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Adolescents' Participation in School Physical Activity before and during the COVID-19 Pandemic: An Educational Priority

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Abstract: The aim of this study was to identify the structure of weekly physical activity (PA) of adolescents with varying degrees of participation in school PA and motivation for PA before and during the COVID-19 pandemic. PA was assessed using the IPAQ-long form and motivation by using the MPAM-R questionnaire. Participants (N = 1257) were divided into groups involved and not involved in school PA. During the pandemic, the greatest decrease was observed in vigorous and moderate PA in boys ($H = 98.52$, $p < 0.001$, $\eta^2 = 0.179$) and girls ($H = 56.86$, $p < 0.001$, $\eta^2 = 0.075$) involved in school PA and in boys involved and not involved in school PA and in transportation PA. Physical education (PE) teachers should focus on promoting vigorous PA and home PA for boys and girls in the post-pandemic period. Student participation in school PA and an increase in overall PA should be supported through distance PE, which should be a mandatory part of PE programs and comprehensive school PA programs.

Keywords: physical education; school lifestyle; types of motivation; public health; distance education

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1. Introduction

Because high schools educate most adolescents, they have the potential to deliver a significant proportion of their physical activity (PA) [1,2], health-related fitness [3], regular organized PA [4], movement integration in traditional classrooms [5], outdoor after-school PA [6] and sufficient physical literacy [7]. The achievement of these and other functions in high schools is dependent especially on the level of physical education (PE) [1], comprehensive school PA programs [8], cooperation of schools with sports clubs and leisure activities [9] and cooperation with parents [10].

However, the trend in adolescents' health and lifestyle clearly shows that schools do not sufficiently fulfill the expected function in PA among adolescents [11], in the compensation for sedentary behavior in school [12] or provision of mental health knowledge [13]. There are frequent objections to the level of PE in high schools [14,15]. Evidence suggests that mental strain and sedentary behavior in adolescents are insufficiently compensated with PA during breaks, after school and on weekends [12,16,17], which also leads to a higher prevalence of depressive symptoms [18], especially in less physically active and sedentary adolescents [19]. In most countries, PE is also associated with a lower status than other subjects [20], but PE should be designated as one of the main subjects [14].

The success of PE in high schools is highly dependent on adolescents' participation in PE, participation in classroom-based PA [21] and other forms of school PA (PA during class breaks) [16]. But it is also dependent on extracurricular PA, including active transportation to and from school [22]. The greatest emphasis should be placed on increasing the participation of adolescents in PE. In an extensive study involving 67 countries, Martins et al. [23] reported non-participation in PE among 18.2% of adolescents. In Poland, 15–23% of pupils in middle schools and 30% of students in high schools do not participate in PE lessons [24].

According to the results of repeated research studies in Poland, no school PA in a week is reported by approximately 17–22% of adolescents [25,26]. At the same time, theory as well as school practice requires students in school to participate in PE lessons without exception [27].

Participation in PE is positively associated with a range of health-related benefits among adolescents [23]. The most significant effect of participation in PE classes is an increase in vigorous PA, as documented by comparisons between Polish (mostly three PE classes per week) and Czech schools (mostly two PE classes per week) [28]. The positive influence of family motivation and lifestyle is another important aspect of the perception of health and the importance of PA in adulthood [29].

The effort to strengthen the role of PE in school PA was significantly affected by the onset of the COVID-19 pandemic. Schools, teachers and students were not prepared for these challenging, society-wide settings. Moreover, PE in the school schedule was no longer a priority. The prohibition, restriction or transition to hybrid or distance PE and the restrictions on other forms of organized PA led to a significant decrease in adolescents' PA [30–32]. During the pandemic, 81% of European students aged 6–18 years did not meet the recommended 60 min of PA per day [33]. In Poland [34] and in many other central and eastern European countries, the implementation of distance PE was exceptional, uncontrolled and varied between countries [35]. In addition, PE teachers in central and eastern European countries did not have adequate experience with hybrid PE or synchronous and asynchronous distance PE classes. Despite the criticism of online education [36] and different attitudes toward distance PE [37], multiyear experience with promoting distance PE [27,38] played a positive role during the pandemic [39,40]. Therefore, schools will play a crucial role in eliminating the negative consequences of the pandemic and in the subsequent restoration of high-quality education and the promotion of health [41]. The school context is the key space to meet the daily recommended PA for students and contributes to more than 40% of the overall daily moderate-to-vigorous PA (MVPA) [17]. School PA covers 30–37% of the overall daily PA for Polish girls and 28–39% for Polish boys [26]. Numerous reports emphasize that every school should implement a health-promoting PA support system [42]. Especially for the less physically active and less PA-motivated adolescents, it will be very difficult to restore the habit of regular PA [43]. At the same time, it is unlikely that sports clubs and other leisure institutions will compensate the insufficient school PA among adolescents [44]. Boosting adolescents' participation in organized PA is dependent on the level of PE and the effectiveness of comprehensive school PA programs, extracurricular school PA programs and other school-based activities. Non-participation in school PA means that participants report no vigorous PA, moderate PA or walking related to school. Solving the issue of non-participation in school PA, especially among low physically active adolescents, also requires respecting the positive associations between PA and types of motivation for PA [45].

Because high-quality PE and school PA are irreplaceable in the restoration of regular PA and the promotion of total PA, this study aims to identify the structure of weekly PA among adolescents with different level of participation in school PA and different motivations for PA in habitual education before the pandemic and in distance education during the COVID-19 pandemic.

The following research questions were formulated:

- What are the differences in PA and in meeting PA guidelines in habitual education before the pandemic and in distance education during the pandemic between adolescents with and without school PA?
- What types of motivation for PA are associated with higher weekly PA in adolescents with and without school PA in habitual education before the pandemic and in distance education during the pandemic?

2. Materials and Methods

2.1. Participants before the Pandemic

Between 2018 and 2019, before the pandemic, we contacted high schools that cooperated regularly with the university in the Katowice region (cities with less than 30,000 and more than 30,000 inhabitants) of Poland in the organization of teaching practice and in research. A total of 23 high schools' headmasters agreed to participate in research. In each school, the researchers randomly selected two classes of students, who had a computer science lesson in the computer lab during the research week in habitual education. The reason was not to disrupt the daily education program, which is unique approach, and to hold the initial participant meeting in a location where each student had access to a computer. The research involved a total of 347 boys (age 16.32 ± 0.74, BMI 21.92 ± 3.77) and 458 girls (age 16.31 ± 0.65, BMI 22.71 ± 2.83). A total of 90.8% of students and their parents signed informed consent and participated in the research.

2.2. Participants during the COVID-19 Pandemic

During the pandemic, from 2020 through 2021, we have offered research participation to other high schools cooperating with the Katowice university. During the pandemic, with distance education, 14 schools agreed to participate in the research. These were different high schools than before the pandemic, but they were schools of the same type, size and regional distribution. In each of the schools, the school administration selected two classes/groups of students with fully organized synchronous or asynchronous distance education. None of the schools included in the research had a clearly defined regular distance PE program. The research was presented as a recommended education program but required informed consent from each participant. Participation in the schools and groups greatly varied, but it was 73% and 89% in the groups. This part of the research involved a total of 192 boys (age 16.96 ± 0.98, BMI 22.60 ± 3.90) and 260 girls (age 16.39 ± 0.98, BMI 21.13 ± 3.06). All demographics are presented in Table 1.

Table 1. Basic descriptive characteristics of the sample.

	Age (M + SD)	Height (M + SD)	Weight (M + SD)	BMI (M + SD)	Urban (%)
Boys before pandemic (n = 347)	16.32 ± 0.74	177.22 ± 7.56	69.10 ± 14.04	21.92 ± 3.77	66.9
Boys during pandemic (n = 192)	16.96 ± 0.98	178.17 ± 7.14	71.89 ±13.78	22.60 ± 3.90	64.6
Girls before pandemic (n = 458)	16.31 ± 0.65	165,77 ± 5.94	56.92 ± 8.45	22.71 ± 2.83	74.7
Girls during pandemic (n = 260)	16.39 ± 0.98	165,62 ± 5.50	58.02 ± 9.27	21.13 ± 3.06	75.0

M = mean; SD = standard deviation; Urban = % of students in cities with more than 30,000 inhabitants

2.3. Setting

Research before and during the pandemic was always realized in October–November and in April–May. A common feature of the research conducted before and during the pandemic was the completion of surveys. Before the pandemic, the questionnaires were completed during the initial meeting in the computer lab after registration in the Indares (International Database for Research and Educational Support; www.indares.com, accessed on 24 January 2023) under research team supervision. The Indares web application enables the recording of personal data (self-reported age, weight, height), the filling in of questionnaires and the subsequent analysis and evaluation of the data. During the pandemic, participants completed questionnaires in this system again under the guidance of the research team via online support. The PA questionnaire was completed first, followed by the PA motivation questionnaire. Based on the results, boys and girls were grouped as follows:

(1) Before the pandemic—habitual education with school PA (boys 74%, girls 81%) and without school PA (boys 26%, girls 19%).
(2) During the pandemic—distance education with school PA (boys 40%, girls 55%) and without school PA (boys 60%, girls 45%).

2.4. Measures

Before the pandemic, school administrators received the purpose and rationale of the research on decreasing PA and the importance of motivation for PA among adolescents. During the pandemic, school administrators received information about the negative effects of the pandemic on PA, school PE and adolescents' lifestyles. School administrators were informed of the process of data anonymization in the Indares application (using codes) and the processing of average group results for the needs of the schools involved. School headmasters appointed an administrator in each school responsible for checking and recording data in the Indares application and for applying the results in school practice.

2.5. Questionnaires Applied in the Research

1. Weekly PA questionnaire

The International Physical Activity Questionnaire-Long Form (IPAQ-LF) was used in a modification for adolescents [46]. The Polish version of the questionnaire was developed in compliance with standard translation procedure according to the EORTC Quality of Life Group [47]. Pearson's correlation coefficient (concurrent validity) between subjectively assessed PA (METs-min/week) and pedometer-monitored PA (steps/week) was between r = 0.231 and 0.283. The internal consistency reliability Cronbach's α coefficient of the Polish version was $\alpha = 0.848$. The analysis of the questionnaire data was performed according to the IPAQ scoring protocol except for the determination of MET-min for vigorous PA, which was multiplied by the coefficient of 6 METs (originally by 8). The maximum limit of the aggregate duration of reported PA was 600 min/day, while the maximum limit of the overall sum of MET-min/week was 16,000 MET-min/week. Sitting time was recoded to a minimum value of 60 min/day and a maximum value of 960 min/day. Eighty-seven respondents were excluded for noncompliance with these criteria. In the study, school PA was represented by domain school-related physical activity (vigorous PA, moderate PA and walking) from the IPAQ-LF.

2. PA motivation questionnaire

A modified version of the Motives for Physical Activity Measure-Revised (MPAM-R) [48] was used. The Polish version was subject to the required translation procedure [47]. The internal consistency of the scale was high (Cronbach's α above 0.87 for each subscale) [49,50]. The questionnaire consisted of 30 items in five categories: enjoyment, competence, appearance, fitness and social factors. The categories were assessed on a 7-point Likert scale from 1 "not at all true for me" to 7 "very true for me". In terms of the categories of participants and their motivation for PA, both boys and girls were divided according to the median value as with low and high motivation.

Classification of Questionnaires in the Time Distribution of Research

To compare the physical activity level of adolescents before and during the pandemic, we chose the form of a retrospective cross-sectional study regarding restrictions during the pandemic at schools. The research design of the study is shown in Figure 1.

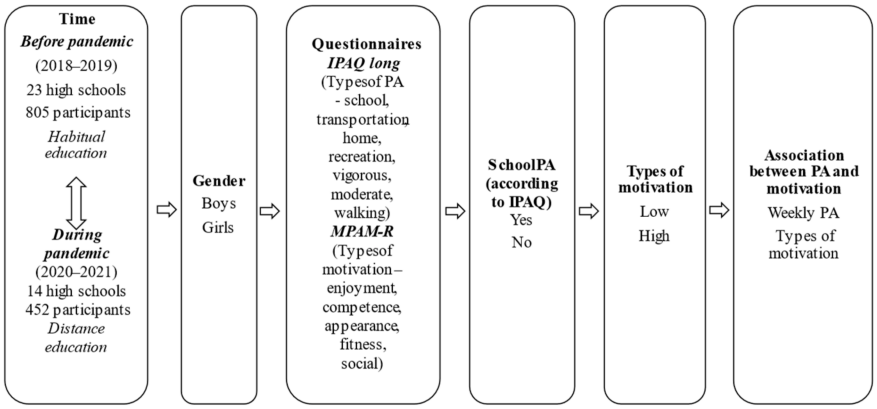


Figure 1. Scheme of the study design.

2.6. Data Analyses

Statistical data processing was performed in Statistica version 13 (StatSoft, Prague, Czech Republic) and SPSS version 25 (IBM Corp., Armonk, NY, USA). Basic descriptive statistics were used to characterize the sample, Kolmogorov–Smirnov and Lilliefors tests were used to check the data distribution. The Kruskal–Wallis test was used to identify the differences in the types of PA and types of motivation during the pandemic. We could not use the more informative multilevel regression analysis due to multicollinearity among independent variables and non-normal distribution of dependent variables. Differences between groups in the level of motivation were assessed using the Mann–Whitney U test. The data distribution in the assessment of weekly PA and motivation was presented by means of bag plots. The η^2 and r effect size coefficients were evaluated as follows: $0.01 \leq \eta^2 < 0.06$ ($0.1 \leq r < 0.3$) small effect size, $0.06 \leq \eta^2 < 0.14$ ($0.3 \leq r < 0.5$) medium effect size, $\eta^2 \geq 0.14$ ($r \geq 0.5$) large effect size. The level of statistical significance was set at $p < 0.05$.

3. Results

3.1. Differences in the Structure of Weekly PA in Habitual and Distance Education in Boys and Girls with or without School PA

In the overall weekly PA in boys, statistically significant differences were observed between habitual education before the pandemic and distance education during the pandemic ($H = 98.52$, $p < 0.001$, $\eta^2 = 0.179$ ***), both in boys without school PA (on average 4276 vs. 2810 MET-min/week, $p < 0.001$) and in boys with school PA (on average 6485 vs. 4053 MET-min/week, $p = 0.009$). In girls, statistically significant differences were observed between habitual and distance education ($H = 56.86$, $p < 0.001$, $\eta^2 = 0.075$ **) only in girls with school PA (on average 5504 versus 4051 MET-min/week, $p < 0.001$). Girls without school PA had a low level of PA (4017 MET-min/week) before the pandemic already; therefore, the decrease in distance education was not significant (3119 MET-min/week).

As far as the types of PA are concerned, the greatest negative effects in distance education in boys with school PA were due to vigorous PA ($p = 0.017$), moderate PA ($p < 0.001$) and walking ($p = 0.013$) (Figure 2). In girls with school PA, vigorous PA ($p < 0.001$) and moderate PA ($p = 0.014$) were observed but not walking.

Boys with school PA reported significantly more vigorous PA than boys without school PA (in habitual education by 1278 MET-min/week, $p < 0.001$, and in distance education by 849 MET-min/week, $p < 0.001$). Girls with school PA reported significantly more vigorous PA than girls without school PA only in habitual education (by 836 MET-min/week, $p < 0.001$) but not during the pandemic in distance education.

A significantly lower level of school PA in distance education during the pandemic was observed only in girls with school PA ($p = 0.001$) (Figure 3). In contrast, a significant decrease in transportation PA was observed in boys with school PA ($p < 0.001$) and without school PA ($p = 0.024$).

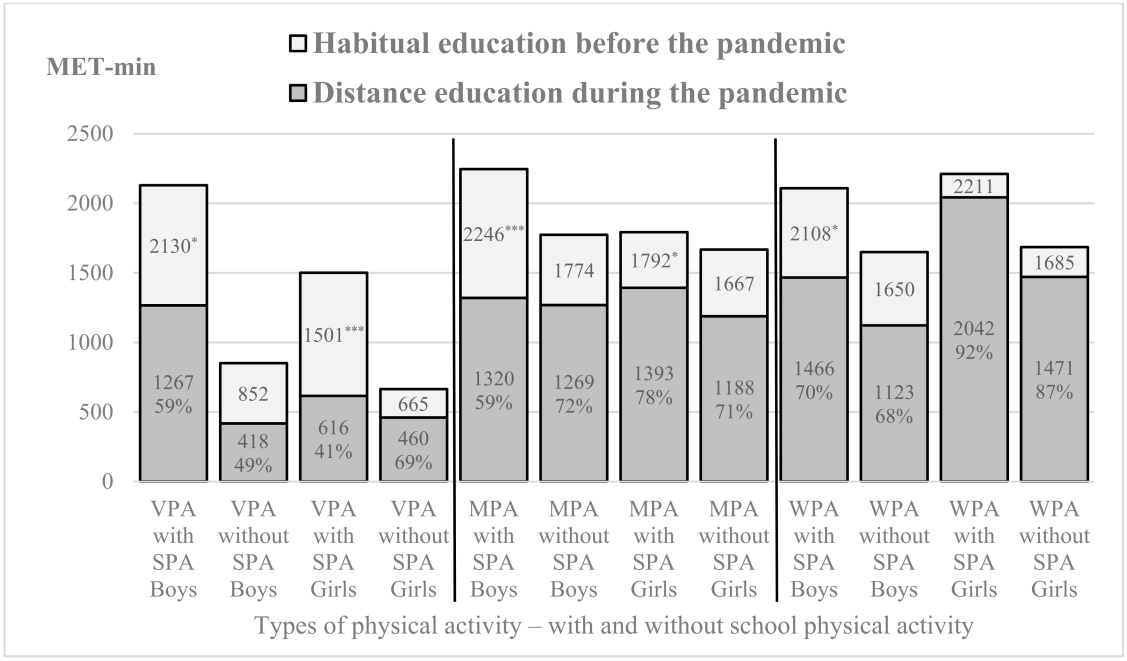


Figure 2. Structure of weekly PA (vigorous, moderate, walking PA) in boys and girls with and without school PA in habitual education before the pandemic and distance education during the pandemic. VPA = vigorous physical activity; MPA = moderate physical activity; WPA = walking; SPA = school physical activity; average values in MET-min. * $p < 0.05$; *** $p < 0.001$.

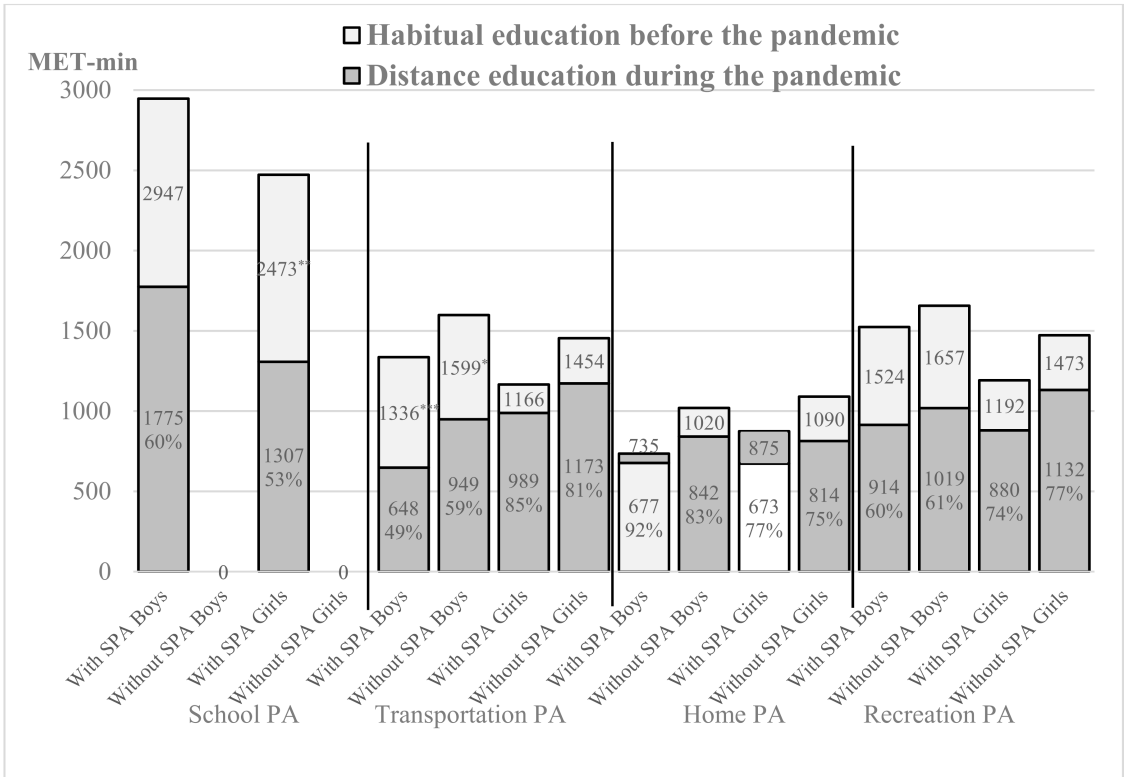


Figure 3. Structure of weekly PA (school, transportation, home, recreational PA) in boys and girls with and without school PA in habitual education before the pandemic and distance education during the pandemic. SPA = school physical activity; average values in MET-min. * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

3.2. Differences in Total Weekly PA in Habitual and Distance Education in Boys and Girls with or without School PA by Types of Motivation for PA

A lower level of total weekly PA in distance education as opposed to habitual education was reported by boys with school PA and with high enjoyment ($p = 0.002$), competence ($p < 0.001$), appearance ($p < 0.001$), fitness ($p < 0.001$) and social motivation ($p = 0.027$) and by boys with school PA and with low social motivation ($p = 0.009$) (Table 2). In contrast to boys, a lower level of total weekly PA in distance education was reported by girls with school PA but with low enjoyment ($p = 0.024$), competence ($p = 0.013$), appearance ($p = 0.002$) and fitness ($p = 0.006$). An even lower level of total PA in distance education was reported by girls with school PA but with high social motivation ($p = 0.036$).

Table 2. Associations between the weekly PA (METs-min/week) and types of motivation in low and high motivated boys and girls in habitual and distance education.

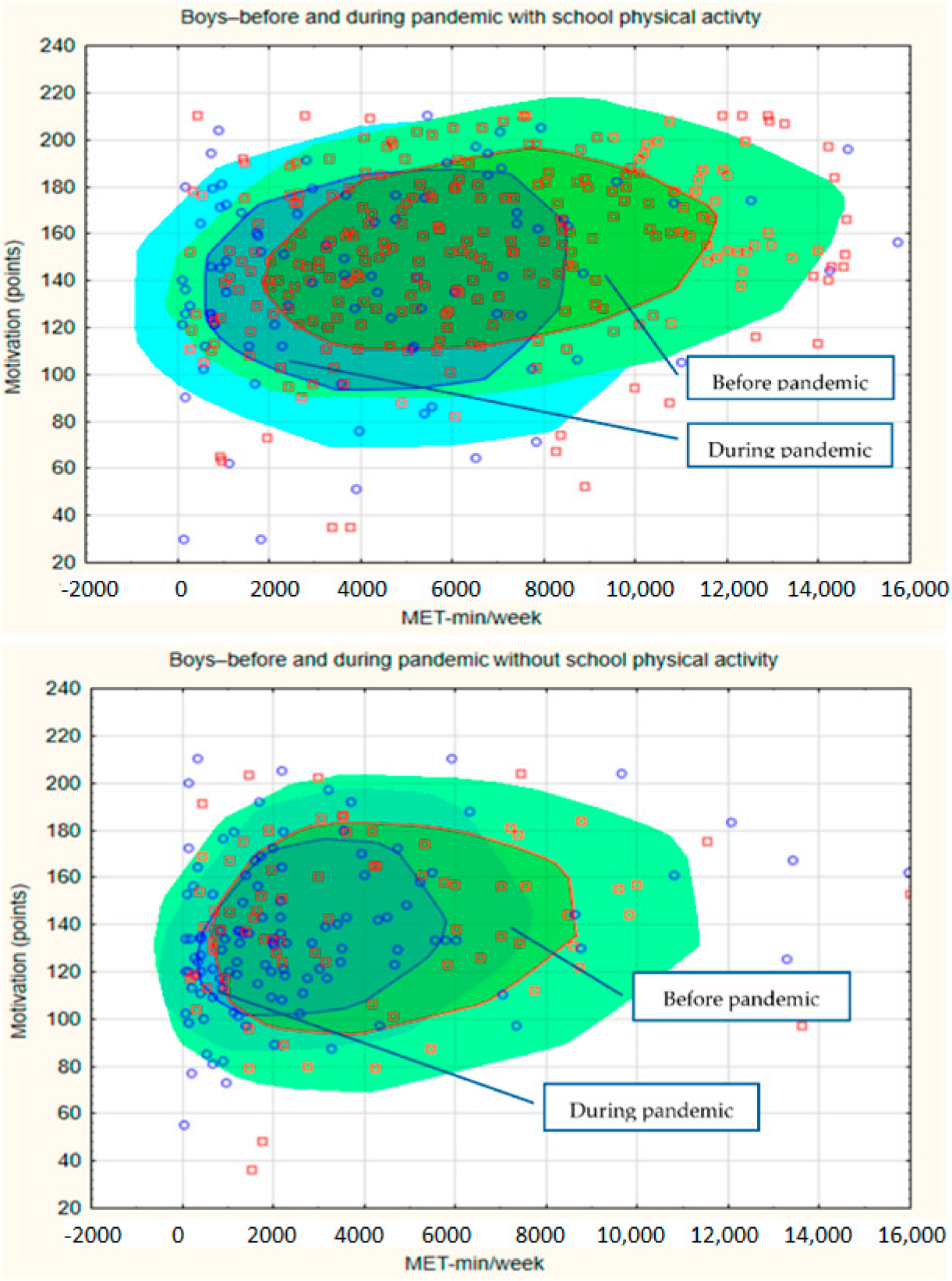
Types of Motivation	Without School Physical Activity				With School Physical Activity				*H*	*p*	η^2
	Habitual Education (*n* = 180)		Distance Education (*n* = 234)		Habitual Education (*n* = 625)		Distance Education (*n* = 218)				
	Low *Mdn* (*IQR*)	High *Mdn* (*IQR*)	Low *Mdn* (*IQR*)	High *Mdn* (*IQR*)	Low *Mdn* (*IQR*)	High *Mdn* (*IQR*)	Low *Mdn* (*IQR*)	High *Mdn* (*IQR*)			
Total weekly physical activity—boys											
Enjoyment	2779 (4457)	5400 (6807)	1312 (2118)	2222 (4075)	5197 (5687)	6643 (5650)	2181 (4845)	3588 (5067)	118.76 [b]	<0.001	0.089 **
Competence	2426 (4542)	5281 (6004)	1334 (2023)	3120 (4321)	5157 (5646)	7213 (6133)	2232 (5607)	3068 (4385)	123.52 [b]	<0.001	0.093 **
Appearance	3787 (6284)	3261 (5135)	1796 (2877)	2078 (2792)	5016 (5413)	7356 (6222)	2183 (4287)	3548 (5754)	110.39 [b]	<0.001	0.083 **
Fitness	3636 (4745)	4005 (6010)	1836 (2526)	1990 (3595)	5665 (6254)	6605 (5805)	2183 (5213)	3518 (4285)	106.50 [b]	<0.001	0.080 **
Social	2942 (4599)	4311 (5973)	1559 (2663)	2169 (2958)	5157 (5413)	6667 (6066)	2183 (4061)	3548 (5642)	106.51 [a,b]	<0.001	0.080 **
Total weekly physical activity—girls											
Enjoyment	1982 (3429)	4647 (4895)	1905 (3103)	2987 (3815)	4179 (5443)	5367 (6006)	2452 (3661)	3515 (4650)	82.47 [a]	<0.001	0.060 **
Competence	2331 (3756)	4039 (5096)	1388 (2946)	3164 (3914)	4100 (5350)	5718 (6050)	2678 (3702)	3406 (4170)	87.18 [a]	<0.001	0.064 **
Appearance	2603 (4630)	2460 (4439)	2773 (3774)	2322 (2853)	4036 (5553)	5267 (6244)	2295 (3882)	3574 (4537)	65.04 [a]	<0.001	0.046 *
Fitness	2050 (3756)	4068 (4981)	2227 (3240)	3015 (2980)	4003 (5352)	5701 (5966)	2337 (3645)	3994 (4579)	76.58 [a]	<0.001	0.056 *
Social	2331 (3700)	3043 (5182)	1901 (2939)	3220 (4140)	3939 (5485)	5599 (6133)	2802 (4469)	3223 (4259)	73.25 [b]	<0.001	0.053 *

H = Kruskal–Wallis ANOVA; *p* = significance; η^2 = effect size coefficient; differences between habitual and distance education, [a] (with school PA, low motivation), [b] (with school PA, high motivation); * small effect size; ** medium effect size.

3.3. Changes in the Overall Motivation for PA and Overall Weekly PA in Boys and Girls with and without School PA

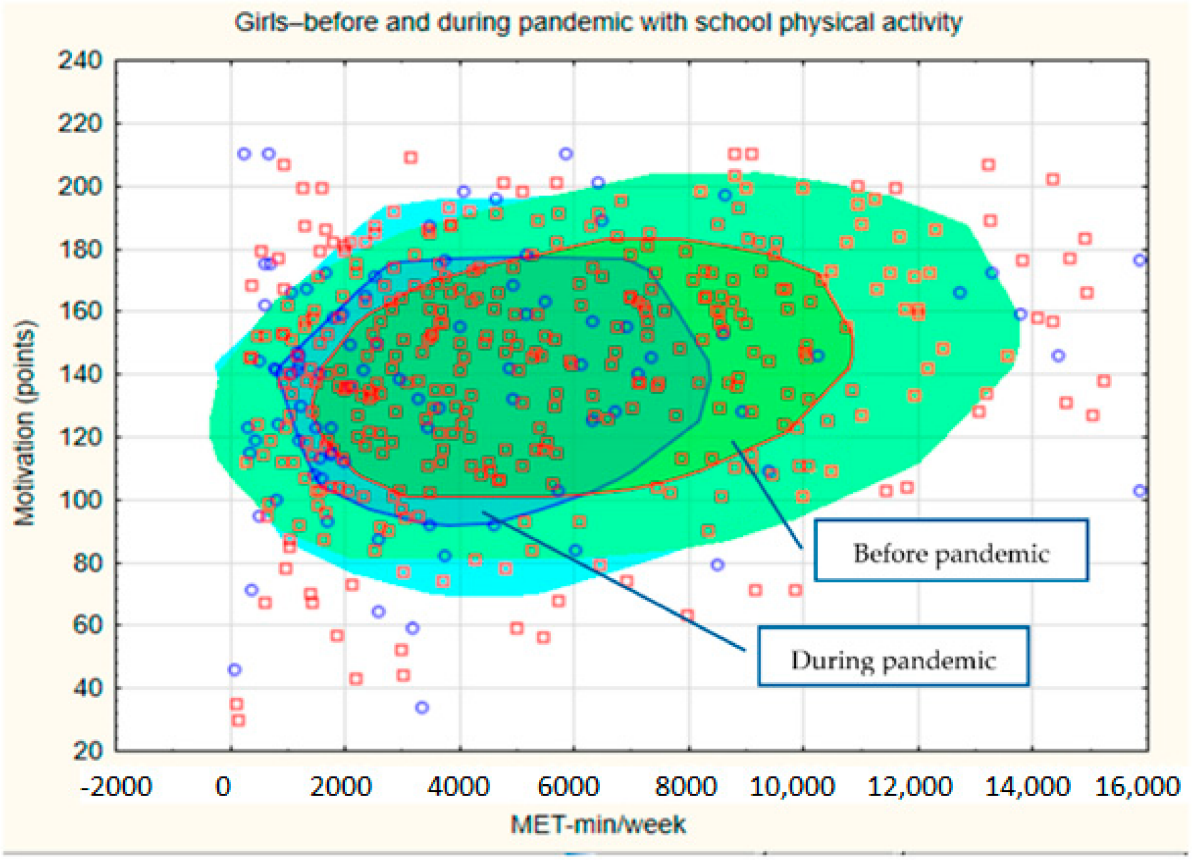
Before the pandemic in habitual education, boys with school PA had a greater motivation for PA (152 points) than boys without school PA (141 points) ($p = 0.032$); similarly, during the pandemic in distance education, boys with school PA had a greater motivation for PA (141 points) than boys without school PA (136 points), but the difference was not significant ($p = 0.113$). Girls with school PA before the pandemic in habitual education showed motivation for PA of 142 points and girls without school PA of 138 points ($p = 0.283$). During the pandemic in distance education, girls with school PA scored 130 points, while girls without school PA scored 129 points ($p = 0.893$).

The changes between habitual education before the pandemic and distance education during the pandemic in overall weekly PA and in motivation for PA in boys and girls with and without school PA are shown by means of bag plots (Figure 4).



(**A**)

Figure 4. *Cont.*



(**B**)

Figure 4. Association between total weekly PA and overall motivation for PA in boys (**A**) and girls (**B**) with and without school PA before and during the pandemic.

4. Discussion

The aim of this study was to identify the structure of weekly PA among adolescents with different degrees of participation in school PA and different motivations for PA in habitual education before the pandemic and in distance education during the pandemic. The greatest negative effects on the structure of weekly PA during the pandemic were observed in vigorous PA for boys and girls with and without school PA. The restriction or prohibition of PE, and often organized PA, resulted in this lower level of vigorous PA and is consistent with other studies [51,52]. According to Nagata et al. [51], the number of U.S. adolescents meeting MVPA guidelines decreased from 16.1% pre-pandemic to 8.9% during the pandemic. The decrease was caused mainly by the restrictions on team and racket PA; for example, in the UK, the likelihood of pursuing these types of PA decreased up to 76% [31]. A remarkable fact is that the lower transportation PA for boys with and without school PA compared with girls showed no significant decrease. Boys and girls with school PA also reported more home PA in distance education during the pandemic in contrast to habitual education before the pandemic, although the change was insignificant. Obviously, a more significant increase in home PA was not observed, especially because adolescents, their PE teachers, other teachers and parents were unable to adequately respond to the situation.

The significant negative impact of distance education during the pandemic on the vigorous PA of both boys and girls, more and less involved in school PA, draws attention to the importance of preparing boys and girls to perform independently vigorous PA. This should be provided both in PE lessons and other offers in school PA, including online vigorous PA programs. It is important to respect gender specifics and individual PA preferences.

The lower level of overall weekly PA in distance education during the pandemic compared with PA in habitual education before the pandemic was confirmed in boys and girls with school PA and boys without school PA. It was not confirmed in girls without school PA, which is related to their low weekly PA and the globally lower weekly PA in girls as opposed to boys [17,53,54]. The greatest negative impact of the pandemic on overall weekly PA was observed in boys with school PA and those who were more motivated to engage in PA. In contrast, in girls with school PA, the greatest decrease in weekly PA was observed in those less motivated to engage in PA. Pieró-Velert et al. [55] found that girls less motivated for PA are dissatisfied with PE lessons, consider participation in PE a waste of time and they participate in PE partly because they are supposed to do so and might have difficulty if they do not. Among girls with school PA and more motivated for PA, only girls with high social motivation for PA had significantly less overall weekly PA in distance education. This finding highlights the negative effects of fewer social contacts in distance education during the pandemic [56]. Therefore, a greater focus should be placed on social motives for the types of PA preferred among less motivated girls to allow social contact in distance. Previous studies have also suggested that, among girls, the negative effects of the pandemic and distance education might reflect more in their mental health, while in boys the greater effect is on PA [57].

Previous research studies in Poland and the Czech Republic have not reported such low levels of weekly school PA, transportation PA, home PA and recreational PA as during the pandemic [44,58]. A significant decrease in overall weekly PA during the pandemic was also observed in schools in Shanghai [59], in French schools, a decrease in PA was observed in 59% of adolescents [30], and 66% of adolescents reported a decrease in overall PA [60]. In Polish schools, a decrease in PA was observed by 50% of adolescents [61].

Increased attention should be given to the significant decrease in walking among boys during the pandemic, although this type of PA may have been affected by the short-term and exceptional restrictions of movement outside of home. Unfortunately, smaller groups of students were exceptionally motivated to occasionally check their PA using wearables and mobile phones. Therefore, it is important to pay particular attention to the adoption of the habit of using available wearables to support motivation for walking. To date,

there has never been a significant economic and political call for the massive support of active transport in the European region in the post-pandemic era. It is the responsibility of schools, and especially PE teachers, to enforce a fundamental change in thinking toward a responsible ecological, economic and political attitude toward adolescents' lifestyles.

The results of the study revealed numerous shortcomings in PE and suggested potential changes in PE classes. PE teachers are willing to accept the increased demands for the distance PE settings and to support its use to improve PE classes [39] despite numerous barriers [62]. We can hardly expect that particularly less physically active adolescents will restore or improve the level of PA to pre-pandemic levels without adequate support. The role of PE lessons in supporting the PA of these adolescents is difficult to replace [63]. Therefore, it is crucial to understand and respect the PA preferences of these students and thus reduce the level of unwillingness to participate in PE lessons [64]. Another significant aspect is to ensure high-quality distance PE, which will provide attractive PA programs to increase home PA and fitness among adolescents.

Every crisis has certain positive outcomes. This also applies to distance education in high schools during the pandemic. Acquisition of new IT skills and broader forms of communication with teachers and classmates should be used in PE to expand its effect on adolescents. Increasing technology use in PE classes, the use of gamification methods [65], providing better home PA programs, expanding PA cooperation among students and substantially innovating the objectives, content and methods of PE curricula are needed.

The following should be recommended for school practice in high schools:

All students who are present in school should be required to participate in PE classes and in activities as part of a comprehensive school PA program; there should be no exceptions.

- Students who do not participate in PE and school PA should be offered participation in distance PE.
- Mandate the requirement to provide alternative distance PE as an integral part of traditional PE.
- Improve outdoor facilities for PE classes and other school PA to ensure wider use. A focus on outdoor PE is also supported by the experience of PE teachers in Sweden, where PE was not abolished during the pandemic but significantly changed [66].
- Promote the adoption of PA types that adolescents prefer in distance education.
- Teach students to develop their own individual PA programs with an emphasis on fitness activities and complementary home PA programs.
- Effectively use wearables in PE classes and implement the knowledge and experience of using them in daily PA.
- Enable and motivate adolescents to access individual forms of fitness testing.
- Support the implementation of PA guidelines in the main segments of the school day [25].
- Enhance knowledge and skills regarding the benefits of home PA, such as reducing stress and improving physical and mental health, as part of implementing physical literacy.

In this context, PE research needs to quickly assess interventions aimed at distance and hybrid PE, ways of promoting new approaches to PA and healthy lifestyles in adolescents in school and local and national policy. It is also necessary to verify the possibility of having students use wearables during distance PE and implementing comprehensive school PA programs, including interventions to encourage students to develop individual PA programs and methods of PA self-control.

A limitation of this research is that high schools could not afford to increase the burden of distance education by adding more tasks associated with this study. More than a quarter of students in distance education during the pandemic did not respond to the call for participation in the research. According to the teachers, these were mostly less responsible students. At the same time, this group of students could have affected the structure of weekly PA. A significant limitation was that the schools did not allow us to address students involved in the research before the pandemic. Even so, the one-year delay also would have been a limitation in the context of the changed education program. The study was also

limited by not using wearables to monitor PA because schools could not accommodate research team meetings with students during pandemic prevention lockdowns.

5. Conclusions

The negative impact of the pandemic was reflected in a reduction in total weekly PA in both boys and girls, both in participants and non-participants in school PA. The most negative impact of the pandemic on total weekly PA was observed in boys involved in school PA and more motivated to engage in PA. Conversely, among girls involved in school PA, the greatest decline in weekly PA was observed among those less motivated to engage in PA. In terms of PA types, the most significant decrease during the pandemic occurred in vigorous PA. Ideas and requirements have been proposed for changes in PE and school PA as lessons learned from the pandemic. Supplementing traditional PE with distance PE should be a mandatory part of education programs and comprehensive school PA programs in high schools. Distance PE should focus on adolescents who are not involved in PE or school PA and encourage them to participate. The difficult period during the pandemic must be considered a crisis period for PE and school PA for adolescents, which requires the application of positive experiences not only in high schools but also in the professional training of PE teachers.

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