

# **Does sports club participation contribute to physical activity among children and adolescents? A comparison across six European countries**

**Running title:** Sports clubs participation and physical activity

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1 **TITLE**

2 **ABSTRACT**

3 **Aims:** Insufficient physical activity (PA) is one of the largest public health challenges of  
4 our time and requires a multisectoral public-health response. PA recommendations state  
5 that all children and adolescents should accumulate at least 60 minutes of moderate-to-  
6 vigorous PA (MVPA) daily and carry out vigorous PA (VPA) three times weekly. While  
7 participation in sports club activities is known to enhance the probability of reaching the  
8 recommended overall PA level, less is known about the contribution of sports club  
9 participation to VPA and few cross-national comparisons have been carried out.  
10 The purpose of this paper is to study whether participation in sports club activities is  
11 associated with meeting the overall PA and VPA recommendations among children and  
12 adolescents across six European countries with some different characteristics, namely  
13 Belgium (Flanders), Czech Republic, Finland, France, Ireland and Sweden. **Methods:**  
14 Analysis were carried out on existing self –reported national data sets using descriptive  
15 statistics and logistic regression. **Results:** Results indicate that approximately two-thirds  
16 of children and adolescents take part in sports clubs activities in given countries. Sports  
17 club participants were more likely to meet the overall PA recommendations (OR 2.4-  
18 6.4). Sports club participants were also more likely to reach VPA recommendation (OR  
19 2.8-5.0) than non-participants. **Conclusions:** The extent to which overall PA and/or  
20 VPA is gained through sports club participation versus other settings needs to be further  
21 studied. Still, it can be argued that sports clubs have an important position in PA  
22 promotion for younger populations.

23 **Key words:** guidelines and recommendations, physical activity, public health, sport,  
24 youth

## 25 **BACKGROUND**

26 There is strong evidence for the physical, mental and psychosocial benefits of physical  
27 activity (PA) [1, 2] and that insufficient PA requires a multi-sectoral public-health  
28 response [3]. Global PA recommendations for health state that children and adolescents  
29 should achieve at least 60 minutes of moderate-to-vigorous intensity PA (MVPA), most  
30 of it aerobic, every day to improve cardiorespiratory and muscular fitness, bone health,  
31 and cardiovascular and metabolic health biomarkers [4]. Vigorous intensity PA (VPA)  
32 including muscle and bone strengthening activity should be incorporated at least three  
33 times weekly. It is also highlighted that amounts of PA greater than 60 minutes provide  
34 additional health benefits [4, 5].

35 International research has demonstrated that the majority of children and adolescents do  
36 not reach these PA recommendations. A recent overview on the PA of children and  
37 adolescents in 38 countries from all continents showed that on average sixty percent of  
38 children and youth worldwide fail to meet the international recommendations for PA  
39 [6]. About half of the countries reported that only a third or less of the children and  
40 adolescents met the PA guidelines and some countries reported even lower levels,  
41 raising a widespread issue of insufficient PA during childhood across Europe.

42 Moreover, some universal trends in PA in relation to gender, age and family affluence  
43 need to be highlighted, where boys, younger age groups and children from high  
44 affluence groups reach the recommended level of PA more frequently than girls, older  
45 age groups and low affluence groups respectively [7]. This combined knowledge is

46 alarming, particularly considering the health benefits of PA in regard to physical,  
47 mental, social health, and in the prevention of non-communicable diseases [8].

48 Therefore, the World Health Organisation [4] and the European Commission [9] as well  
49 as national governments have set PA promotion as one of the priority aims in our  
50 societies, especially with respect to children and adolescents. As health should be  
51 promoted where people learn, work, play and love [10], PA should also be promoted in  
52 these different settings. One setting that is particularly suitable for promoting PA is the  
53 sports club who deliver organised sport to a notable proportion of children and  
54 adolescents in many European countries, including Belgium, Finland and Sweden [11].

55 In spite of the high diversity of sports policies in different countries across Europe and  
56 in the population of sports clubs, it can be generalised that sports clubs represent the  
57 very core and the local suppliers of the sports systems in this continent [11]. On average,  
58 40-59% of the children and adolescents in Europe participate in sports clubs [6].

59 Participation in sports clubs can and should contribute to meeting PA guidelines. Some  
60 research has demonstrated that children and adolescents participating in sport at a sports  
61 club have higher levels of MVPA than non-participants [12]. However, some other  
62 recent findings in European countries have also indicated that not all sports club  
63 participants reach recommended PA levels [13, 14]. Among sports participants, boys are  
64 more likely to reach the PA guidelines for MVPA than girls [15] and there are also  
65 studies that show a positive relationship between sport participation and VPA [16, 17].

66 To date, no research has focussed on comparing overall PA levels and especially the  
67 additional assessment of VPA of sports club participants and non-participants between  
68 several European countries. Therefore, the purpose of this paper is to study whether

69 participation in sports club activities is associated with meeting the overall PA and VPA  
70 recommendations among children and adolescents across six European countries with  
71 some different characteristics, namely Belgium (Flanders), Czech Republic, Finland,  
72 France, Ireland and Sweden.

73

## 74 **METHODS**

75 Authors from six countries, belonging to the HEPA Europe: Sport Clubs for Health  
76 working group, identified the relevant data sets, which could facilitate the information  
77 on sports club participation, overall PA and VPA among children and adolescents aged  
78 11, 13 and 15 years old, with restrictions in Ireland (10-11 and 12-14 year olds) and  
79 Sweden (13 and 15 year olds). Apart from the Swedish data, (regional “Life and Health  
80 Young-survey” in Region Örebro County), all data are national monitoring studies with  
81 self-reports from large representative cross-sectional samples, and are gathered under  
82 the Health Behaviour in School-aged Children (HBSC) study in Belgium (Flanders),  
83 Czech Republic, France [18] and Ireland and the National Physical Activity Behaviour  
84 of Children and Adolescents (LIITU) study in Finland (Appendix 1).

### 85 *Variables*

#### 86 *Sports Club Participation*

87 Measures of sports club participation varied between countries (Appendix 1) but  
88 generally included mentioned sport/sports clubs in the question or as a response  
89 alternative. They were however made comparable when dichotomised into yes/no  
90 participation categories.

91

92 *Overall Physical Activity (PA)*

93 The HBSC-study assessed participation in overall PA as with the following question  
94 “*Over the past 7 days, on how many days were you physically active for a total of at*  
95 *least 60 minutes per day? Please add up all the time you spent in physical activity each*  
96 *day.*” An introductory text to illustrate moderate-to-vigorous intensity physical activity  
97 was set prior to the question: “Physical activity is any activity that increases your heart  
98 rate and makes you get out of breath some of the time. Physical activity can be done in  
99 sports, school activities, playing with friends, or walking to school. Some examples of  
100 physical activity are running, walking briskly, roller-skating, cycling, dancing,  
101 skateboarding, swimming, downhill skiing, cross-country skiing, football, basketball  
102 and baseball.”. Response options included 0 to 7 days per week in data for Belgium,  
103 Czech Republic, Finland, France and Ireland. The categories were then dichotomized  
104 according to meeting of the PA recommendation: yes: seven days and no) less than  
105 seven days.

106 In Sweden the overall PA question was “*How much on average are you physically*  
107 *active per day (ex. walking, biking or doing sports)?*” was used. The answer options  
108 were: “Less than 30 min”, “30-60 min”, or “More than 60 min”. The categories were  
109 then dichotomized according to meeting the PA guidelines: yes) more than 60 minutes  
110 and no) 60 minutes and less.

111 *Vigorous physical activity (VPA)*

112 Belgium, Czech Republic, France and Ireland used the HBSC study question on the  
113 frequency of VPA: “*Outside school hours: how often do you usually exercise in your*  
114 *free time so much that you get out of breath or sweat?*”, with seven response categories:  
115 every day, 4 to 6 times a week, 2 to 3 times a week, once a week, once a month, less  
116 than once a month, never.

117 Finland used the following VPA question: “*Think about an ordinary week. In how many*  
118 *days does your physical activity include vigorous activity?*” with response options from  
119 0 to 7 days. An introductory text to illustrate the types of PA and determine the intensity  
120 level of VPA, “...any activity that increases your heart rate a lot and makes you out of  
121 breath substantially. Some examples of vigorous intensity physical activities are speedy  
122 plays and games and running or cross-country skiing”, was set prior the question.

123 In Sweden the VPA question was formulated as: “*How often do you exercise in your*  
124 *leisure-time, more than 30 min so that you are short of breath/sweating?*” with answer  
125 options: Every day, 4-6 a week, 2-3 a week, once a week, 1-3 a month, less than once a  
126 month.

127 Because only Finnish data could be specific in the proportion meeting the VPA  
128 guidelines exactly 3 times a week the variable was dichotomized similarly for all  
129 countries to 1) at least 4 times a week and 2) at most 3 times a week.

### 130 ***Data analysis***

131 Descriptive statistics, specifically frequencies, crosstabs and  $\chi^2$ -test were used to  
132 generate overall, and gender and age comparisons in sports club participation.

133 Crosstabs,  $\chi^2$ -test and binary logistic regression were carried out to determine the

134 likelihood of sports club participants meeting the overall PA and VPA recommendations  
135 compared with non-participants. Odds ratios were calculated to compare the risk of not  
136 meeting the overall PA and VPA recommendations (dependent variables) when  
137 participating in sports clubs versus not participating in sport clubs (independent  
138 variable), stratified by age and gender. A results higher than 1 means that sports clubs'  
139 participation increases the likelihood to meet overall PA and VPA recommendations.  
140 Data were analysed using IBM SPSS Statistics.

141

## 142 **RESULTS**

### 143 *Sports club participation*

144 Overall, two out of three (60-69%) children and adolescents participated in sports club  
145 activities (Table 1). Boys were more active in participating in sports club activities than  
146 girls in every country (boys 61-76%, girls 49-66%). Participation in sports club  
147 activities decreased with age in each country; moving for example in Finland from 68%  
148 of 11 year olds to 48% of 15 year olds.

149

150 \*\*\*\*\*Table 1 near here\*\*\*\*\*

151

### 152 *Overall Physical Activity (PA)*

153 The PA recommendation of at least 60 minutes of daily PA in a week were met by 12-  
154 42% of children and adolescents (Table 2). The proportion meeting the overall PA



155 recommendation was higher among boys (18-47%) than girls (7-38%) and a decrease  
156 with age was evident: 11-year-olds (15-37%), 13-year-olds (11-45%), and 15-year-olds  
157 (9-39%).

158 Sports club participants (17-51%) met the recommendation of overall PA more often  
159 than non-participants (3-22%) (Table 2), and overall were 2-6.4 times more likely to  
160 meet the PA guidelines (Table 3). Among the sports club participants, boys met the  
161 overall PA recommendation more often than girls in all countries. The odds of sports  
162 club participants' meeting the PA recommendations increased with age when compared  
163 with non-participants (Table 3).

164

165 \*\*\*\*Table 2 near here\*\*\*\*

166

167 \*\*\*\*Table 3 near here\*\*\*\*

168

169 ***Vigorous physical activity (VPA)***

170 In total, 30-62% of the children and adolescents engaged in VPA at least four times  
171 weekly (Table 4), with a higher prevalence among boys (43-68%) than in girls (18-  
172 57%). Among sports club participants, 47-70% reported VPA at least 4 times a week,  
173 compared to 17-45% of non-participants (Table 4). In all countries, among the sports  
174 club participants, boys met the VPA recommendation more often than girls. Sports club

175 participants' odds for meeting the recommendation increased with age when compared  
176 with non-participants (Table 3).

177

178 \*\*\*\*Table 4 near here\*\*\*\*

179

180 Sports club participants were more likely to meet the VPA recommendation (OR 2.8-  
181 5.0) than non-participants in the countries involved in the study (Table 3). The  
182 likelihood of meeting recommendations for VPA was higher among boys who were  
183 members of sports clubs than for their female counterparts compared with those who did  
184 not perform sport (Table 3).

185

## 186 **DISCUSSION**

187 Sports club participation among children and adolescents was high (60-69%) in all  
188 featured countries with these sport participants more likely to meet the PA  
189 recommendations than non-participants. This clearly emphasizes the role and  
190 importance of sports clubs as a setting for enabling children and adolescents to achieve  
191 recommended levels of PA. These results also underline that despite a broad variety in  
192 sport system and policies in the different countries, sports clubs can be recognized as a  
193 PA promoting setting [11]. The wide reach of sports clubs demonstrates the societal  
194 significance of sport and reinforces the ten-year-old call by the European Commission  
195 for better recognition and more actions by the sports sector for PA promotion [9]. The

196 results of this study both support the positive contribution of sports clubs to PA and  
197 highlight shortcomings that still need to be tackled, as there is still a significant  
198 proportion of sports club participants who do not meet the recommendations for PA,  
199 most notably among girls.

200 The findings of this study are consistent across all countries involved; sports club  
201 participants are more likely to meet the recommendations for overall PA. These results  
202 of overall PA are in line with earlier research [12]. Furthermore, sports clubs  
203 participants achieved the VPA recommendations to a higher extent across all countries  
204 of the study which earlier studies [16, 17] have been able to conclude for only two  
205 single countries. In this international study, results are remarkably consistent across the  
206 countries, despite wide differences in geography, socio-economy, culture and climate  
207 [19], as well as sport system [11].

208 Despite these promising overall results, many sports club participants did not reach  
209 recommendations for PA. Related rates ranged from 17% in France to 51% in Sweden  
210 for overall PA and between 47% and 70% in the Czech Republic and Ireland  
211 respectively for VPA. The better outcome for VPA and cross-country variation may be  
212 explained by two reasons. Firstly, the VPA recommendation is a minimum of three  
213 times per week, which may be more reflective of how youths participate in sport;  
214 several times per week but not every day, which is inherent in the overall PA guidelines.  
215 Secondly, the most popular sports in these countries (e.g. gaelic games in Ireland, soccer  
216 in France, Finland and Sweden) are high action ball sports and thus likely classified as  
217 vigorous intensity PA.

218 There are other possible explanations for why many sports participants did not meet PA  
219 guidelines. Children and adolescents spend large proportions of time during organized  
220 sport passive or in light physical activity [20]. The delivery of sport by coaches could  
221 therefore impact on opportunities for MVPA during training and games [21]. Secondly,  
222 in sport, recovery is important and may amount to one or even two rest days per week  
223 likely impacting the daily aspect of recommendations for PA [13].

224 At the same time, it is important to consider how to improve sports contribution to PA;  
225 there are indicators that some sports clubs have increased the volume of activity sessions  
226 in response to low PA, but there is a concern that an increased volume of training may  
227 lead to drop out from sports [22]. In this analysis, the decrease of participation with age  
228 was already high in all countries, most notably in Finland (20% drop between 11-15  
229 years) and is in line with previous findings [22].

230 Furthermore, consideration of sport types is needed to identify how different sports  
231 contribute to PA and to investigate previous findings that have shown that those  
232 engaging in multiple sports meet the MVPA and VPA recommendations more often  
233 than those who specialise in one sport [23]. Unfortunately, it was not possible to report  
234 the frequency of training and type of sport practiced in this analysis due to lack of  
235 available data.

236 An interesting finding is that at the same time that the proportion of PA decreases with  
237 age the likelihood of sports clubs participants meeting the recommendations of both  
238 overall PA and PA increases with age. This can be interpreted as the importance of  
239 sports clubs participation actually increases with age. Clubs have to consider how they  
240 can recruit more children and adolescents to sport but equally prevention of drop out

241 should become a greater priority for sports clubs and those involved in the promotion of  
242 PA, as results of the present study has shown a decrease of meeting overall and VPA  
243 recommendations with age. In practice, this may mean more variation in the club  
244 activities and a greater consideration of the influence of coaches' behaviours on youth  
245 [24] with specific strategies for female and minority sub groups [25, 26].

246 Another important finding of this study is that boys reported higher participation in sport  
247 than girls and also that those boys who participate in sport are more likely to reach PA  
248 guidelines than their female counterparts. These gender differences are in line with  
249 previous findings [15]. For sports clubs, this suggests a need to acknowledge varying  
250 sports preferences among girls and to develop sports club activities that focus on  
251 participation, fun and skill development which may appeal to those girls who are not  
252 drawn to traditional team sports or the competitive sports environment [22, 27].

253 Considering the results from odds ratio analysis, sports clubs could be a setting which  
254 increase the likelihood of meeting overall PA and VPA recommendations. Participation  
255 in sports clubs could be considered as protecting factors from a public health point of  
256 view, and attention should be given to those children and adolescents who are not  
257 participating in sports clubs, because of their lower levels of PA. These most physically  
258 passive youths are at the same time the most challenging ones to be activated and likely  
259 need professional and long-term assistance, which would call for actions by the health  
260 sector. But despite strong political will for inter-sectoral collaboration between sport and  
261 health sectors, several challenges for implementation have been identified, mostly  
262 around the level of understanding of the mission, core-business and main outcomes of  
263 the other sector [28]. Moreover, as sports club activities are often based on voluntary

264 civil activity with limited capacity and resources, it would be over-optimistic to argue a  
265 much wider reach for sport. To overcome these barriers, Kokko et al. [29] have  
266 proposed the concept of a health promoting sports club, in which health is promoted  
267 comprehensively through sport using a settings-based approach. These health promotion  
268 activities may promote health [30], but also may support recruitment and retention of  
269 participants in sports clubs, linking strategies to promote sport and PA to issues such as  
270 integration and equality. This, in turn, would strengthen the societal significance of  
271 sports clubs and enhance their potential to promote PA and health [29, 31]. Future  
272 research has to be encouraged on the implementation of such aims, and sports clubs and  
273 coaches' motives, barriers and capacities for implementation [29].

274

275

### 276 *Limitations and future research directions*

277 Some limitations need to be taken into account when interpreting the findings of the  
278 present study. Despite all data sets, except Sweden (who does not include the sports  
279 clubs question in the HBSC survey), being nationally representative, they were cross-  
280 sectional self-reports. Therefore, the respondent evaluations might be sensitive to social  
281 desirability and reporting biases. The cross-sectional data provides descriptive  
282 information and associations between some particular variables, but no causal  
283 relationships can be inferred. The difference in measurement of participation in a sports  
284 club and in PA affected the accuracy of data reductions to comparable variables and  
285 limited the inclusion of other studies, which would have ensured better cross-national  
286 comparisons. In this study VPA is measured as at least 4 times a week compared to the

287 recommendations 3 times a week. Despite this higher proportions for VPA than overall  
288 PA were observed in this study.

289 Furthermore, the influence of others variables, like family affluence or health  
290 biomarkers, could help to better understand the universality of the results and the  
291 influence of individual versus environmental factors. The contribution of different types  
292 of sport to meeting the PA recommendations for health should also be further examined.  
293 The lack of large scale studies using objective measures of PA and the difficulty of  
294 comparison between PA measurement instruments used, has limited the comparison  
295 between countries. Future large scale and cohort studies should consider probing sports  
296 club participation, in terms of sport practiced, time spent within sport clubs, and quantity  
297 and content of training sessions.

298

## 299 **CONCLUSIONS**

300 Sports clubs are predominant leisure time settings for children and adolescents reaching  
301 two-thirds of this population group. Sports club participation have an evident positive  
302 association to overall PA, and to vigorous intensity PA particularly. However, this  
303 contribution varies and is limited among girls and adolescents. National sports  
304 organisations and clubs require support and direction to harness the potential of sport to  
305 improve the overall activity habits of all young people.

306

## 307 **Disclosure of interest**

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322



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Table 1 Gender and Age Comparison of Sports Club Participation in %.

	Overall	Boys	Girls	p-value	11 yr	13 yr	15 yr	p-value
<b>Belgium</b> (n=2778-2794)*	67	71	62	<.001	73	67	61	<.001
<b>Czech Republic</b> (n=10 501)	62	70	55	<.001	66	64	57	<.001
<b>Finland</b> (n=5355)	60	61	59	ns	68	63	48	<.001
<b>France</b> (n=5975)	63	76	49	<.001	68	64	56	<.001
<b>Ireland</b> (n=6025)	66	75	59	<.001	52	48	-	ns
<b>Sweden</b> (n=4661-4717)*	69	72	66	<.001	-	73	64	<.001

\*Different number of respondents when comparing gender or age due to respondents not answering either of the gender or age questions.

Table 2 Overall and Gender proportions and comparison of sports club participants (SC) and non-participants (Non-SC) meeting the overall PA recommendations.

	Overall	Boys	Girls	11 year	13 year	15 year	SC	Non- SC	p- value	SC boys	Non- SC boys	p- value	SC girls	Non- SC girls	p- value
<b>Belgium (n=2764)</b>	16	20	12	18	18	14	20	9	<.001	24	10	<.001	15	8	<.001
<b>Czech Republic (n=10 426)</b>	21	24	18	26	21	17	26	13	<.001	29	15	<.001	23	12	<.001
<b>Finland (n=5330)</b>	28	34	23	39	26	17	35	18	<.001	41	22	<.001	29	15	<.001
<b>France (n=5975)</b>	12	18	7	15	11	9	17	3	<.001	21	4	<.001	11	3	<.001
<b>Ireland (n=6025)</b>	33	40	25	37	29	-	37	22	<.001	45	27	<.001	29	20	<.001
<b>Sweden (n=4565)</b>	42	47	38	-	45	39	51	22	<.001	56	24	<.001	47	20	<.001

Table 3 Odds ratios (OR) of Sports Club Participants meeting Recommendations for overall PA and VPA; overall and gender- and age-stratifies

<b>Overall PA</b>	<b>Overall</b>	<b>95%CI</b>	<b>Boys</b>	<b>95%CI</b>	<b>Girls</b>	<b>95%CI</b>	<b>11 yr</b>	<b>95%CI</b>	<b>13 yr</b>	<b>95%CI</b>	<b>15 yr</b>	<b>95%CI</b>
<b>Belgium</b>	2.6***	2.0-3.4	2.8***	2.0-3.9	2.2***	1.5-3.2	1.7*	1.1-2.6	2.2**	1.4-3.6	4.7***	2.8-7.6
<b>Czech Republic</b>	2.4***	2.1-2.6	2.4***	2.0-2.8	2.2***	2.0-2.8	1.9***	1.6-2.3	2.2***	1.8-2.6	3.1***	2.5-3.8
<b>Finland</b>	2.4***	2.1-2.7	2.4***	2.0-2.9	2.3***	1.9-2.8	1.7***	1.4-2.1	2.2***	1.7-2.8	2.9***	2.2-3.0
<b>France</b>	6.4***	4.9-8.2	4.2***	3.0-6.0	6.7***	4.5-10.1	5.0***	3.4-7.3	6.6***	4.1-10.7	7.9***	4.7-13.2
<b>Ireland</b>	2.0***	1.8-2.4	2.2***	1.8-2.8	1.7***	1.4-2.0	1.9***	1.5-2.4	2.1***	1.8-2.5	-	-
<b>Sweden</b>	3.3***	2.8-3.9	3.6***	2.9-4.5	3.0***	2.4-3.8	-	-	3.4***	2.7-4.3	3.2***	2.6-3.9
<b>VPA</b>												
<b>Belgium</b>	3.1***	2.6-3.7	3.3***	2.6-4.2	2.7***	2.1-3.5	2.5***	1.8-3.4	3.0***	2.1-4.1	3.8***	2.9-5.0
<b>Czech Republic</b>	3.1***	2.8-3.3	3.3***	2.9-3.8	2.7***	2.4-3.0	2.6***	2.2-3.1	3.1***	2.7-3.6	3.4***	2.9-3.9
<b>Finland</b>	3.5***	3.1-4.0	4.0***	3.4-4.8	3.1***	2.6-3.6	2.2***	1.8-2.7	4.2***	3.4-5.2	4.7***	3.7-5.8
<b>France</b>	-	-	-	-	-	-	-	-	-	-	-	-
<b>Ireland</b>	2.8***	2.5-3.3	3.2***	2.7-3.9	2.4***	2.1-2.7	2.3***	1.9-2.7	3.4***	2.9-3.9	-	-
<b>Sweden</b>	5.0***	4.2-6.0	5.6***	4.4-7.2	4.3***	3.3-5.6	-	-	4.9***	3.7-6.4	5.2***	4.1-6.5

\* p<.05, \*\* p<.01, \*\*\* p<.001

Table 4 Overall and Gender proportions and comparison of sports club participants (SC) and non-participants (Non-SC) meeting the Recommendation for VPA

	Overall	Boys	Girls	11 year	13 year	15 year	SC	Non- SC	p- value	SC boys	Non- SC boys	p- value	SC girls	Non- SC girls	p- value
<b>Belgium</b> (n=2765)	42	49	33	-	-	-	51	25	<.001	58	30	<.001	41	21	<.001
<b>Czech Republic</b> (n=10 455)	38	43	33	38	40	37	47	23	<.001	51	24	<.001	43	22	<.001
<b>Finland</b> (n=5323)	40	43	38	44	41	35	52	23	<.001	55	23	<.001	48	23	<.001
<b>France</b> (n=5975)	30	43	18	37	29	24	57	-	-	36	-	-	49	-	-
<b>Ireland</b> (n=6025)	62	68	57	66	57	-	70	45	<.001	75	48	<.001	65	44	<.001
<b>Sweden</b> (n=4598)	40	46	34	-	40	39	50	17	<.001	56	19	<.001	43	15	<.001

## Appendix 1. Overview of Data Sources

Country	Name of study	Year of data collection	Type of study	Sample size, age distribution	Question regarding SC participation with response options	Questions regarding MVPA and VPA with response options
Belgium (Flanders)	HBSC	2013 / 2014	Paper questionnaire via school classes	11, 13 & 15 yr n=3195	“Are you involved with these organisations or clubs?” which listed sports clubs as one of the possibilities that had to be scored either yes or no.	<p>MVPA: “Over the past 7 days, on how many days were you physically active for a total of at least 60 minutes per day? Please add up all the time you spent in physical activity each day.”</p> <p>Response options: from 0 to 7 days.</p> <p>VPA: “Outside of school hours, how often do you exercise or sport in your leisure time so much that you are out of breath or sweating?”</p> <p>Response options: every day, 4 to 6 times a week, 2 to 3 times a week, once a week, once a month, less than once a month, never. The item was dichotomized as at least 4 times a week vs. at most 3 times a week.</p>



## Appendix 1. Overview of Data Sources

Czech Republic	HBSC	2013 / 2014	Paper questionnaire via school classes	11, 13 & 15 yr n= 10 501	In your free time, do you do any of these organized activities?"  Response option:  yes/no. (Bosakova et al. 2016). Out of the six listed activities, two investigated involvement in team and individual sports.	MVPA: "Over the past 7 days, on how many days were you physically active for a total of at least 60 minutes per day? Please add up all the time you spent in physical activity each day." Response options from 0 to 7 days.  VPA: "Outside school hours: how often do you usually exercise in your free time so much that you get out of breath or sweat?" , Response options: every day, 4 to 6 times a week, 2 to 3 times a week, once a week, once a month, less than once a month, never. The item was dichotomized as at least 4 times a week vs. at most 3 times a week.
Finland	National physical activity behaviour study for	2016	Internet survey in school	11, 13 & 15 yr n=5355	Do you participate in to sport club activities in a sport club?" The answer options were: "Yes, I do regularly and actively",	MVPA: "Over the past 7 days, on how many days were you physically active for a total of at least 60 minutes per day? Please add up all the time you spent in physical activity each day." Response options: from 0 to 7 days. (Prochaska JJ, Sallis JF, Long B. (2001).

## Appendix 1. Overview of Data Sources

				children and adolescents (LIITU in Finnish)	“Yes I do occasionally”, “No I don’t at the moment, but I have been participated before”, “No I don’t, and I have never participated”	VPA: Think about an ordinary week. In how many days does your physical activity include vigorous activity?” Response options: “0 days 1 day 2 days 3 days 4 days 5 days 6 days 7 days” The item was dichotomized as at least 4 times a week vs. at most 3 times a week.
France	HBSC	2010	Paper questionnaire via school classes	11-15 yr n= 11638	Outside of school, how many hours during you free time do you practice sport that make you sweat or out of breath?  Outside of school, how many times during you free time do you practice sport that	During the last 7 days, on how many days did you practice PA for 60 minutes or more?

## Appendix 1. Overview of Data Sources

Ireland	HBSC	2010	Paper questionnaire via school classes	10-14 yr n=6025	Do you play with a club? Response options were yes, no.	<p>make you sweat or out of breath?</p> <p>MVPA: "Over the past 7 days, on how many days were you physically active for a total of at least 60 minutes per day? Please add up all the time you spent in physical activity each day."</p> <p>Response options: from 0 to 7 days.</p> <p>VPA: "Outside of school hours, how often do you exercise or sport in your leisure time so much that you are out of breath or sweating?"</p> <p>Response options: every day, 4 to 6 times a week, 2 to 3 times a week, once a week, once a month, less than once a month, never. The item was dichotomized as at least 4 times a week vs. at most 3 times a week.</p>
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## Appendix 1. Overview of Data Sources

Sweden	“Life and health Young” in Region Örebro County	2014	Paper questionnaire via school classes	13 & 15 y n= 4661	“Have you participated in any organized sport during the latest 12 months? With the answers: Yes/No.”	How much on average are you physically active per day (ex. walking, biking or doing sports)? The answer options were: “Less than 30 min”, “30-60 min”, or “More than 60 min”.  “How often do you exercise in your leisure-time, more than 30 min so that you are short of breath/sweating?” The answer options were: “Every day”, “4-6 a week”, “2-3 a week”, “once a week”, “1-3 a month”, “less than once a month”.
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