational variables in PE, affect in PE, well-being

As was expected, boys exhibited a more positive motivational profile in PE in comparison to girls. For example, they were more intrinsically motivated in PE, they had higher positive affect and lower positive affect in PE than girls. This more positive motivational profile seems to be linked with boys' higher perception that their needs are satisfied in PE in comparison to girls. Importantly, boys also reported higher vitality than girls (Figure 4.6).

Boys are generally more motivated in PE and they have higher vitality than girls

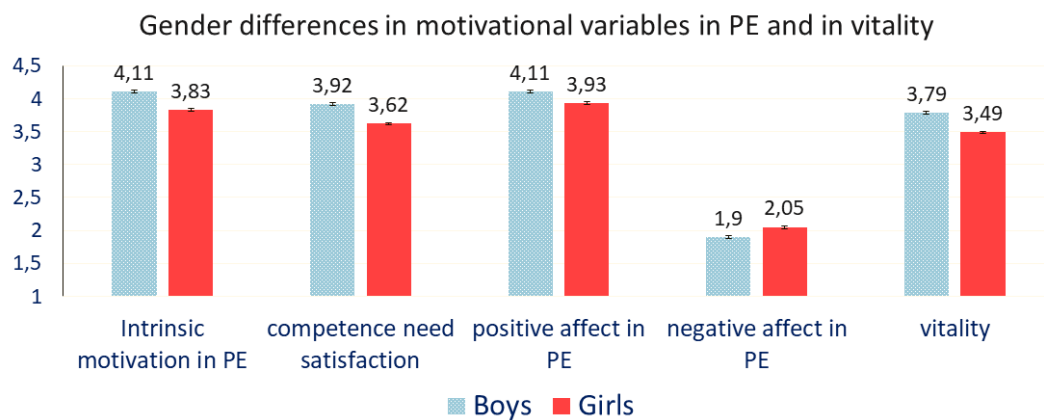


Figure 4.6. Significant gender differences in motivational variables in PE and in vitality (for all differences: $p < .001$)

Age Group Differences in motivation in PE

In general, younger pupils aged 10-12 years old were more motivated in PE than older pupils. For example, pupils aged 10-12 years old had higher scores in intrinsic motivation and positive affect in PE but lower scores in amotivation and negative affect in PE (Figure 4.7). These differences correspond to similar age differences in satisfaction of needs for competence: 10-12 years old pupils felt that their needs for competence were more satisfied than their older counterparts.

Pupils 10-12 years old are generally more motivated in PE than older pupils

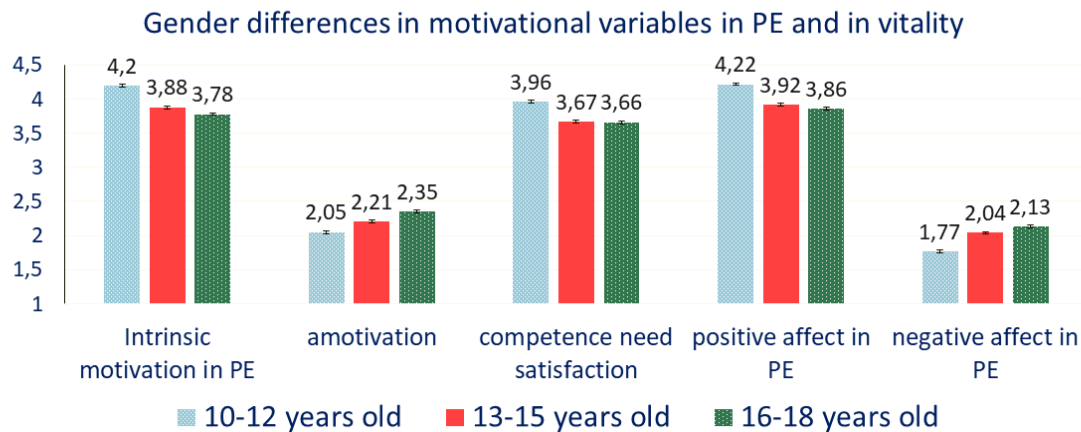


Figure 4.7. Age group differences on pupils' motivational variables (all difference significant at $p < .001$)

Differences in school PA, motivation in PE, and in vitality among pupils with different sport and out-of-school PA experiences

It is known that pupils with sport experiences are more motivated in PE (e.g., Papaioannou 1997). Hence, it was important to examine if out-of-school sport/physical activity experiences has an impact on European pupils' PA levels in school, their motivation in PE and their well-being. Therefore, we divided the sample into three (3) groups based on the hours spent per week in MVPA (totally inactive: 0 to 1 hour PA per week; rather inactive: 2 to 3 hours PA per week; active or rather active: 4 to 7 hours per week). After adjusting for age and gender differences, results from Multivariate Analyses of Covariance shown below indicated that, the more physically active in out-of-school contexts were the pupils:

- the more physically active they were also in school ($F_{2, 7333} = 56.9, p < .001$),
- the more intrinsically motivated they were in PE ($F_{2, 7333} = 133.6, p < .001$),
- the more task oriented (pursuing mastery goals) they were in PE ($F_{2, 7333} = 97.1, p < .001$),
- the more positive emotions & enjoyment they had in PE ($F_{2, 7333} = 122.1, p < .001$),
- the less negative emotions they had in PE ($F_{2, 7333} = 96.4, p < .001$),
- the greater the vitality ($F_{2, 7333} = 190.2, p < .001$) they feel in their life.

Pupils who are not physically active in leisure time are less active in school, less motivated in PE and with lower vitality than more active pupils

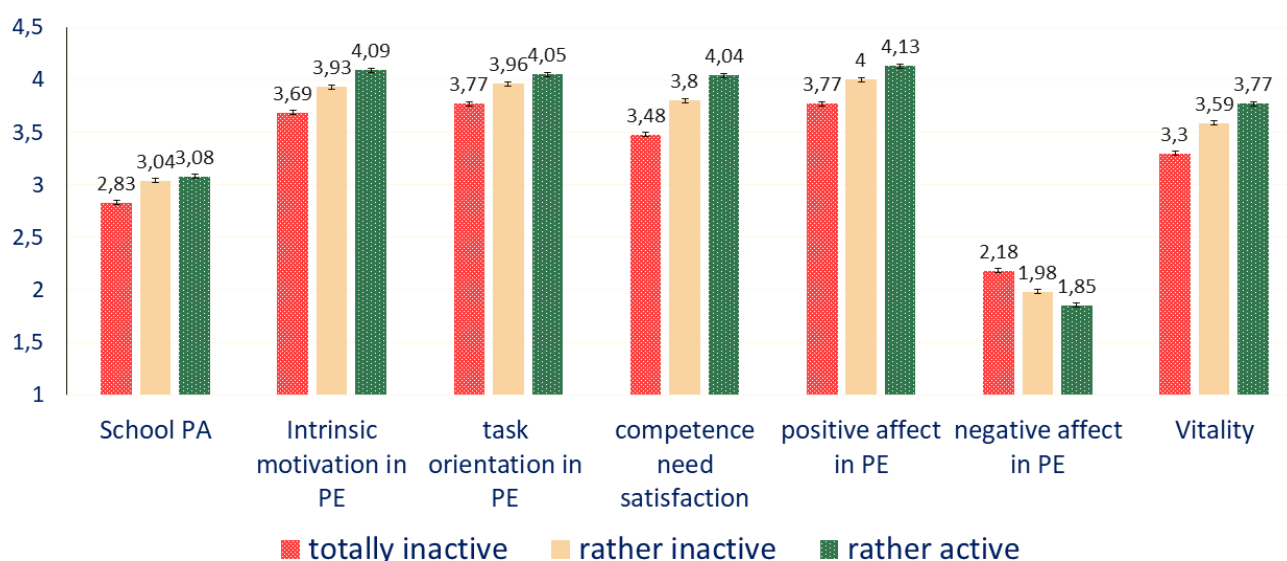


Figure 4.8. Significant differences in PA in school, motivational variables in PE, and vitality among more and less inactive pupils in out-of-school sport and PA settings (after adjustment for gender and age differences)

The group of totally inactive pupils was the most disadvantaged one. In comparison to other groups, totally inactive pupils, i.e. those who mostly need school PA, reported substantially lower (i) PA in school, (ii) motivation in PE and (ii) well-being in life. It should be noted that PE and PA in school settings are consisted mainly of sport activities requiring advanced sport skills and high physical competences for pupil success. In this environment, pupils with no sport and physical activity experiences feel disempowered. As shown in Figure 4.8, these pupils are much less likely to feel that their need for competence is satisfied, compared to their schoolmates who have more experiences from out-of-school sport and physical activity settings.

Importance of Mastery Climate in PE to promote pupils' motivation in PE, school PA, self-monitoring, intentions for out-of-school PA, out-of-school PA

This project focused on mastery-oriented climate in PE, which is considered an important determinant of pupils' motivation in PE and proximal determinants of out-of-school PA (e.g., Papaioannou et al., 2004).

We examined if different levels of European teacher-initiated mastery climate are associated with European pupils' PA levels during school, their motivation in PE, their emotions in PE and their well-being. Based on pupils' answers on the teacher-initiated motivational climate questionnaire (6 items; Papaioannou et al., 2007), we divided the sample into three (3) groups: 1) Low mastery/ learning climate: ≤ 3.67 ($n = 4339$), 2) Moderate mastery/ learning climate: 3.68 to 4.17 ($n = 3456$), and 3) High mastery/ learning climate: ≥ 4.18 ($n = 3471$).

In high mastery-oriented PE classes pupils are more motivated, more active and with higher vitality than in low mastery-oriented PE climate classes

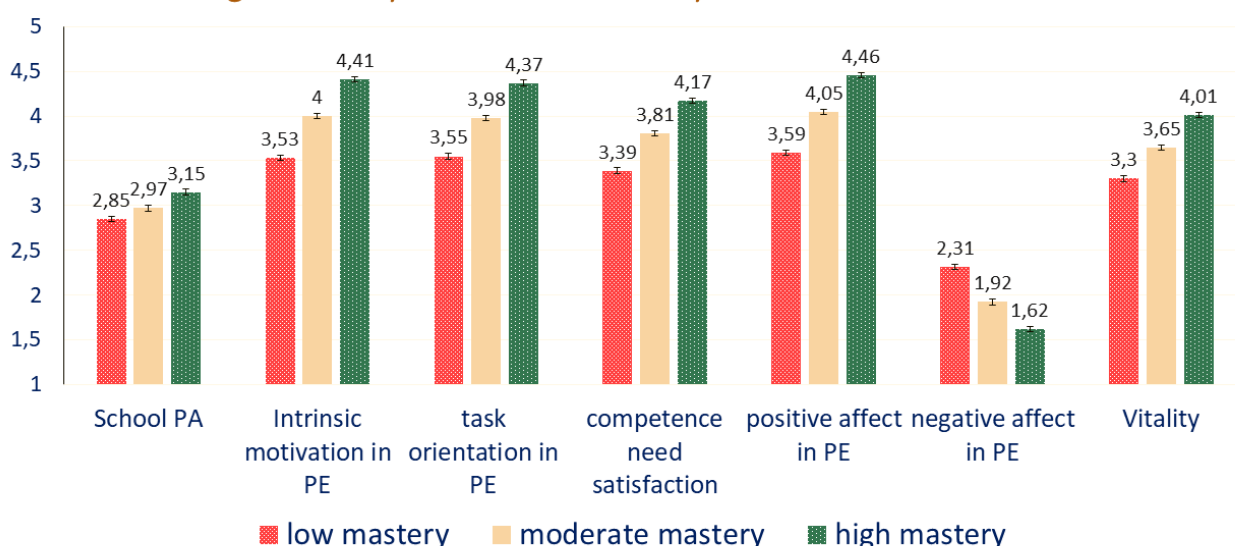


Figure 4.9. Significant differences on pupils' motivational variables in PE, PA in school and vitality among pupils perceiving different levels of teacher-initiated mastery climate in PE.

After adjusted for age and gender, results showed that the more pupils perceive that the PE teacher emphasizes learning / improving:

- the more physically active are during school ($F_{2,7995} = 61.1, p < .001$) (Figure 4.9),
- the more task oriented are in PE ($F_{2,10539} = 1275.4, p < .001$),
- the stronger their intrinsic motivation in PE ($F_{2,10674} = 920.8, p < .001$),
- the more positive emotions & enjoyment they have in PE ($F_{2,10696} = 1115.6, p < .001$),
- the less negative emotions they have in PE ($F_{2,10667} = 558.2, p < .001$),
- the greater their vitality and joy ($F_{2,10471} = 502.7, p < .001$) they feel in their life
- the more likely they perceive satisfaction of their need for competence ($(F_{2,10471} = 929, p < .001)$)

Similarly, we explored if the different levels of teacher-initiated mastery climate are linked with pupils' out-of-school PA, intention, perceived behavioral control, attitudes towards PA and self-regulation strategies to be physically active.

In high mastery climate PE classes pupils are more positively predisposed to out-of-school PA than in low mastery PE classes

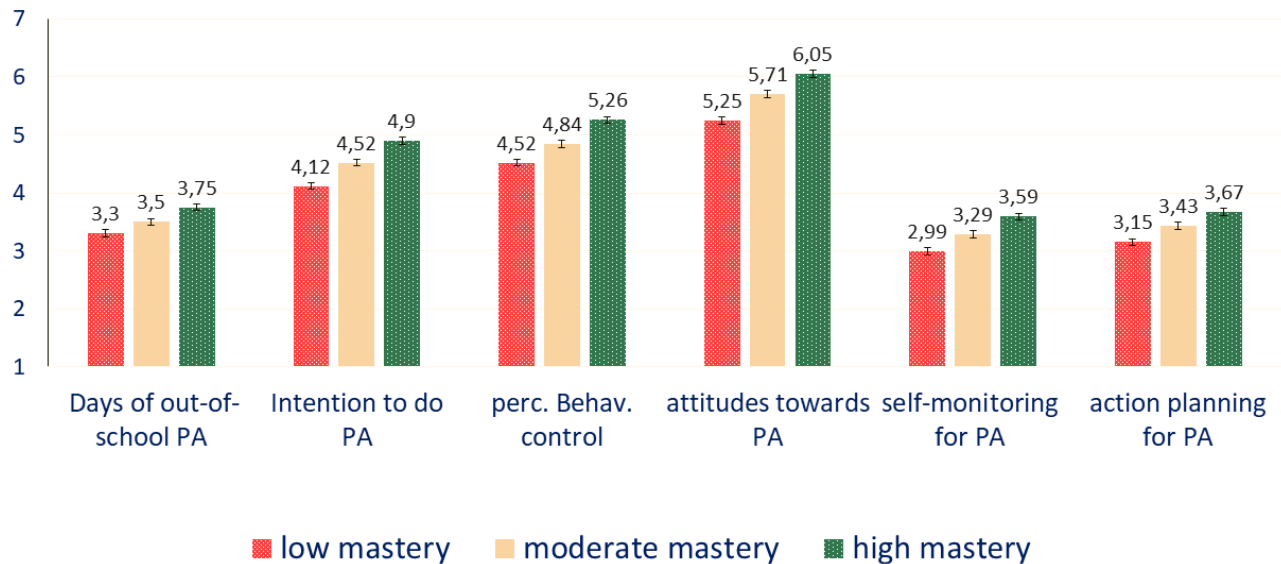


Figure 4.10. Significant differences in predictors of out-of-school PA among pupils perceiving different levels of teacher-initiated mastery climate

After adjusted for age and gender, results showed that the higher the pupils' perception of their PE teacher emphasizing mastery/learning / improving:

- the higher their levels of physical activity ($F_{2, 10878} = 38.051, p < .001$),
- the stronger their intention to do out of school PA ($F_{2, 10207} = 129.650, p < .001$),
- the more they are encouraged and believe that they CAN/ IT'S UP TO THEM to be physically active out of school ($F_{2, 10228} = 156.558, p < .001$),
- the more positive their attitudes towards PA ($F_{2, 10465} = 261.178, p < .001$),
- the more often they monitor themselves how often they do out-of-school PA ($F_{2, 10418} = 205.937, p < .001$), and
- the more likely they are to develop specific plans (when/where/with who/how/how often) to do out-of-school physical activity ($F_{2, 10438} = 165.820, p < .001$; Figure 4.10).

Importance of Pupils' Basic Needs Satisfaction in PE to promote pupils' motivation in PE, PA in school, self-monitoring, intentions for out-of-school PA, out-of-school PA

With regard to interventions in the PE environment, this project also focused on the increase of pupils' basic needs satisfaction. We delivered measures of students' basic needs satisfaction because we assumed that PE teachers satisfying their pupils' needs for autonomy, competence and relatedness have more motivated pupils in PA settings both inside and outside school (Ryan & Deci, 2017).

Firstly, we checked if the different levels of satisfaction of the three basic psychological needs are associated with pupils' PA levels in school, their motivation in PE, their emotions in PE and their well-being. Based on pupils' answers on measures of need satisfaction, the mean scores of the three basic psychological needs (autonomy, competence, relatedness) were computed. Then we divided the sample into three (3) groups: 1) Low satisfaction of the three basic needs: ≤ 3.22 ($n = 3498$), 2) Moderate satisfaction of the three basic needs: 3.23 to 3.82 ($n = 3479$), and 3) High satisfaction of the three basic needs: ≥ 3.83 ($n = 3551$).

After adjusted for age and gender, results showed that the higher the pupils' perception that their three basic psychosocial needs are satisfied in PE:

- the more physically active they are in school ($F_{2, 7572} = 187.424, p < .001$),
- the more task oriented they are in PE ($F_{2, 10012} = 1568.674, p < .001$),
- the stronger their intrinsic motivation in PE ($F_{2, 10110} = 2509.599, p < .001$),
- the more positive emotions & enjoyment they have in PE ($F_{2, 10101} = 1951.083, p < .001$),
- the less negative emotions they have in PE ($F_{2, 10083} = 697.135, p < .001$), and
- the greater vitality and joy ($F_{2, 9908} = 886.272, p < .001$) they feel in their life (Figure 4.11).

Pupils' basic needs satisfaction is positively associated with motivation in PE, Physical Activity in school and higher vitality

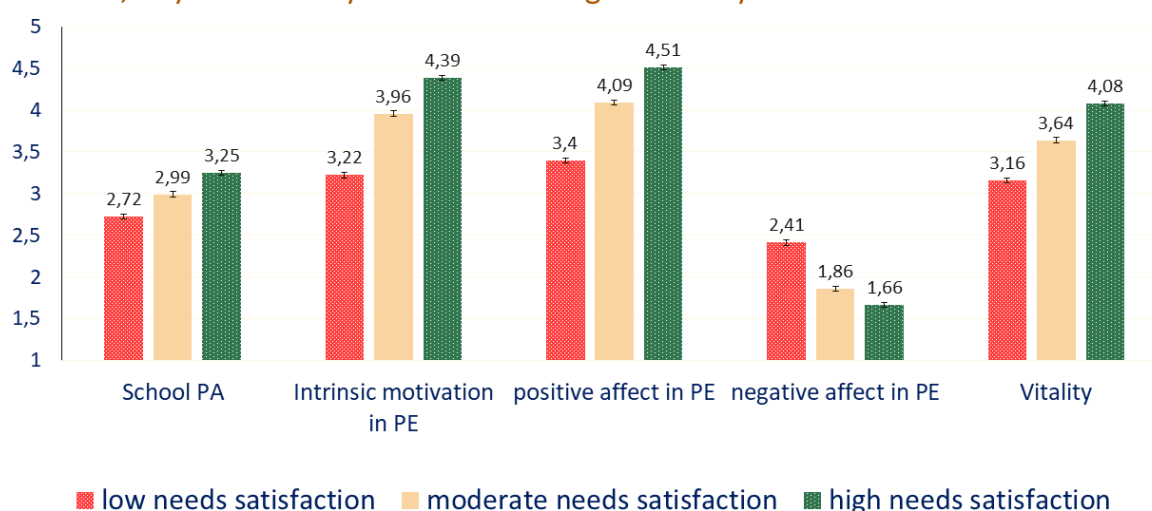


Figure 4.11. Significant differences in pupils' motivational variables in PE, in school PA and in vitality among pupils perceiving different levels of Basic Needs Satisfaction in PE (low, moderate, high)

Results from additional MANCOVAs adjusting for age and gender differences revealed that the more pupils perceive that their three basic psychosocial needs are satisfied:

- the higher their level of out-of-school PA ($F_{2, 10194} = 202.945, p < .001$) (Figure 4.12),
- the stronger their intention to do out of school PA ($F_{2, 9643} = 202.755, p < .001$),
- the more they believe that they CAN/ IT'S UP TO THEM to be physically active out of school ($F_{2, 9663} = 248.631, p < .001$),
- the more positive their attitudes towards PA ($F_{2, 9876} = 273.112, p < .001$),
- the more likely they are to monitor themselves how often they do out-of-school PA ($F_{2, 9852} = 477.026, p < .001$), and
- the more likely they are to develop specific plans (when/where/with who/how/how often) to do out-of-school physical activity ($F_{2, 9878} = 380.832, p < .001$).

Pupils' basic needs satisfaction in PE is positively associated with out-of-school Physical Activity and its most proximal predictors

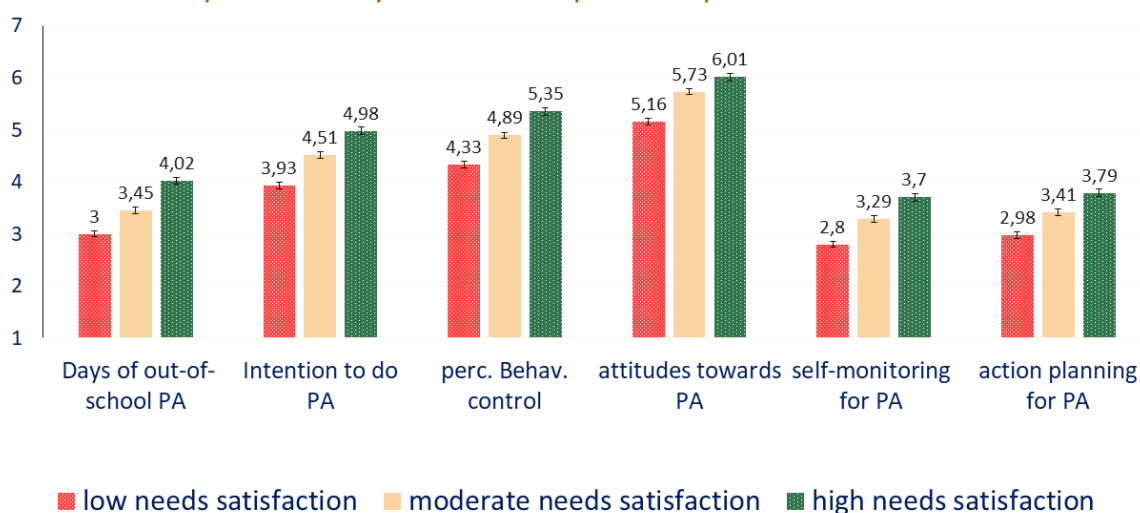


Figure 4.12. Significant differences in PA and proximal predictors of out-of-school PA among pupils perceiving different levels of Basic Needs' Satisfaction in PE (low, moderate, high)

Importance of Developing Self-Regulatory Skills for PA: Self-Monitoring and Action Planning

At the center of this project was self-monitoring and goal-setting for participation in PA. Accordingly, we investigated physical activity among pupils using more or less often self-monitoring strategies. We divided the sample into three (3) groups based on their answers on self-monitoring of their PA (Low self-monitoring: 0 to 2.75; Moderate self-monitoring: 2.76 to 4.00; High self-monitoring: 4.01 to 5.0).

Table 4.7. Number of pupils at different level of self-monitoring

Age	Low	Moderate	High	TOTAL
10	85	139	120	344
11	257	558	461	1276
12	235	359	252	846
13	313	367	227	907
14	479	520	316	1315
15	457	539	298	1294
16	364	349	191	904
17	234	215	128	577
18	94	74	48	216
Total	2518	3120	2041	7679

Self-monitoring of Physical Activity is strongly connected with participation in physical activity (e.g., physical activity hours per week in leisure time)

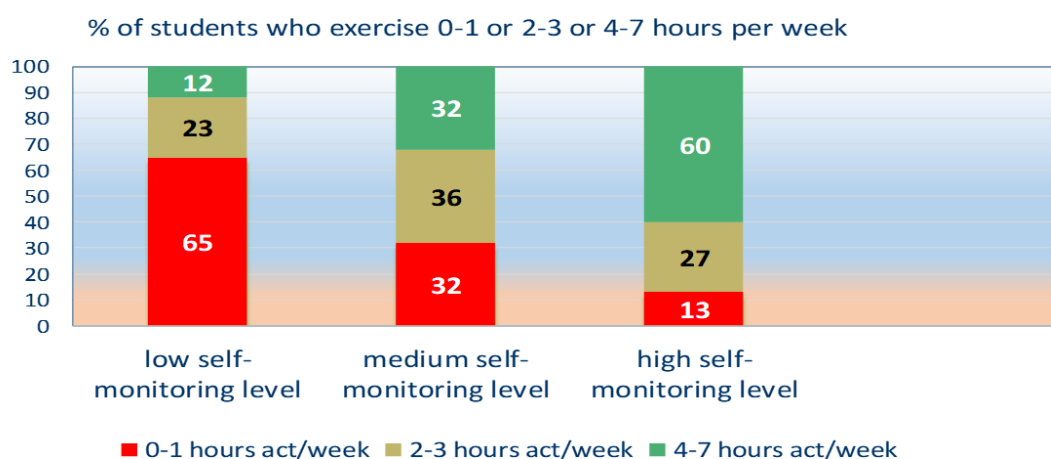


Figure 4.13. Percentages of pupils who are relatively active [4-7 hours of Moderate Vigorous Physical Activities (MVPA) per Week], rather inactive (2-3 hours of MVPA/week) or totally inactive (0-1 hours of MVPA/week) among pupils differing in self-monitoring

As shown in Figure 4.13, there were large differences in Moderate Vigorous Physical Activity in leisure time among pupils adopting different levels of self-monitoring. The majority (60%) of pupils adopting high levels of self-monitoring were physically active or rather active. On the contrary, the majority (65%) of pupils adopting low levels of self-monitoring were totally inactive. Pupils adopting moderate levels of self-monitoring were almost equally distributed across inactive, rather inactive and active/rather active groups.

Summary

- The majority of the pupils in the six European countries (FR, GR, IT, SP, TR, UK) are physically inactive, with one every three pupils almost totally inactive.
- Boys and younger age/primary school pupils were more physically active compared to girls, older age, secondary or high school pupils.
- Number of days of Physical Education (PE) per week was positively related to out-of-school PA, underscoring the importance of PE for pupils' PA and health.
- Lack of time and increased homework for school has been reported as the most important barriers for Physical Activity (PA) in most European countries but not so much in UK.
- Adjusting for country and age-group differences, large between-school differences in PA emerged, underscoring the importance of the IMPACT monitoring tool to policy makers who can use it to find out schools with high levels of inactivity and support them with specific policies.
- Family support and Socio-Economic Status (SES) emerged as important determinants of pupils' PA.
- Pupils' participation in out-of-school PA emerged as determinant of their PA in school and motivation in Physical Education (PE), underlining the need of schools and PE teachers to focus even further on physically inactive pupils and on the promotion of their PA.
- Boys and younger age/primary school pupils were also more motivated in PE classes, underlining the need to adapt the European PE curricular for girls and to start interventions for PA promotion in younger ages.
- The strongest correlates of extra-curricular PA were pupil's intentions for extra-curricular PA, perceived behavioral control, self-monitoring and action planning. The role of self-monitoring in the promotion of PA emerged as particularly important.
- PE teachers can directly affect pupils' intentions, perceived behavioral control, self-monitoring and action planning through implementation of goal-setting programs for PA promotion that also facilitate the development of pupils' self-regulation skills such as self-monitoring and action planning.
- Still, pupils' adoption of goal-setting programs for out-of-school PA is less likely to sustain if pupils are not intrinsically motivated in PA and do not enjoy PA. The implementation of these goal-setting programs should take place within a positive motivational climate in PE.
- Indeed, a positive motivational climate in PE consisted of high mastery climate in PE and satisfaction of pupils' basic needs for autonomy, competence and relatedness emerged as very important for the cultivation of intentions for extra-curricular PA, perceived behavioral control, self-monitoring and action planning and PA.
- Mastery climate in PE and satisfaction of pupils' basic needs also explained large amount of variance of pupils' PA, well-being and motivation in PE, e.g., intrinsic motivation in PE, positive and negative affect in PE and vitality, while they also emerged as distal predictors of extra-curricular PA.
- These findings reinforce the importance of PE teachers' training with regard to how to increase mastery climate and satisfy pupils' basic needs alongside their training to adopt goal-setting programs for out-of-school PA.