Beden Eğitimi ve Spor Araştırmaları Dergisi
Mart 2024, 16(1) 38-56

BESAD JPESS

Journal of Physical Education and Sports Studies
March 2024, 16(1) 38-56

Generalization of Participation in Physical Activity From Physical Education to Recess in Two Elementary School Classes

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Article History
Received : November 9, 2023
Accepted : March 28, 2024
Online : April 23, 2024
DOI: 10.55929/besad.1388096

Article Type
Research Article

Abstract: The purpose of this study was to investigate the generalization of participation in parkour from physical education to parkour recess in two different elementary school classes taught by the same teacher. One class of 2nd grade (n = 19) and one class of 3rd grade (n= 26) elementary school children were taught a seven-lesson parkour unit during physical education. The teacher and the children were new to parkour, and the teacher taught each lesson first to the second-grade class followed by the third-grade class. The voluntary participation and MVPA of children from both classes in six parkour recess sessions connected with seven physical education lessons were recorded. In physical education, MVPA, lesson context, and teacher's physical activity promotion in both classes were investigated. Results indicated that more time was spent in management in grade 2 (50%) compared to grade 3 (45%). In grade 3, children had more skill practice and achieved more MVPA compared to second graders during physical education (38% versus 35%, p<.001). There was more in class physical activity promotion in third grade (15%) compared to second grade (7%). More children from 3rd grade participated in parkour recess (74%) compared to children from 2nd grade (43%, p=0.001), although both groups achieved similar mean MVPA levels (70%). The generalization of participation in parkour from physical education to recess varied between classes taught by the same teacher. This might be the result of teaching the content to two classes, which enabled the teacher to adapt the content and refine teaching strategies.

Keywords: *Transfer, parkour, MVPA, comprehensive school physical activity program (CSPAP)*

Bu makaleye atıf yapmak için | To cite this article

Vanluyten, K., Cheng, S., Taheri, H., & Iserbyt, P. (2024). Generalization of participation in physical activity form physical education to recess in two elementary school classes. *Beden Eğitimi ve Spor Araştırmaları Dergisi, 16*(1), 38-56.

INTRODUCTION

It has been argued that physical activity levels during childhood can track into adulthood (Telama, 2009). Since a lack of physical activity is associated with cardiovascular risk factors and obesity (Bailey et al., 2013; Müller et al., 2016), increasing children's moderate-to-vigorous physical activity (MVPA) is important to promote overall health (Strong et al., 2005). The Global action plan 2018-2030 (WHO, 2018) recommends the provision of high-quality physical education and more opportunities to engage in physical activity for children. The World Health Organization (WHO) strongly recommends that children aged 5-17 years should engage in 60 minutes of MVPA each

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day (across the week) to reduce the risk of cardiovascular diseases (WHO, 2023). In Belgium, only 11% of boys and 1.6% of girls between six and nine years old meet this recommendation, which illustrates the need for physical activity interventions at an early age (Wijtzes et al., 2016). Schools are a unique setting for the promotion of physical activity since children spent a large portion of their time there and nearly all children can be reached (Verstraete et al., 2007).

More recently, multicomponent strategies such as the Comprehensive School Physical Activity Program (CSPAP), have been implemented in schools to encourage children to engage in physical activity across its five components including (a) physical education, (b) physical activity during school, (c) before and after school physical activity, (d) staff involvement and (e) family/ community engagement (Carson & Webster, 2019). Although high-quality physical education plays a pivotal role in promoting physical activity, the issue of insufficient physical activity in youth cannot be addressed through physical education alone, since it is usually scheduled for only two lessons per week (Schwamberger & Sinelnikov, 2015). Furthermore, MVPA levels during physical education in elementary schools are often below the recommended 50% of lesson time, as reported in the review by Hollis et al. (2016). Therefore, it must be combined with other components of the CSPAP such as physical activity during the school day (e.g., recess) to increase children's daily MVPA (Pulling Kuhn et al., 2021). In a CSPAP, the different components are coordinated in order to increase children's activity levels. For physical activity during school, classroom teachers can offer active classroom breaks and activities during recess could be offered. Before and after school programs can offer children an easy and accessible setting to engage in several motor activities, while staff involvement and family and community engagement encourages the people in the children's environment to facilitate and active lifestyle.

Research on physical activity programs during recess have shown that the content of these programs is very often disconnected from physical education (Coolkens et al., 2018b). Over the last five years, researchers have investigated the effect of connecting recess with physical education content in elementary (Cheng et al., 2021, Coolkens et al., 2018c; Iserbyt et al., 2022; Vanluyten et al., 2023a) and secondary school (Iserbyt et al., 2022). This line of research builds on the principle of generalization (Cooper et al., 2020). Generalization means that learners demonstrate a target behavior in a setting that is different from the setting in which it was learned (Cooper et al., 2020). In past generalization research, the proportion of children that participated in physical activities during recess that were learned in physical education as well as their MVPA were investigated (Coolkens et al., 2018b; Cheng et al., 2021; Iserbyt et al., 2022; Vanluyten et al., 2023a). In elementary schools, voluntary participation rate in physical activity sessions during recess was

reported in several studies and ranged between 64-82% (Coolkens et al., 2018b; Cheng et al., 2021; Vanluyten et al., 2023a). Both Coolkens et al. (2018b) and Vanluyten et al. (2023a) did not find any significant differences between boys and girls, unlike Cheng et al. (2021) who reported that more girls (53%) participated in all physical activity sessions during recess compared to boys (35%). In studies in which parkour was used, the amount of MVPA children generated during 20-min parkour recess sessions varied between 58% and 76%. Coolkens et al. (2018b) showed that children, both boys and girls, achieved up to 76% of MVPA during parkour recess. Cheng et al. (2021) found an average MVPA of 68% in parkour recess, with a significant difference between boys (73%) and girls (65%). Vanluyten and colleagues (2023a) reported similar differences with boys generating 64% of MVPA, while girls generated 58% of MVPA. These studies showed that a substantial part of boys and girls participated during organized recess sessions and that they exceeded the guideline of 50% MVPA during recess as suggested by Stratton & Mulan (2005).

To date, our knowledge regarding the process of generalizing participation in physical activity from physical education to recess is still limited. For example, it is unclear whether children's participation or MVPA would vary as a function of their age. Based on research in physical activity and participation in school-based sports, we would expect a decline in MVPA and participation as age increases (De Meester et al., 2014; Drijvers et al., 2022; Farooq et al., 2018). In elementary school, De Meester et al. (2014) found that age was significantly related to children's physical activity level. In secondary schools, Drijvers et al. (2022) reported a decline in participation in school-based physical activity and sport programs as students' age.

In addition, previous generalization research has also not considered how the content was taught. How a teacher presents the content will affect children's learning and their physical education experience, which in turn could affect their voluntary participation and MVPA in that content during recess. To date, all published research on generalization involved physical education teachers who taught only one unit to one class. However, it has been reported that teachers adapt their teaching when teaching a second class based on their experience in the first class (Iserbyt & Madou, 2021). Therefore, in this study we investigated the teacher's delivery of the parkour content by means of lesson context and teacher behavior in a first (i.e., grade 2) and second (i.e., grade 3) class.

This study replicates and extends previous studies on generalization of participation in physical activity from physical education to recess (Cheng et al., 2020; Coolkens et al., 2018b; 2018c; Vanluyten et al., 2023a). It is a replication in that parkour as a content domain in physical education and recess was reexamined in elementary school but within a different cultural context (Coolkens

et al., 2018b; 2018c); and that children's MVPA was investigated in both physical education and parkour recess. It is an extension of previous work in that we investigated whether the generalization from physical education to recess would vary between two different classes (i.e., grade 2 and grade 3) taught by the same teacher. In this study we addressed the following research questions: (1) how does the teacher's delivery of the parkour unit differ between grade 2 and 3? (2) how does children's MVPA in physical education differ between both grades? (3) how does children's participation in parkour recess differ between both grades? (4) how does children's MVPA in parkour recess differ between both grades? And (5) how does children's MVPA during physical education differs from their MVPA during parkour recess?

METHODS

Participants

A total of 45 children (26 boys, 19 girls; mean age 8.5 years) comprising two classes (one second and one-third grade) and their physical education teacher with 31 years of teaching physical education experiences (female, age = 50 years) from one elementary school in Wallonia, the French-speaking part in Belgium, participated in this study. This school was chosen because of its geographical location, which was close to the authors' university. Class size in the second grade was 19 (7 girls and 12 boys) and in the third grade 26 (13 girls and 13 boys). The teacher was asked to categorize the students by their skill level into three groups: lower -, average -, and higher skilled based on previous motor skill assessments of children. Children nor the teacher had previous experience in parkour. The second-grade class was taught first, followed by the third-grade class.

Parkour Unit in Physical Education

A seven-lesson parkour unit was taught in physical education in one second and one third-grade class. Physical education is mandatory and held once or twice a week in Belgian elementary schools. Children in this study received seven 50-minute classes of parkour, once a week. Parkour is an individual content domain in which children have to overcome obstacles in an efficient and creative way (Vanluyten et al., 2023a). It is accessible to both boys and girls and it is considered an attractive sport for leisure time (Green, 2016). In both grades the same lesson plans, unit goal and lesson goals were used. During the first lesson, focus was put on balance, landing safely (i.e., precision) and transitions from one obstacle to another by performing strides. In the subsequent lessons, several vaults (i.e., barrel roll), spins (i.e., palm spin) and wall movements (i.e., wall run) were introduced (see also Vanluyten et al., 2023b). In each lesson three new parkour moves were

introduced (i.e., speedstep, catleap), or already learned moves were extended by introducing progressions (i.e., speedstep was extended to thiefstep). During each lesson plinths, benches, spring boards and other obstacles were set up in three stations where small groups of children could do a circuit and learn one of the three newly introduced skills while applying previously learned skills. An overview of the content can be found in Table 1. The unit originally consisted of ten lessons. However, school closures due to a general lockdown (Covid-19 Pandemic) after lesson seven made the completion of the unit impossible.

Table 1. Parkour Lesson Unit

Lesson	Lesson content Parkour
1	Precision: jumping from object to object, or landing after a vault. Stride: running strides from object to object. Balance: movement or landing in balance.
2	Vault: speedstep: jumping over an obstacle with hand support on the obstacle. Wall movement: Tik: run towards a wall, put one foot against the wall and change direction. Spin: palm spin: overcome an obstacle, by placing your hand on the obstacle, and rotating around your hand.
3	Vault: barrel roll: roll over a low obstacle (with helper). Wall movement: catleap: jump and land on an obstacle where you hang (feet against obstacle). Spin: side vault: put two hand on the obstacles and jump on and over it by making a rotation.
4	Progressions lesson 2: Speedstep -Thiefstep Tik - Tiktak Palm spin on and over plinth
5	Progressions lesson 3: Barrel roll over a plinth (with helper) Catleap against a climbing wall Side vault: two hands on the obstacle and jump over it by making a rotation
6	Focus on transitions and fluency of performance by connecting two to three previous learned parkour moves
7	Progressions, transitions and fluency Speedstep - Thiefstep - Thief Palm spin over plinth (without landing on the plinth) Barrel roll over a plinth (without helper)

Parkour Recess Sessions

Parkour recess was held once a week in the school gymnasium for both second and third grade together. Every week, children had the opportunity to voluntarily participate in parkour recess, which lasted 20 minutes. During parkour recess, teachers did not introduce new content, nor were there any new skills instructed. The equipment in the gymnasium was set up similarly as during the

physical education lessons. Parkour recess was offered during lunch recess, and children could freely choose to participate during parkour recess or stay on the playground. Lunch recess on the playground was supervised by the school's staff and teachers and lasted 45 minutes. Children could freely choose what to do on the playground, from being sedentary to playing sports or games. The teacher gave a standardized invitation at the end of the physical education lesson that preceded parkour recess.

Teacher Training and Procedural Fidelity

The physical education teacher was invited to study a standardized parkour manual based on Coolkens et al (2018a) and Vanluyten et al. (2023b), which included developed lessons plans, prior to the 4-hour workshop on the teacher's school to assure the learning of parkour skills. During the workshop, which was led by the last author, parkour moves of five movement categories (for an overview of the content, see Vanluyten et al., 2023b) were discussed and performed with an emphasis on the critical elements and how to correct common errors children could make. After the workshop the teacher successfully completed a quiz on the parkour content to assess her understanding of the critical elements of all parkour moves for an elementary school unit. In addition, to assess her understanding of the teaching progressions for the different parkour skills, the teacher taught the content to the researchers of this study and received ongoing feedback on her task presentation and ability to provide task adaptations for higher- and lower-skilled children.

Data Collection and Coder Training

Data was collected from January 2020 until March 2020. All physical education and parkour recess sessions were videotaped, which enabled the coding of all children present. The dependent variables in this study are (1) lesson context and physical activity promotion during physical education, (2) physical activity levels during physical education, (3) voluntary participation during parkour recess, (4) physical activity levels during parkour recess. The number of children who participated during parkour recess was recorded for each session. Voluntary participation was calculated by dividing the number of children that were present during a parkour recess session by the total number of children, this was done separately for each grade. Physical activity levels, lesson context and physical activity promotion were collected through systematic observation, which was a validated and reliable method (Rowe et al., 1997; Cooper et al., 2020). The System for Observing Fitness Instruction Time (SOFIT) tool was used for coding physical activity levels, lesson context and physical activity promotion (McKenzie et al., 1992). MVPA levels of all children were coded during physical education and parkour recess while lesson context and physical activity promotion

were only coded during physical education. The SOFIT tool uses momentary time sampling for physical activity levels and lesson context, with a 6-second 'observe' and a 6-second 'record' interval. During the 'observe' interval, observers focus on the target child, while on the 'record' prompt, the physical activity level at that point is recorded. Children's activity level was coded using five levels, namely level 1 (lying), level 2 (sitting), level 3 (standing), level 4 (walking), and level 5 (very active). Level 4 and 5 were added to represent the MVPA variable. For lesson context, the following categories were coded: management (M; e.g., changing stations), knowledge (K; e.g., children listening to teacher's instruction), skill practice (S; e.g., practice of parkour skills), game play (G; e.g., application of skills in a game), fitness (F; e.g., changing children physical state by means of cardiovascular exercises) and other (O, e.g., free play time). For physical activity promotion partial interval recording was used in which the target behavior must occur at least somewhere during the 6-second 'observe' interval. The physical activity promotion variable was adapted from the original SOFIT protocol to have a more in-depth understanding of teacher's behavior. Physical activity promotion can be divided into in-class and out of class promotion, which was in the original SOFIT-manual. It was further specified as it can be directed at the individual or the whole group level, resulting into four categories: individual in-class promotion (Ii; i.e., "great speedstep Mike"), individual whole-group promotion (Ic, "Well done, you all performed a magnificent catleap"), individual out of class promotion (Oi, "Really nice to see you attended parkour recess, Sarah") and whole-group out of class promotion (Oc, "You can do this parkourmove on the playground during recess"). When there was no physical activity promotion by the teacher, none (N) was coded.

Coders needed to successfully complete nine steps to finish their training as reliable observers. Six coders were involved in the coding process of this research project. First, a lecture on systematic observation needed to be studied, while in step two the SOFIT manual had to be studied (McKenzie et al., 1992). Subsequently, there were tests on codes (step three), conventions (step four) and written situations (step five), in which observers needed to score 100% in order to proceed to the next step. In steps six and seven, a video was coded, where the interobserver agreement (IOA) needed to be 85% or higher. In step eight, a live coding session with a reliable observer was done, where the IOA ≥85%. In step 9, observers could code independently. However, at least 12% of all data should be coded by two independent coders with an IOA ≥85%, as suggested in behavioral research (Cooper et al., 2020). For physical education the reliability was 87% for MVPA, 95% for lesson context and 88% for physical activity promotion. The proportion of intervals that was coded by two independent coders (i.e., overlap) was 21% for MVPA and 28%

for lesson context and physical activity promotion. For parkour recess, the reliability was 85% with an overlap of 14%.

Data Analysis

The Statistical Package for Social Science software (SPSS, version 27) was used to analyze all data. Differences in participation during parkour recess between second and third grade children in each session were assessed with a chi-square test. A Mann Whitney U test was used to assess differences between second and third grade for mean participation in six parkour recess sessions and for MVPA during parkour recess, as the data was independent and not normally distributed. Furthermore, an unpaired T-test (equal variances) was used to assess differences between the MVPA in second and third grade for each session and for the average MVPA of seven lessons, as data was normally distributed. The variables related to the teacher's delivery of the Parkour unit (i.e., SOFIT) were analyzed descriptively and reported in proportion of lesson time.

RESULTS

Teacher's Delivery of the Parkour Unit

Means for all SOFIT categories for both grades during all physical education lessons are presented in Table 2. The physical education teacher spent most time in management in both grade two (50%) and grade three (45%), followed by skill practice (25% for grade 2 and 33% for grade 3), knowledge (19% for both classes) and fitness (7% for grade 2 and 4% for grade 3). The lesson context categories 'game' and 'other' did not occur and therefore were not added in Table 1. Apart from lesson six, more time in management was spent during each lesson in grade 2 compared to grade 3. More time was spent in skill practice in grade 3. For knowledge, similar percentages were found in both grades. Time spent on management was higher in both grades (63% and 55%) at the start of the unit compared to the end of the unit (37% and 33%). In contrast, an upward trend could be observed for skill practice with values of 19% and 24% at the beginning and 29% and 47% at the end.

Most of the time there was no physical activity promotion (90% for grade 2 and 84% for grade 3) by the physical education teacher. There was no out of class physical activity promotion, not on the individual level nor classwide. Individual in class physical activity promotion occurred 7% in grade 2 and 15% in grade 3, while class wide in class physical activity promotion occurred 2% in both grades. Only during lesson four an even amount of time was spent on individual in class

physical activity promotion (7%), while during all other lessons more physical activity promotion occurred in grade 3.

Table 2. Physical Activity, Lesson Context and Physical Activity Promotion in Second Grade and Third Grade during Physical Education

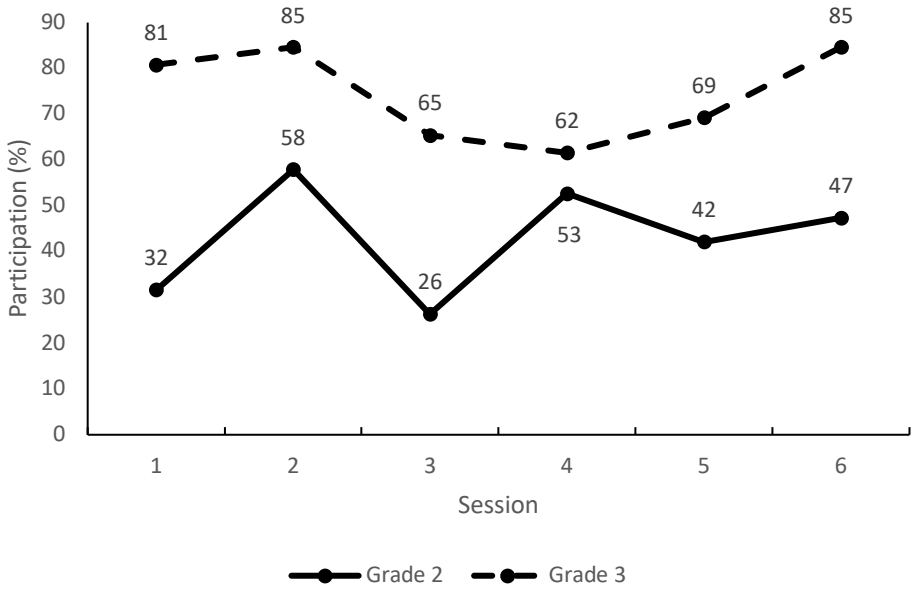
	Lesson 1		Lesson 2		Lesson 3		Lesson 4		Lesson 5		Lesson 6		Lesson 7		Means	
	G2	G3	G2	G3	G2	G3	G2	G3	G2	G3	G2	G3	G2	G3	G2	G3
Physical activity (%)																
MVPA	32	29	38	38	38[a]	43[a]	37	41	30	37	33[b]	44[b]	35	36	34	36
Lesson context (%)																
M	63	55	56	54	55	43	53	44	51	43	37	41	37	33	50	45
K	14	18	16	14	17	19	13	16	23	25	22	20	26	20	19	19
F	4	3	16	0	4	6	5	6	5	4	6	6	8	0	7	4
S	19	24	12	33	30	32	29	34	22	28	35	34	29	47	25	33
G	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
O	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PA promotion (%)																
I_i	4	16	9	16	7	20	7	7	9	13	4	16	11	14	7	15
I_c	2	3	3	2	2	2	1	2	1	2	0	2	3	0	2	2
O_i	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
O_c	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N	93	82	87	82	91	77	92	91	90	85	96	83	78	86	90	84

a: $p<.05$, b: $p<.001$, G2 = grade 2, G3 = grade 3, M: Management, K: Knowledge, F: Fitness, S: Skill Practice, G: Game, O: Other, Ii: individual in-class promotion, Ic: whole-group in-class promotion, Oi: individual out of class promotion, Oc: whole-group out of class promotion

Participation in Parkour Recess

There was a significant difference in terms of overall participation between second grade (43%) versus third graders (74%), U = 103.5, p= 0.001. During session one, $\chi^2(1, 45) = 11.07$, $p<.001$, two, $\chi^2(1, 45) = 4.01$, $p=.045$, three, $\chi^2(1, 45) = 6.71$, $p=.01$, and six, $\chi^2(1, 45) = 7.11$, $p=.008$, significantly more third graders participated compared to second graders.

Figure 1. Participation Proportions of Children in Second and Third Grade Elementary During Parkour Recess in Flanders (Belgium).



Physical Activity during Parkour Recess

Second and third grade children spent on average a similar amount of time in MVPA during parkour recess (70%). The mean MVPA values for each parkour recess session in grades 2 and 3 are shown in Table 3. During 20-minute recess session children generated between 12 and 17 minutes of MVPA, which shows that children actively spent 60-85% of recess time and contributes to 20-28% of the daily recommended MVPA.

Table 3. Moderate-to-Vigorous Physical Activity (MVPA) during Parkour Recess for Second and Third Grade Elementary

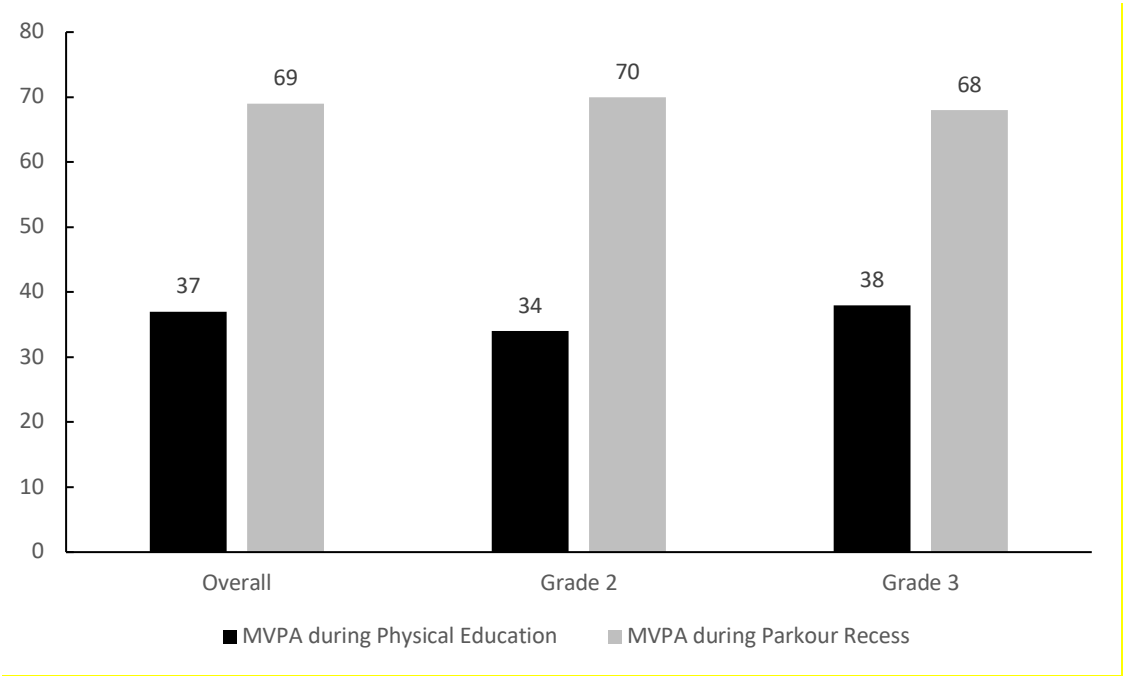
	MVPA (%)	
	Grade 2	Grade 3
Session 1	67	63
Session 2	66	62
Session 3	84	85
Session 4	64	67
Session 5	66	75
Session 6	70	66
Average	70	70

Physical Activity in both settings

MVPA levels of all children (grade 2 & grade 3) were higher during parkour recess (69%) compared to physical education (37%), $t(42) = 31.45$, $p<.001$, $d = 4.75$. Similarly, children from grade 2 had

higher MVPA levels during parkour recess (70%), compared to physical education (34%, $t(17) = 18.43$, $p<.001$, $d = 4.34$. Finally, this was also the case for third graders with 68% of MVPA during parkour recess compared to 38% MVPA during physical education, $t(24) = 31.25$, $p<.001$, $d = 6.25$.

Figure 2. MVPA during Physical Education and Parkour Recess



DISCUSSION

The purpose of this study was to investigate the generalization of participation in parkour from physical education to parkour recess in two different elementary school classes taught by the same teacher. Results indicated that the teacher spent less time in management and more time on skill practice in grade 3 compared to grade 2. There was more in class physical activity promotion in third grade and children achieved more MVPA. Although children of both grades achieved similar MVPA levels during parkour recess, more children from 3rd grade participated in parkour recess.

Teacher's Delivery of the Parkour Unit

During physical education, most time was allocated to management, with values up to 45% in grade 3 to 50% in grade 2. These values are considerably higher than the ones reported in the review of Smith et al. (2018) in which time allocated to management was between 14%-31% and where the

content domains were different from parkour. Time spent in management during this study might be high because it was the first time the teacher taught this content. Sport Education was used as the instructional model, which requires the installation of routines and student roles. In addition, parkour equipment was set up and removed during the physical education setting, which requires some extra time. Lesson context categories knowledge, fitness, and skill practice aligned within the ranges reported in the review of Smith et al. (2018). However, it might be important to decrease the amount of time spent in management since it is negatively associated with MVPA (Smith et al., 2018). In grade 2 less time was spent in skill practice and more time was spent in management compared to grade 3. Possibly with younger children more time in management is needed, since setting up equipment and installing management routines may take up more time with younger children. Another important aspect is that the teacher taught the content for the second time in grade 3, which could indicate that the teacher's management improved based on her experience from teaching grade 2. Research with preservice teachers has consistently shown that after teaching a lesson for the first time, one of the core teaching practices they adapt for subsequent teaching is their management (Cho et al., 2023; Xie et al., 2020; 2021). Finally, teacher's physical activity promotion was higher in grade 3, which might have affected MVPA levels in that class. In 3rd grade, the physical activity promotion was often 2-3-fold that of the 2nd grade. Also, here the repeated teaching might explain why the teacher had higher rates of physical activity promotion in third grade, as she was more familiar with the content. She spent more time on skill practice in grade three, which is typically the moment to promote physical activity. Although few studies investigated the relationship between in class physical activity promotion and MVPA, Vanluyten et al. (2023c) found a moderate positive correlation during third grade elementary team handball unit. The teacher mainly promoted individual children's physical activity. Class wide physical activity promotion was virtually non-existent. With the higher values of individual physical activity promotion in third grade, it might be that children from third grade felt more supported by their teacher to engage in parkour during recess. This finding provides important avenues for future work. First, research might focus on how to increase teachers' physical activity promotion during physical education and its relationship with participation in that same content during recess. Next, the differential effect of class wide versus individual feedback on children's MVPA during physical education and recess could be investigated.

Physical Activity during Physical Education

On average second and third graders spent less MVPA, respectively 34% and 36%, during physical education compared to the physical education data from previous parkour studies by Cheng et al.

(2021) and Vanluyten et al. (2023a). These results are also below the recommended 50% MVPA for children during physical education (Elliot et al., 2013) and lower than the values in the systematic review of Hollis et al. (2016) in elementary school. Although the MVPA levels of children in grade 3 were significantly higher compared to grade 2, they only represent a marginally higher value of 3%, representing one and a half minutes of class time.

The data on MVPA in this study aligns with the findings from Levin et al. (2001), which showed an increase in MVPA levels from third to fifth grade in elementary. In addition, children in grade 3 might have generated more MVPA because of reduced management time, increased skill practice time, and higher physical activity promotion by the teacher compared to their peers in grade 2. This increase in MVPA from Grade 2 to grade 3 in physical education, which is a structured setting, contrasts with the finding that general MVPA levels decline throughout K12 education (Farooq et al., 2018). In addition, age differences between the two grades is only minor and it might be possible that few differences are observed as the result of developmental differences. To data there is contradictory evidence in literature. In a review on elementary children's physical activity levels (Fairclough & Stratton, 2006), they reported studies that found significant differences between two consecutive grades (Barnett et al., 2002; Hodges-Kulinna et al., 2003). However, the goal of this study was no to focus solely on the difference in age as this is the first study that worked with two classes taught by the same teacher.

Participation in Parkour Recess

While the overall participation of second graders in this study (43%) was substantially lower compared to other studies (Coolkens et al., 2018c; Cheng et al., 2021 and Vanluyten et al., 2023a), third graders showed more similarity with those studies (74%) and align with values found in Coolkens et al. (2018c) (73%-82%) and Cheng et al. (2021) (70%-77%). Therefore, the generalization of participation in parkour was more successful in third grade. We can only speculate as to why we observed a substantial difference in participation between 2nd and 3rd graders. Possibly, because third graders spent more time in skill practice and generated more MVPA during physical education, they might have been more skillful in parkour which could have positively affected their participation in parkour recess. Previous work from Coolkens et al. (2018c) reported that more higher-skilled children participated in parkour recess compared to lower-skilled children.

In both grades two and three there was no out-of -class physical activity promotion from the teacher during physical education, which is in line with McKenzie & Smith (2017) and Smith et al.

(2018). These reviews reported in general no out of class physical activity promotion, except for one study in secondary schools. Apart from the standardized instruction by the physical education teacher, who invited the children to freely participate during parkour recess, there was no prompting or encouragement in parkour recess from teachers either verbally or by means of posters or emails. Future interventions can focus on further increasing the promotion by training teachers, involving classroom teachers, having attractive posters in the hallway, and asking children to sign up manually or virtually.

Physical Activity during Parkour Recess

Both second and third grade children spent 70% of parkour recess time in MVPA, which is higher than the results from Cheng et al. (68%; 2021) and Vanluyten et al. (58-64%; 2023a), while Coolkens et al. (2018c) reported MVPA levels of 76%. Stratton and Mulan (2005) suggested a benchmark of 50% MVPA during recess, which is surpassed by both second and third graders in this study. This result indicates that children in both second and third grade spent 14 minutes in MVPA during parkour recess. Although second grade children were less active during physical education, they were achieving the same MVPA levels during parkour recess. Possibly, this was facilitated due to the fact that there is less management needed during parkour recess (i.e., short instructions, there was no new content introduced, etc.).

Physical Activity in both settings

Children from second and third grade had higher levels of MVPA during parkour recess compared to physical education. Since no new parkour content was taught during parkour recess and short instructions were implemented, most of the time was available for performing parkour moves. Furthermore, the similarity with physical education (i.e., equipment, gymnasium and the presence of the physical education teacher) might have nurtured the high MVPA levels (up to 70%).

Limitations

In this study the generalization from physical education to parkour recess was investigated in children from grade two and grade three. Future research could replicate this work with different classes from the same age. Furthermore, within this study no qualitative measures were done with regard to why children did or did not participate during parkour recess. Future research can also focus on actively integrating teacher's voice (i.e., feedback and reflection after each lesson) and children's voice (i.e., how did they experience parkour recess).

CONCLUSION

Connecting physical education content with organized recess sessions offered a valuable contribution to children's MVPA levels. Providing a structured environment and accessible equipment during parkour recess, similar to the physical education setting, are key components in this intervention. During a 20-minute parkour recess session, children achieved 12-17 minutes of MVPA, which is 20-28% of the daily recommended MVPA. While earlier research projects focused on different teachers teaching only one class, this study focused on one teacher who taught the content to two different classes enabling her to adapt the content and refine her teaching strategies. This might have affected the results in grade three - which is the class that was taught second – and had increased practice time, higher MVPA levels during physical education, and more children participating in parkour recess. Future research should further explore how children's participation and MVPA levels vary as a function of teachers' effectiveness in delivering the content, and as a function of the age of the children.

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