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The Effect of Physical Education Content on Children's Activity during Recess based on Skill Level

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Abstract

The purpose of this study was to investigate voluntary participation of lower-, average, and higher skilled children during parkour recess and MVPA in physical education, parkour recess and regular recess. In total 147 (55 girls, 92 boys) elementary children from seven schools participated. During (i.e., generalization) and after (i.e., maintenance) a 10-lesson parkour unit was taught, five parkour recess sessions were organized. Systematic observation was used to assess children's physical activity levels. Average skilled children participated more (74%) in parkour recess compared to higher skilled children (55%; p=.002). No differences were found for MVPA between lower-, average -and higher skilled children in any of the settings. Regardless of skill level, children voluntarily participated in parkour recess with MVPA levels 15-20% higher compared to regular recess. These findings are especially important for lower-skilled children, who are more at risk for lower participation in physical activities and adhering to physical activity guidelines.
Keywords: Participation, School health, MVPA

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INTRODUCTION

Regular physical activity is associated with several health benefits in both children and adolescents (Biddle et al., 2004). The Institute of Medicine (IOM) and the World Health Organization (WHO, 2020) recommend at least 60 minutes of moderate to vigorous physical activity (MVPA) a day for five to 17-year olds (WHO, 2022). However, a recent review on surveillances of physical activity indicated that in general children (3-18 years) have low levels of physical activity and that physical activity levels decrease with age (Aubert et al., 2021). In addition, substantial declines in MVPA are observed from early childhood (Farooq et al., 2018, 2020). In Flanders (Belgium), only 7% of children aged 6-9 meet the 60 minutes daily MVPA guideline (Wijtzes et al., 2016). Children with high skill levels are 2.46 times more likely to meet physical activity guidelines than children with low skill levels (De Meester et al., 2018). Since physical activity behaviors in childhood track into adulthood, these children are more at risk for health problems (De Meester et al., 2018). Results from these studies support the call to increase children's MVPA by means of school-based interventions, since schools are the place where children spent most of their waking hours (Clarke et al., 2013; Pate et al., 2006). For some children, schools are the only setting where they can engage in physical activity and receive physical education taught by an expert (Coolkens et al., 2018a). Physical education can be a crucial context in which children's motor competence is built, which is important since higher skilled children are 2.46 times more likely to meet the daily MVPA guidelines (De Meester et al., 2018).

Study Purpose

The purpose of this study was to investigate differential effects of children's skill level on voluntary participation and MVPA in parkour recess concurrently with the teaching of a 10-lesson parkour unit in physical education (i.e., generalization phase) and after the parkour unit in physical education had ended (i.e., maintenance phase). In addition, skill level differences regarding MVPA between children were investigated in physical education and regular recess.

CONCEPTUAL FRAMEWORK

School-Based Physical Activity

To support children in achieving the 60 minutes per day guideline, multicomponent school-based approaches like the Comprehensive School Physical Activity Program (CSPAP) are suggested (Brusseau and Burns, 2018). The CSPAP identifies five components for children to engage in physical activity and to develop the knowledge, skills, and confidence to be physically active for a lifetime (Carson and Webster, 2019). Although one of the goals of a CSPAP is to promote coordination among the five different components, research examining how this should be conducted is limited (Erwin et al., 2013). Therefore, this study investigates the coordination of two components of the CSPAP model, namely physical education and recess (i.e., during school physical activity component).

For physical education, the IOM and the Association for Physical Education (Harris, 2015) recommend that children should engage at least 50% of lesson time in MVPA (Elliot et al., 2015). Systematic reviews in elementary physical education have shown that children do not meet this benchmark, with MVPA levels of 34% (Fairclough et al., 2006) and 45% (Hollis et al., 2016). Similar results were found in Flanders, with MVPA levels ranging from 42-47% in elementary schools (Cheng et al., 2021). Recess, which is an important element within the physical activity during school component, is increasingly viewed as an opportunity to improve children's daily percentages of MVPA (CDC, 2017). Recess is defined as noncurricular, but assigned time during a school day that children spend on the playground. Previous research suggests that recess can contribute up to 40% of the daily recommended minutes of MVPA (Ridgers et al., 2006; 2018). In Flanders, it is mandatory for schools to schedule 50 minutes daily for lunch recess (Het Vlaams Ministerie van Onderwijs en Vorming, 2022). During this time, children have lunch after which they spent time on the playground. Lunch recess has the potential to contribute substantially to children's daily MVPA, especially when a suggested benchmark of 50% MVPA during recess is reached (Stratton and Mullan, 2005).

Connecting Physical Education with Recess

Since one of the goals of CSPAP is to provide coordination between the different components to maximize the applications and practice of skills learned in physical education, researchers have investigated the effect of connecting physical education and recess (Cheng et al., 2021; Coolkens et al., 2018b; Iserbyt et al., 2022; Knowles et al., 2018). Knowles et al., (2018) connected a 10-lesson unit tag rugby and a 10-lesson unit handball to weekly voluntary organized recess sessions in which five to 12 boys participated, while none of the girls participated. In the first of a series of studies in which the content of physical activity programs (i.e., parkour) during recess were connected with the content of physical education, Coolkens et al., (2018a) showed that when the physical education teacher led these sessions by implementing class wide activities and the provision of prompts, 79% of children voluntarily participated and generated on average 76% MVPA. When these sessions were only supervised by the teacher, participation averages 70% and MVPA was 70%. In a second study, Coolkens et al. (2018b) reported that voluntary participation during parkour recess sessions was 73% for second grade elementary children. Only in the first of three parkour recess sessions, there was a significant difference with fewer low-skilled children participating compared to their higher skilled peers. Children generated 76% MVPA overall during organized recess, with no significant difference concerning skill level. In a similar study with third-grade elementary children, voluntary participation was 73% and children generated 68% MVPA during parkour recess and 44% MVPA during physical education (Cheng et al., 2021). The latter finding is in line with the latest review indicating average MVPA during physical education to be 45% (Hollis et al., 2016). During regular recess (or lunch recess) those children generated 46% MVPA. All these studies focused on generalization, which means children engage in activities learned during a training setting (i.e., physical education) in another setting (i.e., generalization setting or parkour recess; Cheng et al., 2021; Coolkens et al., 2018b; Iserbyt et al., 2022; Knowles et al., 2018). In a study focused on fitness activities for middle school, students could participate in fitness sessions during lunch recess before, during (generalization) and after (maintenance) the fitness content was implemented during physical education (Iserbyt et al.,

2022). During the first session more higher-skilled students participated compared to lower-skilled students, while during the other eight sessions no significant differences were found based on skill level. Voluntary participation was lower compared to the studies in elementary schools, with proportions of participation ranging from 5%-60% during generalization. During the last fitness session, which was organized when the fitness unit in physical education was completed (i.e., maintenance), no lower-skilled students participated and only 15% of higher-skilled children (Iserbyt et al., 2022). Overall, students generated up to 48% of MVPA during these sessions, with no significant differences for skill level.

Maintenance

Although maintenance of participation in physical activity is necessary to develop and maintain a physically active lifestyle, very few studies report maintenance data. One large scale study examined the long-term effects of a physical education intervention, which was a health-related curriculum for fourth-graders called Sports, Play and Active Recreation for Kids (SPARK; McKenzie et al., 1997). One and a half years later, a decline to 88% of the intervention levels for MVPA was shown. The CATCH-on study, which was a follow-up study on the SPARK project, five years post intervention, reported the same MVPA levels as during intervention phase, however vigorous physical activity declined sharply by almost one fourth of the initial levels (McKenzie et al., 2003).

METHOD

Research Design and Participants

In total 147 (55 girls, 92 boys, mean age 8 years) elementary children from seven schools in Flanders (Belgium) were selected for participation in this experimental study based on convenience sampling. Schools were included when they could make their gymnasium available for parkour recess during lunch recess and when physical education teachers met the eligibility criteria (see further). Skill level was determined by the children's physical education teacher based on previous assessments of physical activity content (Hastie et al., 2017). Teachers labeled children as lower-, average-, or higher-skilled based in his/her previous experiences with the children. Physical education teachers (2 females, 5 males, mean age 39 y) met the following eligibility criteria: (a) following a four-hour professional development workshop to learn how to teach parkour, (b) willing to teach a 10-lesson parkour unit in physical education, (c) willing to organize ten parkour recess sessions.

Data Collection Tools

Participation during parkour recess was recorded after each session. Physical activity during physical education and parkour recess was collected through systematic observation using the System for Observing Fitness Instruction Time (SOFIT), while for regular recess the System for Observing Children's Activity and Relationship during Play (SOCARP) was used (McKenzie et al., 1992; Ridgers et al., 2010). In both systems, momentary time sampling with a 6-second observe and 6-second record interval was used (McKenzie et al., 1992; Ridgers et

al., 2012). During each observation, two children were followed by coding them alternatingly every ten intervals. During the 6-second observe interval observers focus on the target child, at the "record" prompt the decision is made concerning the activity level. Physical activity is divided into five categories, namely level 1 (lying), level 2 (sitting), level 3 (standing), level 4 (walking), and level 5 (very active), combining these two latter levels result in the MVPA values.

Procedure

Independent variables: In this study, physical education served as the training setting, parkour recess was the generalization setting, and regular recess was the comparison setting. During generalization phase, physical education, parkour recess and regular recess were the three settings where observations were made. During maintenance phase, only parkour recess and regular recess were observed, since physical education content was disconnected (i.e., other content) from parkour recess.

Physical education: In physical education, parkour as a content was taught through a 10-lesson unit during generalization phase, after which teachers could teach any content but parkour during maintenance phase (see supplementary file, Vanluyten et al., 2023a). Planned lesson time was 50 minutes for all schools, except for one school which had sessions of 70 minutes. Parkour can be defined as an individual motor domain where children overcome various obstacles by running, jumping, swinging and climbing (Vanluyten et al., 2023b). Children were taught several parkour moves, which could be combined in order to show a routine during the final lesson. Teachers received a standardized four-hour workshop in their own school for teaching parkour and were assessed on their mastery of the content upon completion.

Regular recess: Regular recess refers to the 'business as usual' situation in which school staff and teachers supervised the children while they spent time on the playground. Regular recess time (time spent on the playground) ranged between 30-70 minutes (average 44 minutes). Small equipment (i.e., balls, jump ropes, hoops) was often available and children could engage in any preferred behavior such as playing active games, talking with friends, or reading a book.

Parkour recess: A total of 10 parkour recess sessions were organized, five during the generalization phase and five during the maintenance phase. This means one parkour recess session was organized every two weeks, with a duration of 20 minutes per session. During parkour recess no new content was taught. Physical education teachers in all schools gave four short, standardized prompts to promote physical activity during parkour recess. These prompts were the same each parkour recess but their order was randomized. The four instructions were the following: (a) "Show the parkour moves from the previous physical education lesson, I will encourage you and see if you can do it correctly", (b) "Try to do as many parkour moves as possible, count out loud whenever you finished a parkour move. When you reach ten, you will get a token (i.e., bracelet)", (c) Do parkour moves in dyads, the first performer does parkour moves, the others follow the same moves", (d) "You can move freely around the gym and use all the equipment that is set up, I will supervise and encourage you". Participation in parkour recess was voluntary and implemented during regular recess. Children had the choice to

participate in parkour recess or to stay on the playground like they did any other day during regular recess.

Ethical Approval

Informed consent was obtained from teachers and parents after the Social and Societal Ethics Committee of the first author's university approved the study on the 22nd of May 2020.

Collection of Data

Participation in each parkour recess session was recorded based on the video recordings. Participation rates were calculated by dividing the number of children that were present during parkour recess by the total amount of children (for both boys and girls). For physical education and parkour recess MVPA data from the first nine lessons were collected through video coding in which all children (n=147) were coded, which represents more than 1300 hours of observation. Data from the final lesson was excluded as it served as a summative assessment. For each school all ten parkour recess sessions were observed and the MVPA of all participating children was coded. For regular recess, video was not feasible due to the large playground, so live coding was needed. Therefore, during each observation four to eight boys and girls of different skill levels were randomly selected. At least 11 observations were conducted in each school (range: 11-22 observations). Data was collected from September 2020 to June 2021.

Observer training and reliability: An extensive training of nine steps was used in order to train observers to collect reliable data on children's MVPA using systematic observation. In step one the observers had to study a lecture on systematic observation, while in step two the SOIFT or SOCARP manual had to be studied (McKenzie et al., 1992; Ridgers et al., 2012). Step three, four and five consist of tests concerning codes, coding conventions and written situations, 100% success is needed to further proceed the training protocol. In step six and seven a video in real-time is coded, agreement should be 85% or higher. In step eight the same reliability should be achieved when coding twice with a trained observer, after which coding independently is possible from step nine. Interobserver reliabilities for physical activity during physical education were 84% with 19% overlap, during parkour recess 85% with 12% overlap and during regular recess 93% with 47% overlap. All observer reliability measurements met the 80% benchmark for behavioral research (Cooper et al., 2020).

Analysis of Data

All data were analyzed using the Statistical Package for Social Science software (SPSS, version 27) and R 4.1.1 (R Core Team 2021). A chi-square test was used to analyze children's participation in each parkour recess session as a function of skill level. For overall participation rates (mean participation), a one-way analysis of variance (ANOVA) and post-hoc Tukey HSD test was used to assess differences based on skill level, while for each phase a Welch ANOVA was used. For each skill level group, a Wilcoxon signed rank test was used to assess differences based on phase. Differences based on skill level for physical education, parkour recess and regular recess was tested with respectively a Welch ANOVA, a one-way ANOVA and a Kruskal-Wallis test. Wilcoxon signed ranks and a paired T-test was used to assess MVPA

differences between settings and phases. In addition, effect sizes were reported. To control for the clustered nature of our data since children are nested within schools, an intraclass correlation coefficient (ICC) was calculated and a chi Square for clustered data test (Gregg et al., 2020) and multilevel regression was used.

FINDINGS

Since children were clustered in schools, ICC's were calculated showing the need for cluster control for overall participation (0.39; p<.001), MVPA during regular recess (0.09; p<.001), MVPA during parkour recess (0.49; p<.001) and MVPA during physical education (0.79; p<.001).

Participation in parkour recess: Figure 1 shows the average proportions of voluntary participation in parkour recess for higher-, average -and lower skilled children. Significant differences were found in recess session three, χ^2 (1, 147) = 9.28, p=.01, six, χ^2 (1, 147) = 10.41, p=.005, and ten, χ^2 (1, N=147) =11.99, p=.002. In recess session three, more average skilled children (88%) participated compared to higher skilled children (69%), χ^2 (1, 147) = 6.71, p=.01, and lower skilled children (64%), χ^2 (1, 147) = 7.99, p=.005. For recess session six, the same differences were found between average skilled children (73%) compared to higher (46%), χ^2 (1, 147) = 8.70, p=.003, and lower skilled children (45%), χ^2 (1, 147) = 6.26, p=.012. For recess session ten a significant difference was found between average (73%) and higher skilled children (43%), χ^2 (1, 147) = 11.95, p<.001. Differences based on skill level for overall participation were found, F(2, 147) = 6.08, p=.003, indicating a significant difference between higher (55%) and average (74%) skilled children, p=.002.

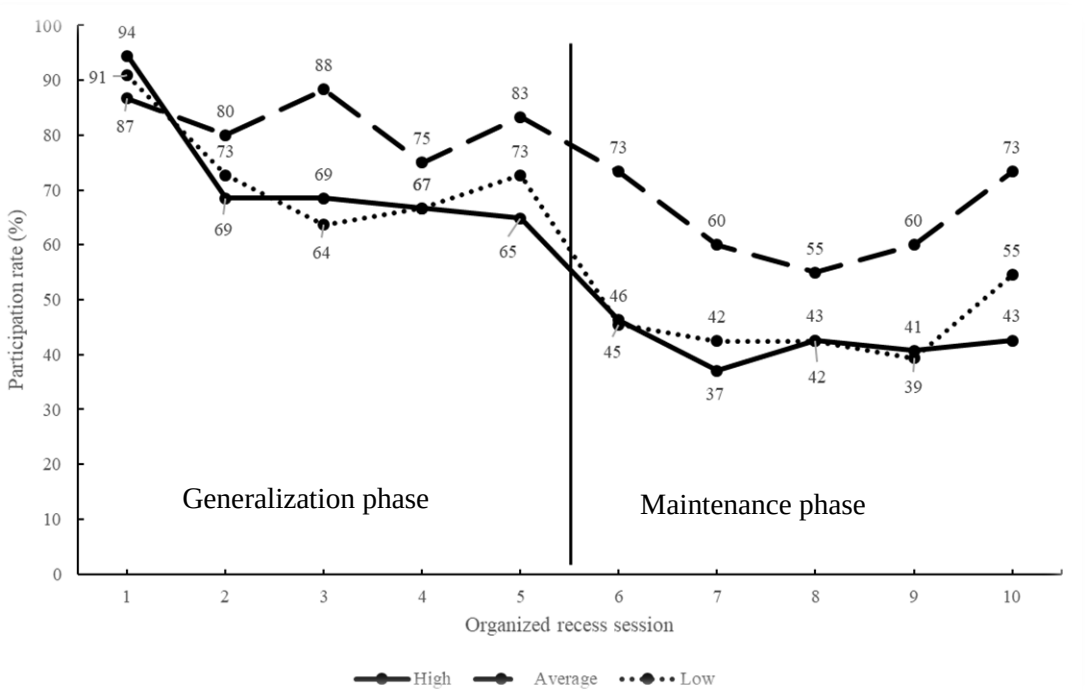

Figure 1. Participation rate of high, average and low skilled children during parkour recess sessions

No differences in participation were found based on skill level during generalization phase. However, during maintenance phase average skilled children achieved significantly higher rates (64%) compared to higher skilled children (39%), F(2,146) = 6.95, p=.001. Participation for each skill level group was higher during generalization phase compared to maintenance phase, Z = 4.61, p<.001, ES = 0.65 for higher skilled children, Z = 4.43, p<.001, ES = 0.58 for average skilled children, Z = 3.71, p<.001, ES = 0.62, and for lower skilled children.

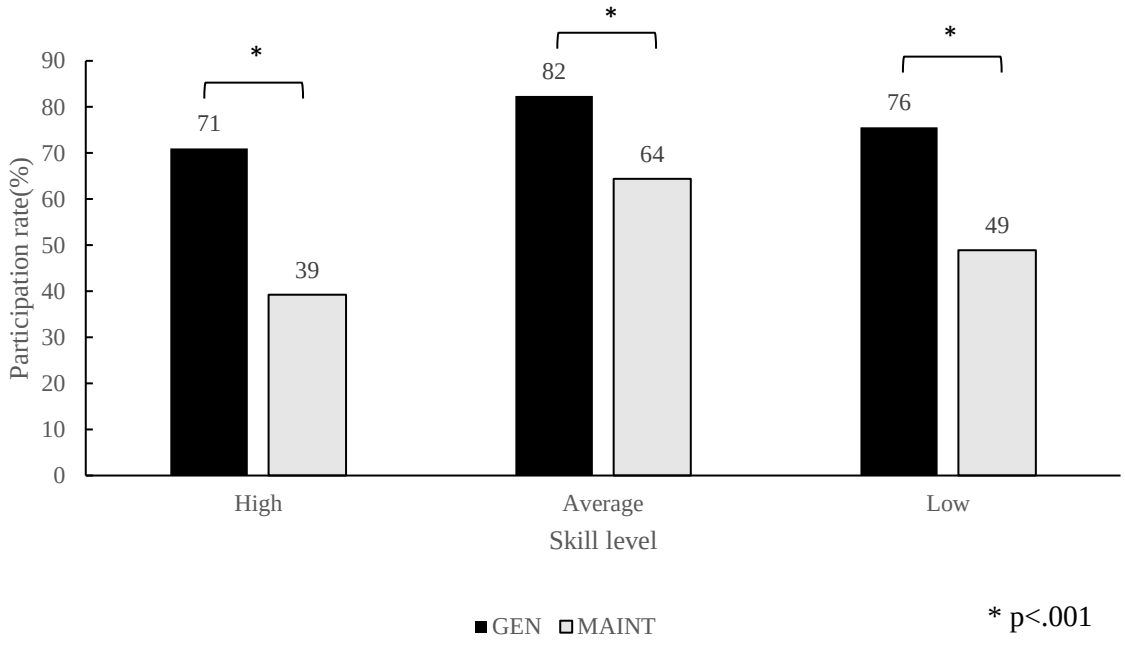

Figure 2. Participation rate of high, average and low skilled children in parkour recess during generalization and maintenance phase

Moderate to vigorous physical activity: There were no differences found based on skill level in physical education, parkour recess and regular recess. When comparing physical education and parkour recess, significant differences were found for higher skilled, Z = 5.79, p<.001, ES = 0.80, average skilled, Z = 6.52, p<.001, ES = 0.85 and lower skilled children, t(36) = 11.21, p<.001, ES = 1.87, all having higher MVPA levels during parkour recess. Similarly, higher MVPA levels were observed during parkour recess compared to regular recess for higher skilled, t(51) = 5.96, p<.001, ES = 0.84, average skilled, t(59) = 6.42, p<.001, ES = 0.84, and lower skilled children, t(36) = 5.04, p<.001, ES = 0.84. Comparing physical education with regular recess, only average skilled children reached significantly higher MVPA levels during regular recess, t(59) = 2.62, p=.018, ES = 0.34.

Overall, MVPA levels in parkour recess during maintenance phase (66%) were higher than during generalization phase (60%), Z = 4.30, p<.001, ES = 0.41, while there were no differences for MVPA in regular recess between generalization and maintenance (47% versus 46%). During generalization phase there were no significant differences based on skill level in parkour recess and in regular recess, similar there were no differences found during maintenance phase in both settings.

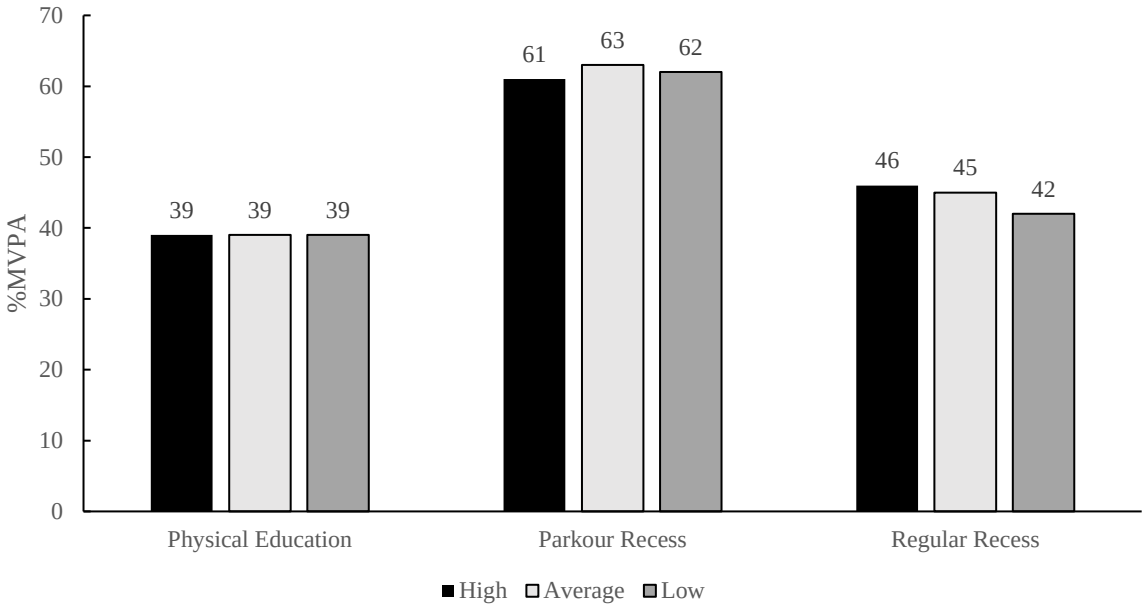

Figure 3. MVPA levels of high, average and low skilled children in physical education, parkour recess and traditional recess

DISCUSSION AND CONCLUSION

The purpose of this study was to investigate voluntary participation and MVPA in parkour recess during generalization and maintenance phase for higher, average, and lower skilled children. In addition, physical activity levels during physical education and regular recess were assessed.

Participation in Parkour Recess

For voluntary participation, average skilled children tended to participate more (74%) compared to higher skilled children (55%; p=.002), which contrasts previous work where no significant differences were found (Coolkens et al., 2018b; Iserbyt et al., 2022). In only three out of ten parkour recess sessions a significant effect for skill level was found. This contrasts previous work that showed that generally more higher skilled children participated in recess programs (De Meester et al., 2018; Knowles et al., 2018). Research in which physical education was connected with recess programs on average shows different results than programs that are disconnected from physical education, with participation between 19% and 41% (De Meester et al., 2018; Drijvers et al., 2022). Although not significant, lower skilled children showed higher participation rates compared to their higher skilled peers. This is important since children with lower actual motor competence are less likely to meet the daily MVPA guidelines (De Meester et al., 2018). In this study, lower skilled children might have benefited from the connection between parkour recess and physical education, since physical education allowed them to develop the confidence and skills to participate in the activity, which they enjoyed as a consequence. Previous research indicated that during parkour recess children use the skills they learned in physical education (Coolkens et al., 2018b). This supports the notion that some

level of skill competency, developed in physical education, is needed for children to participate in a physical activity program during recess (Drijvers et al., 2022).

During generalization phase, participation was high (71%-82%%), whereas in the maintenance phase this dropped to around 50%. It seems that for half of the children, withdrawing the connection with the physical education curriculum did not affect their participation. Although speculative, these children might maintain their participation because they enjoyed the activity, and liked spending their recess time doing parkour. Future research should investigate children's motives for maintaining or terminating their participation in parkour recess. It is important to note that participation in parkour recess sessions was voluntary and no efforts were made by the teachers nor research team to encourage participation. Besides the announcement by the physical education teacher, who shared the date and place for the next session, no other measures were taken to promote participation. Future research might look into several strategies to promote participation such as promotion through social media, posters in the hallway, formal subscription, and involvement of classroom teachers.

Physical Activity Levels

In this study, there were no differences found in terms of MVPA levels between the three skill levels groups in physical education, parkour, and regular recess. This finding is consistent with previous work examining recess sessions in both elementary and secondary schools (Coolkens et al., 2018b; Iserbyt et al., 2022; Knowles et al., 2018). During physical education, MVPA levels were below 50% and lower than 40% as reported in a review by Hollis et al. (2016). Although teachers followed a workshop, they taught the parkour content for the first time, which might have impacted MVPA levels during physical education. This may also have resulted in more time spent on management due to the organization of the lesson and the use of station work. Repeated teaching of this content could lead to a more fluent enactment of the parkour content for teachers.

In this study during parkour recess, children generated around 12 minutes of MVPA during a 20-minute recess session, which is lower than in a previous parkour study (Coolkens et al., 2018b). The high MVPA levels during parkour recess compared to regular recess shows the added value of these parkour sessions and their potential in contributing to the daily guidelines. In addition, they offer an opportunity for children to apply the skills learned in physical education in another setting, which is a core goal of the CSPAP (Carson and Webster, 2019).

Strengths and Limitations

This study connected physical education content with organized recess sessions which are two components of CSPAP in order to increase children's MVPA. It replicates previous research and adds a maintenance phase to investigate what happens when the intervention has ended. Methodologically, a strength is that all children during all physical education lessons and parkour sessions were observed. Furthermore, the effect sizes for both voluntary participation, showing higher rates during generalization phase, and MVPA, showing higher MVPA levels during parkour recess, reported in this study are all above the U.S. Department of Education's What Works Clearinghouse 0.25 criterion, indicating a substantively important effect (U.S. Department of Education's What Works Clearinghouse, 2014). It is a limitation that teachers taught this content for the first time, which might have impacted MVPA levels as well as other

teaching variables during physical education, which in turn could have impacted voluntary participation and MVPA during parkour recess. Future investigations on children's learning, teacher behavior, and motives as to why children chose to participate or chose not to could assist in teasing out how to promote generalization and maintenance of participation in physical activity from physical education to recess.

RECOMMENDATIONS

Connecting physical activity programs during recess with the content of physical education gives children the opportunity to apply the skills learned in physical education in a different context, which is a core aim of the CSPAP. Therefore, school policy could be informed by CSPAP and create organized recess programs that are connected with physical education. By encouraging children to participate in organized recess, the connection between physical education and organized recess can be actively built. In this study, parkour recess enabled children to achieve more MVPA during recess without adding curricular time or additional costs. Since parkour was taught in physical education to all children, parkour recess was an equitable approach for children whereas traditional programs unconnected with physical education tend to be more exclusionary (i.e., the best players dominate; Drijvers et al., 2022). By connecting physical education content to parkour recess, children generated up to 63% of MVPA during a 20-minute session, while applying skills learned during physical education. Voluntary participation was higher during generalization phase compared to maintenance phase, with no differences based on skill level during generalization phase. Children's skill level did not affect their MVPA during parkour recess, which demonstrates that all children benefit from the increase in physical activity opportunities offered by the recess program.

Conflicts of Interest: The authors declare that they have no conflict of interest.

Authors' Contribution: Study Design-Kian Vanluyten, Shu Cheng, Peter Iserbyt, Cédric Rour & Phillip Ward Data Collection-Kian Vanluyten, Shu Cheng, Statistical Analysis-Kian Vanluyten, Manuscript Preparation- Kian Vanluyten, Peter Iserbyt, Cédric Rour & Phillip Ward. All authors read and approved the final manuscript.

Ethical Approval:
Ethics Committee: The institutional review board of KU Leuven approved this research project, reference number G-2020-1691-R3(MAR).
Date/Protocol number: 2020-05-22 / G-2020-1691-R3(MAR).

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SUPPLEMENTARY FILE*

Parkour lesson unit in elementary

Parkour workshop

Before the start of the intervention teachers received an individual, four-hour content knowledge workshop on parkour tailored to their specific context in terms of gymnasium and equipment. They received a syllabus with written lesson plans for all ten lessons. During the workshop teachers were taught the parkour moves (critical elements and how to perform them; Vanluyten et al., 2023). Afterwards, common errors were demonstrated and discussed in order to correct these errors.

Terminology in Parkour

• **Precision**: jumping from object to object, or landing after a vault. • **Stride**: running strides from object to object. • **Balance**: movement or landing in balance.	Lesson 1
• **Vault**: taking obstacles by jumping over them with hands supported on the obstacles. • **Wall-run**: running up an inclined or vertical object. • **Tiktak**: a running and turning movement against the wall.	Lesson 2-4-7
• **Roll**: roll after or over an obstacle. • **Catleap**: jump and land on an obstacle where you hang (feet against obstacle). • **Underbar**: movement between two bars.	Lesson 3-6-8
• **Swing**: swing movement on a bar in order to bridge some distance. • **Spin**: rotate around own body-axis.	Lesson 5-7
During lesson 8-9 the culminating event is prepared. The focus of those lessons is on the combination of different parkour moves in a fluent and efficient routine performed all over the gymnasium.	Lesson 8-9

Parkour Content

During the physical education lessons, parkour moves were taught to the children. Different movement families (spins, vaults…) were given a different color to structure the content. A ribbon in a matching color was attached to an obstacle in order to visualize the movement family (the colors also match the colors of the Olympic rings). During the last lesson children will perform a parkour routine showing at least one movement of each color (and thus movement family). The table below also shows the task progression for each parkour movement.

Blue Precisions & strides	**Precisions**	Precision on the ground (front)
		Precision on the ground (back)
		Precision on big and stable objects
		Precision after jumping off a higher object
		Precision on smaller and instable objects
	Strides	Strides on the ground
		Strides on big and stable objects
		Strides on elevated objects (f.e.; bench)
		Strides on smaller and instable objects
Yellow Spins	**Butt spin**	Butt spin: slide on a bench, no rotation
		Butt spin 180° (bench, chair,…)
		Butt spin 180° (plint)
		Butt spin 180° (small surface)
		Butt spin 360°
	Palm spin	Palm spin (wall bars + horse)
		Palm Spin (wall bars + horse + cord)
		Palm Spin (wall bars + horse + cord + precision)
		Palm spin + precision: hand against the wall
		Palm spin with feet on plinth
		Palm spin (plint)
	Reverse	Side vault (bench)
		Side vault (feet on plint)
		Side vault with half turn (plint)
		Side vault with half turn (no contact with feet on plint)
		Reverse with two hands
		Reverse with one hand
Black VAULTS	**Speedstep**	Speedstep: inclined bench
		Speedstep (foot on plint) walking
		Speedstep (foot on plint) running
	Speed vault	Speed vault: walking
		Speed vault: running
		Speed vault: not preferred side
	Thief	Thiefstep: walking
		Thiefstep: running
		Thiefstep: foot against wall
		Thief: running
	Barrel roll	Barrel roll: rolled mat + helper
		Barrel roll: rolled mat (alone)
		Barrel roll: rolled mat (alone) + arm- and leg movement
		Barrel roll: plint + helper

		Barrel roll: plint (alone)
Green Wall movements	**Tiktak**	Tik: inclined approach, inclined landing, inclined springboard
		Tik: inclined approach, frontal landing, inclined springboard
		Tik: frontal approach, frontal landing, inclined springboard
		Tik: inclined approach, inclined landing, wall
		Tik: inclined approach, frontal landing, wall
		Tiktak: inclined springboard
		Tiktak: wall
	Wall run	Inclined bench + jump off and landing in precision
		Inclined bench + jump off + 90° rotation and landing in precision
		Inclined bench + jump off + 90° rotation and landing in precision + roll
		Higher bench + catleap + + jump off + 90° rotation and landing in precision
		Wall run against wall or mat
	Catleap	Catleap: walking
		Catleap: running, inclined springboard
		Catleap: running straight wall
		Catleap: hands crossed while hanging
		Stride catleap + 90° precision
		Catleap + 180° precision
Red Swings	**Underbar**	Foot on bar or bench
		Underbar oblique (cord)
		Underbar straight (cord)
		Underbar straight (between two bars)
		Underbar (360°): sitting
		Underbar (360°) no contact
	Swing	Jump up, hang on bar and release
		Swing
		Swing + back precision
		Swing + front precision
		Swing 180°: switch hands one by one
		Swing 180°: switch hands during one swing

Example lesson plan: Vaults, wall run and tiktak

<table>
<tr><th colspan="3">Lesson plan : Vaults, wall run and tiktak</th></tr>
<tr><td colspan="3">Warm-up</td></tr>
<tr><td></td><td colspan="2">Children start by moving through the gymnasium on and around the equipment. While doing so they will perform precisions, strides and balance exercises.
Afterwards, during the rest of the lesson, children will work in stations. There will be three different stations, in which all children will practice.</td></tr>
<tr><td colspan="3">LESSON CONTENT</td></tr>
<tr><td></td><td>Station 1 : Strides and tiktak

Equipment : springboard, mat, mat against wall, hoops and spots.

Name the colors of each movement and show the direction of the course.

Critical elements Tik:
Take off with foot closest to the springboard
Put one foot against the springboard and push
Landing: running (left-right or right-left)</td><td>General
Start with a tik against an inclined springboard (against wall bars). You can use chalk to draw feet on the springboard as an environmental cue for children to place their feet. Afterwards the more difficult progressions can be implemented depending on the quality of performance.

Task progression
Informing task:
Tik = one foot against the springboard, inclined approach and inclined landing
Extending task: inclined approach, straight landing, inclined springboard
Extending task: straight approach, straight landing, inclined springboard
Extending task: one of the previous tasks against a straight object (mat or well)
Refining task: Keep short contact with the springboard
Refining task: Stay low</td></tr>
<tr><td></td><td>Station 2 : Wall run & precisions

Equipment : Bench in wall bars, bench upside down, hoops, several mats

Name the colors of each movement and show the direction of the course.

Critical elements Wall run:
Run the inclined bench without using hands
Jump (take off with two feet)
Landing: two feet</td><td>General
Wall run is running up an inclined or vertical object. Start with an inclined bench.

Task progression
Informing task:
Wall run: run the inclined bench, jump off and land in precision
Extending task: wall run + jump off and rotate 90°
Extending task: wall run + jump off and rotate 90° + roll after landing
Refining task: Bend through your knees while landing</td></tr>
</table>

	Station 3 : Speedstep & balance **Equipment :** Plint, elevated bench, balance boards, stepping stones, several mats Name the colors of each movement and show the direction of the course. **Critical elements Speedstep:** • Take off on one foot • Crossed coordination: hand and foot on the plint • Other leg swings between hand and foot (plint) • Landing: running (left-right or right-left)	**General** The speedstep is a vault. **Task progression** • **Informing task**: Speedstep: foot on plint: walking (focus on right coordination) • **Extending task**: Same execution, however more fluently (running if possible) • **Extending task**: try the not preferred side. • **Refining task**: Try to execute the exercise with a fluent flow (approach in a fluent way and fluent take off after landing)
End of the lesson		
	Children can combine the newly learned parkour moves (speedstep, wall run and tik tak) in a parkour routine moving across the whole gymnasium. During this exercise special attention is given to fluently moving from one obstacle to another.	

*****The Supplementary file was taken from Vanluyten et al. (2023).