



Effectiveness Of School-Based Physical Activity Programs In Improving Motor Skills And Life Skills: A Systematic Literature Review

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Abstract

Physical activity has been widely recognized as an important factor supporting children's physical and psychosocial development. School environments provide structured opportunities where such activities can be systematically implemented through physical education programs. Although previous studies have examined the benefits of physical activity, evidence concerning its simultaneous impact on motor competence and life skills development remains scattered. This study aims to synthesize empirical findings regarding the effectiveness of school-based physical activity programs in improving fundamental motor skills and life skills among children and adolescents. A systematic literature review was conducted following the PRISMA procedure using articles obtained from Scopus, ScienceDirect, Google Scholar, ResearchGate, and the Directory of Open Access Journals. After applying inclusion criteria, 17 studies were selected for analysis. The results indicate that structured physical activity interventions consistently improve fundamental motor skills, particularly locomotor and object control abilities. In addition, participation in physical activity programs contributes to the development of life skills such as teamwork, leadership, communication, and self-management. Programs that integrate skill practice, game-based learning, and social interaction demonstrate the most consistent outcomes. These findings suggest that well-designed physical activity programs in schools can support both motor competence and broader developmental outcomes in children.

Keywords: *Physical Activity, Motor Skills, Life Skills, Physical Education, Systematic Literature Review*

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INTRODUCTION

Physical activity constitutes an essential component of children's growth and development. Participation in regular movement-based activities is associated with improved physical health, cognitive functioning, and psychosocial well-being (Campbell et al., 2024; Chan et al., 2019; Joshi & Dodge, 2022; Smedegaard et al., 2016). Within educational settings, schools provide structured environments where children can engage in physical activity through organized learning experiences, particularly through physical education programs (Bailey et al., 2013; Ha et al., 2021; Jaakkola et al., 2015a; Rafiei Milajerdi et al., 2021). One key outcome of children's participation in physical activity is the development of motor competence. Fundamental Motor Skills (FMS), including locomotor movements such as

running and jumping and object control skills such as throwing, catching, and kicking, form the basis for engagement in more complex physical activities and sports (Basterfield et al., 2023; Haverkamp et al., 2020a; Jaakkola et al., 2015b; Kokstejn et al., 2019; Toivonen et al., 2021). These skills do not develop automatically as a result of biological maturation. Rather, they emerge through repeated practice, guided instruction, and meaningful movement experiences. Motor competence during childhood is closely related to long-term participation in physical activity (Cook et al., 2019; Haverkamp et al., 2020b; Iivonen et al., 2013). Children who develop strong motor skills tend to be more physically active and demonstrate higher levels of physical fitness. In contrast, limited motor competence often results in reduced participation in physical activities, which may contribute to sedentary lifestyles and long-term health risks (Forneris et al., 2013; Kane & Staples, 2016; Lubans et al., 2012; Wagemakers et al., 2018).

Beyond physical competence, participation in physical activity also provides opportunities for the development of psychosocial abilities commonly referred to as life skills (Elmagd et al., 2015; Sallis et al., 2020; Vazou & Mavilidi, 2021). Life skills include social competencies such as teamwork, communication, leadership, emotional regulation, and problem-solving abilities (Syväoja et al., 2013). Sport and movement activities provide natural social environments where children interact with peers, collaborate in team situations, and learn to cope with both success and failure (Anguera et al., 2017; Haapala, 2012; Wang & Zhou, 2024).

Several theoretical frameworks explain the relationship between physical activity and these developmental outcomes. The concept of Physical Literacy emphasizes the development of movement competence, confidence, motivation, and understanding necessary to sustain lifelong engagement in physical activity (Morano et al., 2014; Rasberry et al., 2011; Yun & Beamer, 2018). The Positive Youth Development (PYD) framework highlights how structured sport environments can foster character development and social skills when supported by appropriate instructional practices (Dhuli et al., 2022). Meanwhile, Motor Development Theory explains how motor competence develops through interactions between individual characteristics, task demands, and environmental conditions (Shepherd et al., 2021).

Although several studies have shown that physical activity benefits children's motor development, most studies still prioritize the improvement of motor skills as the main goal of interventions. Other research focuses on psychosocial aspects such as character development, leadership, and social skills thru sports activities (DiPietro et al., 2020). However, studies that systematically integrate both dimensions are still limited. Many studies analyze the impact of

physical activity on motor skills or life skills separately, so the understanding of the relationship between the two in the context of school-based physical activity programs is still not comprehensive. Moreover, the variation in intervention designs used in previous studies indicates that not all (Weiss et al., 2014) programs produce the same impact on student development. Some studies emphasize specific motor skills training, while other research combines game-based activities and social interaction (Kahan et al., 2023). The difference in approaches raises questions about the type of physical activity programs that are most effective in improving motor skills while also promoting the development of life skills. Based on these conditions, a systematic review is needed to synthesize findings from various studies to understand how school-based physical activity programs contribute to the development of (Dewi & Verawati, 2022) (FMS) and life skills in children and adolescents. Therefore, this study aims to analyze empirical evidence regarding the effectiveness of physical activity programs in enhancing motor skills and life skills through a systematic literature review approach.

Therefore, this study aims to synthesize empirical findings regarding the effectiveness of school-based physical activity programs in improving fundamental motor skills and life skills among children and adolescents through a systematic literature review.

Physical activity programs within schools serve as structured opportunities for students to engage in movement-based learning (Erwin et al., 2013; Polero et al., 2021; Yu et al., 2006). These programs are commonly implemented through physical education classes, sport-based activities, and specially designed movement interventions (Smith et al., 2014). Research indicates that school-based physical activity initiatives can increase levels of moderate-to-vigorous physical activity among students while also enhancing engagement in learning environments (Raiola & Di Domenico, 2021). Educational institutions play a critical role in providing equitable access to physical activity opportunities. Through structured programs, schools can introduce children to diverse forms of movement, allowing them to explore physical capabilities and develop confidence in their physical abilities (Dapp et al., 2021; Lorenz et al., 2017; Marques et al., 2017).

Fundamental Motor Skills represent basic movement patterns that form the foundation for more advanced motor activities. These skills are typically classified into locomotor skills and object control skills. Locomotor skills involve movements that transport the body from one location to another, such as running, hopping, and jumping (ji et al., 2022). Object control skills involve manipulating objects through movements such as throwing, kicking, and catching. Motor Development Theory suggests that the acquisition of motor skills occurs through dynamic interactions between individual factors, environmental conditions, and task

requirements (Liong et al., 2015). Learning environments that provide repeated opportunities for practice, constructive feedback, and varied movement experiences are more likely to support optimal motor development (Lindsay et al., 2020).

Life skills refer to the psychosocial abilities that enable individuals to navigate everyday challenges effectively. In the context of sport and physical activity, life skills may include teamwork, communication, leadership, goal-setting, emotional regulation, and resilience (Camiré et al., 2012; Newman et al., 2023; Quinaud et al., 2023). The Positive Youth Development framework proposes that participation in sport and physical activity can foster these competencies when learning environments emphasize supportive relationships, meaningful participation, and opportunities for personal growth (Prajapati & Sharma, 2017). Within such contexts, coaches and teachers act as facilitators who guide students in transforming sport experiences into broader developmental outcomes (Pierce et al., 2017).

Physical Literacy offers a comprehensive perspective on movement education. Rather than focusing solely on motor competence, this framework integrates physical ability with motivation, confidence, and understanding of physical activity (Battaglia et al., 2020; Hakim et al., 2023; Zhang et al., 2023). Individuals who develop strong physical literacy are more likely to sustain active lifestyles throughout their lives. In educational contexts, physical literacy can be cultivated through diverse movement experiences that encourage exploration, enjoyment, and self-confidence in physical activity (Carl et al., 2022a, 2022b).

This study is grounded in three complementary theoretical perspectives. Motor Development Theory explains how structured movement experiences contribute to the development of fundamental motor skills. The Positive Youth Development framework highlights the potential of sport and physical activity contexts to foster psychosocial competencies such as teamwork and leadership. In addition, the concept of Physical Literacy emphasizes the development of competence, confidence, and motivation to engage in lifelong physical activity. Based on these perspectives, this study proposes that school-based physical activity programs influence the development of students' fundamental motor skills, which in turn contribute to the development of life skills through participation in structured sport and movement activities.

Based on the identified research gap, this study aims to synthesize existing evidence regarding the effectiveness of school-based physical activity programs in improving motor skills and life skills among children and adolescents. To guide the review process, the following research questions were formulated:

- RQ1: What types of school-based physical activity programs have been implemented to improve motor skills and life skills among children and adolescents?
- RQ2: How effective are school-based physical activity programs in improving fundamental motor skills among children and adolescents?
- RQ3: How do school-based physical activity programs contribute to the development of life skills such as teamwork, leadership, and communication?

METHOD

In this study, the researcher used the SLR (Systematic Literature Review) method, using digital databases (Scopus, ScienceDirect, ResearchGate, Google Scholar, Directory of Open Access Journals and Academia). The researcher conducted an extensive literature review on PYD, particularly life skills, drawing on relevant articles, book chapters, and other narratives on concepts, definitions, processes, and explanations for the phenomenon (e.g., Lerner & Lerner, 2006; Petitpas et al., 2005; Roth & Brooks-Gunn, 2003). The search strategy used combinations of keywords such as physical activity program, fundamental motor skills, life skills, physical education intervention, and school-based physical activity.

The article selection process followed the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) procedure. The initial search identified 4,266 records. Duplicate records and irrelevant studies were removed during the screening stage based on titles and abstracts.

The inclusion criteria for this review were as follows:

1. Studies examining physical activity or physical education interventions
2. Research involving children or adolescents as participants
3. Articles reporting outcomes related to motor skills or life skills
4. Peer-reviewed academic publications

After applying these criteria and conducting full-text assessments, 17 studies were included in the final analysis. Data from each study were extracted and analyzed through narrative synthesis to identify patterns in intervention characteristics and developmental outcomes.

Data Extraction and Analysis

After searching for data from various sources for analysis in this study, about 17 articles were identified that discussed how the Effectiveness of Physical Activity Programs in Improving Motor Skills and Life Skills. In further review, based on the formulation of the problem, an assessment was made to establish the relevance and applicability of the literature to the context of the discussion. In order for the literature to be included and reviewed in this study, predetermined criteria included:

1. Studies examining physical activity or physical education interventions
2. Research involving children or adolescents as participants
3. Articles reporting outcomes related to motor skills or life skills
4. Peer-reviewed academic publications

By meeting these criteria, the selected literature will help provide in-depth insight into how the Effectiveness of Physical Activity Programs in Improving Motor Skills and Life Skills.

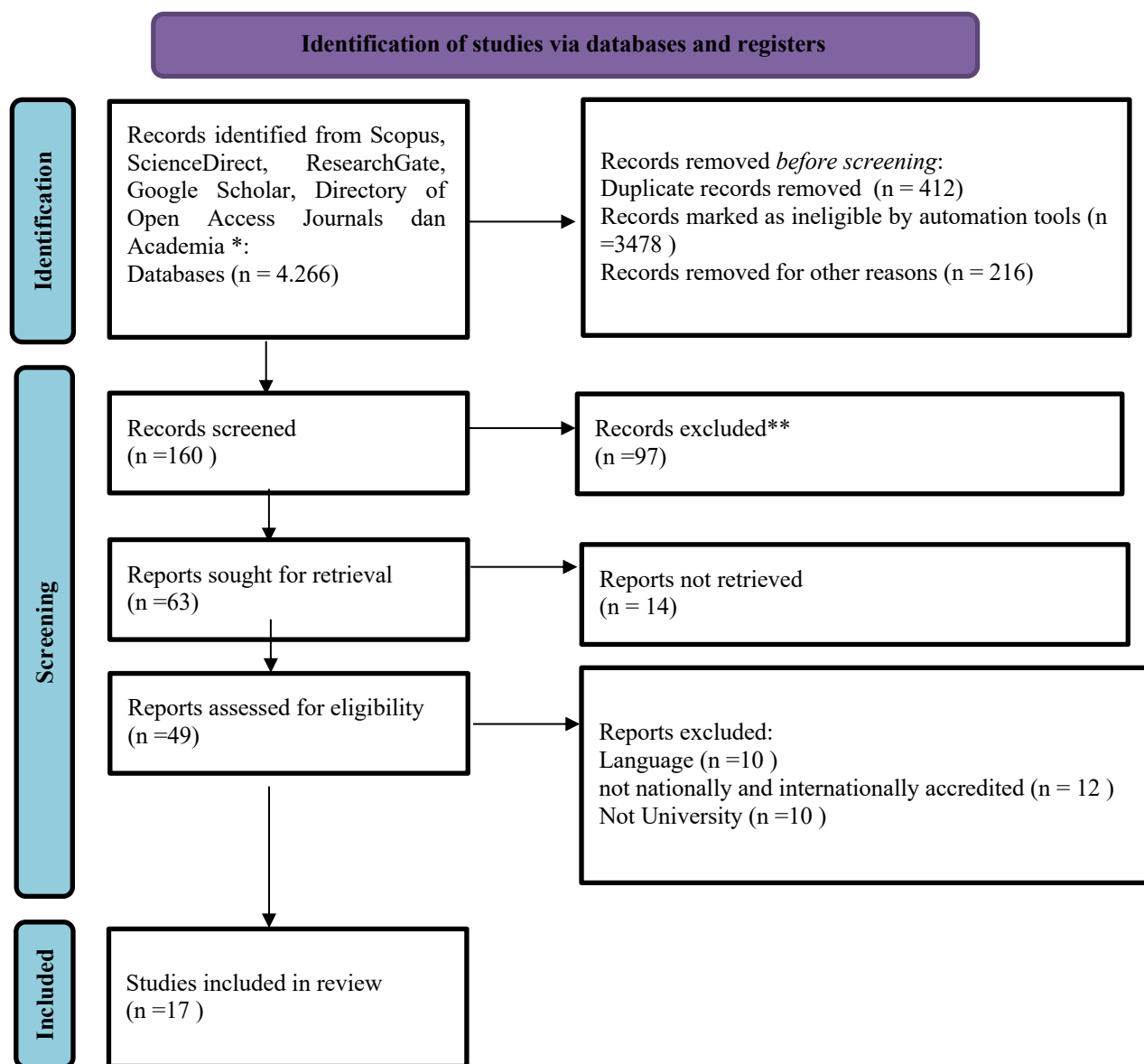


Figure 1. Prisma Flow

RESULTS AND DISCUSSION

Result

Table 1. Result Data Extraction and Analysis

No	Author	Participants	Intervention Type	Duration	Main Outcome
1	Telford et al.	318 elementary students	Physical Education Physical Literacy (PEPL) program	33 weeks	Improved object control skills and moderate increase in physical activity
2	Chan et al.	763 primary school students	Physical activity participation analysis	Cross-sectional	Motor skills indirectly influence physical activity through perceived competence
3	Danish & Nellen	Youth at risk	Sport-based life skills program	Program based	Sport participation facilitates development of psychosocial skills
4	Forneris et al.	Underserved youth	Community sport programs using TPSR	Case studies	Sport programs improve psychosocial development and life skills
5	Vazou & Mavilidi	273 preschool children	Move for Thought cognitive-engaging activity program	8 weeks	Improved attention and classroom engagement
6	Düz & Aslan	500 high school students	Sport participation study	Survey	Sport participation associated with leadership and teamwork skills
7	Fizi et al.	46 elementary students	Game-based physical education model	Intervention	Improved motor skills, cooperation, and discipline
8	Weiss et al.	Youth development program participants	Life Skills Transfer Survey validation	Multi-study	Demonstrated transfer of life skills from sport to daily contexts
9	Luo et al.	108 university students	Team Game Tournament learning model	12 weeks	Increased learning motivation through sport-based learning
10	DeVahl et al.	210 university students	Physical activity program with academic incentives	12 weeks	Increased adherence to exercise participation
11	Doolittle	Middle school students	School sport and physical activity programs	Program implementation	Increased student engagement in physical activity
12	Ignico et al.	Elementary students	Physical activity program	10 weeks	Improved fitness levels and self-esteem
13	Weiss	Youth sport participants	Social psychological perspective	Review	Motor competence linked with motivation and sustained participation
14	Kane & Staples	Children with coordination difficulties	Group motor skill intervention	Intervention program	Improved fundamental movement skills and activity participation
15	Lopes et al.	Primary school children	School physical education program	School year	Improved motor competence and physical fitness
16	Martin et al.	Youth sport participants	Longitudinal sport participation study	Longitudinal	Early motor skill programs influence lifelong activity behavior
17	Morano et al.	Obese children	Multi-modal physical activity program	8 months	Improved BMI, motor competence, and perceived physical ability

Analysis of the seventeen selected studies revealed several consistent findings regarding the effectiveness of school-based physical activity programs.

First, structured physical activity interventions were frequently associated with improvements in fundamental motor skills. Many studies reported measurable gains in locomotor movements such as running and jumping as well as object control skills including throwing and catching. Programs that incorporated structured skill practice and guided instruction produced particularly strong improvements in motor competence.

Second, physical activity programs were found to contribute to the development of life skills. Participation in sport and movement-based activities often involved collaborative tasks that required students to communicate, cooperate, and make decisions together. As a result, students developed social competencies such as teamwork, leadership, and emotional regulation.

Third, several studies highlighted the effectiveness of multi-component interventions. Programs that combined motor skill instruction, game-based learning, and structured social interaction produced broader developmental outcomes. These interventions supported both physical competence and psychosocial growth among participants.

Discussion

The findings of this review demonstrate consistent evidence that school-based physical activity programs contribute to improvements in both motor competence and psychosocial development. Across the seventeen studies analyzed, structured physical activity interventions were frequently associated with measurable gains in fundamental motor skills (Joshi & Dodge, 2022). Several studies focusing on structured physical education programs reported improvements in locomotor and object control skills following sustained participation in movement-based activities. These findings align with motor development perspectives suggesting that repeated movement experiences and guided instruction facilitate the acquisition of motor competence during childhood (Barrett et al., 2020). A comparison across the studies also reveals variation in the magnitude of improvement depending on the type of intervention implemented. Programs that emphasized structured skill practice tended to produce clear improvements in motor performance outcomes. In contrast, interventions that incorporated game-based activities and cooperative tasks often demonstrated broader developmental effects beyond motor competence. In particular, studies that integrated collaborative learning

environments reported noticeable gains in social behaviors such as teamwork, leadership, and peer interaction (Rasberry et al., 2011).

Several investigations also highlighted the importance of program structure and duration. Interventions implemented over longer periods tended to produce more stable improvements in both physical and psychosocial outcomes. Short-term interventions were still able to generate improvements in engagement and motivation, although changes in motor competence were often less pronounced (Visier-Alfonso et al., 2021). This pattern suggests that sustained exposure to structured movement experiences is necessary for long-term skill development. Another recurring pattern across the studies concerns the effectiveness of multi-component interventions. Programs that combined structured skill instruction, game-based activities, and supportive social environments consistently reported more comprehensive outcomes (Doolittle, 2016). Such programs appear to create conditions that support both motor learning and social interaction simultaneously. From a developmental perspective, this integration is particularly relevant, as children often learn movement skills within social contexts that require cooperation, communication, and shared problem solving.

These findings resonate with the principles of the Positive Youth Development framework, which proposes that sport and physical activity environments can foster positive developmental outcomes when guided by supportive instructional practices. At the same time, the results are consistent with the concept of physical literacy, which emphasizes the development of competence, confidence, and motivation to engage in physical activity throughout life.

Taken together, the comparative evidence across the reviewed studies suggests that the effectiveness of physical activity programs depends not only on the intensity of physical movement but also on the pedagogical environment in which the activities are delivered. Programs that integrate skill development with social interaction and enjoyable learning experiences appear to provide the most meaningful benefits for students.

CONCLUSION

This systematic literature review indicates that school-based physical activity programs play a significant role in supporting children's physical and psychosocial development. Structured interventions improve fundamental motor skills while also fostering life skills such as teamwork, leadership, and communication. Programs that combine skill practice, game-based learning, and supportive social environments appear to produce the most consistent outcomes. These findings highlight the importance of designing physical education programs

that integrate motor competence development with opportunities for social learning. Future research should further investigate long-term intervention effects and explore strategies for optimizing physical activity programs to support holistic child development.

REFERENCES

- Anguera, M. T., Camerino, O., Castañer, M., Sánchez-Algarra, P., & Onwuegbuzie, A. J. (2017). The specificity of observational studies in physical activity and sports sciences: Moving forward in mixed methods research and proposals for achieving quantitative and qualitative symmetry. *Frontiers in Psychology*, 8(DEC). <https://doi.org/10.3389/FPSYG.2017.02196>
- Bailey, R., Hillman, C., Arent, S., & Petitpas, A. (2013). Physical activity: An underestimated investment in human capital? *Journal of Physical Activity and Health*, 10(3), 289–308. <https://doi.org/10.1123/JPAH.10.3.289>,
- Barrett, E., Casey, B., Dollard, M., McCarthy, B., & Casey, D. (2020). Effectiveness of Functionally based Physical Activity Programs on Physical, Psychological, Cognitive, and Adverse Outcomes in Older Adults Living in Nursing Homes: Systematic Review. *Activities, Adaptation and Aging*, 1–42. <https://doi.org/10.1080/01924788.2020.1794352>
- Basterfield, L., Machaira, T., Jones, D., Rapley, T., Araujo-Soares, V., Cameron, N., & Azevedo, L. B. (2023). Early Years Physical Activity and Motor Skills Intervention—A Feasibility Study to Evaluate an Existing Training Programme for Early Years Educators. *Children*, 10(1). <https://doi.org/10.3390/children10010145>
- Battaglia, G., Giustino, V., Tabacchi, G., Alesi, M., Galassi, C., Modica, C., Palma, A., & Bellafore, M. (2020). Effectiveness of a Physical Education Program on the Motor and Pre-literacy Skills of Preschoolers From the Training-To-Health Project: A Focus on Weight Status. *Frontiers in Sports and Active Living*, 2. <https://doi.org/10.3389/fspor.2020.579421>
- Camiré, M., Trudel, P., & Forneris, T. (2012). Coaching and Transferring Life Skills: Philosophies and Strategies Used by Model High School Coaches. *The Sport Psychologist*, 26, 243–260.
- Campbell, A., Lassiter, J., Ertel, M., Taliaferro, A. R., Walker, M. L., & Brian, A. S. (2024). Exploring Facilitators and Barriers to Physical Activity for Families of Rural Preschoolers Participating in a Motor Skill Program. *Children*, 11(3). <https://doi.org/10.3390/children11030362>
- Carl, J., Bryant, A. S., Edwards, L. C., Bartle, G., Birch, J. E., Christodoulides, E., Emeljanovas, A., Fröberg, A., Gandrieau, J., Gilic, B., van Hilvoorde, I., Holler, P., Iconomescu, T. M., Jaunig, J., Laudanska-Krzeminska, I., Lundvall, S., De Martelaer, K., Martins, J., Mieziene, B., ... Elsborg, P. (2022a). Physical literacy in Europe: The current state of implementation in research, practice, and policy. *Journal of Exercise Science and Fitness*, 21(1), 165. <https://doi.org/10.1016/J.JESF.2022.12.003>
- Carl, J., Bryant, A. S., Edwards, L. C., Bartle, G., Birch, J. E., Christodoulides, E., Emeljanovas, A., Fröberg, A., Gandrieau, J., Gilic, B., van Hilvoorde, I., Holler, P., Iconomescu, T. M., Jaunig, J., Laudanska-Krzeminska, I., Lundvall, S., De Martelaer, K., Martins, J., Mieziene, B., ... Elsborg, P. (2022b). Physical literacy in Europe: The current state of implementation in research, practice, and policy. *Journal of Exercise Science and Fitness*, 21(1), 165. <https://doi.org/10.1016/J.JESF.2022.12.003>
- Chan, C. H. S., Ha, A. S. C., Ng, J. Y. Y., & Lubans, D. R. (2019). Associations between fundamental movement skill competence, physical activity and psycho-social

- determinants in Hong Kong Chinese children. *Journal of Sports Sciences*, 37(2), 229–236. <https://doi.org/10.1080/02640414.2018.1490055>
- Cook, C. J., Howard, S. J., Scerif, G., Twine, R., Kahn, K., Norris, S. A., & Draper, C. E. (2019). Associations of physical activity and gross motor skills with executive function in preschool children from low-income South African settings. *Developmental Science*, 22(5). <https://doi.org/10.1111/desc.12820>
- Dapp, L. C., Gashaj, V., & Roebbers, C. M. (2021). Physical activity and motor skills in children: A differentiated approach. *Psychology of Sport and Exercise*, 54. <https://doi.org/10.1016/j.psychsport.2021.101916>
- Dewi, R., & Verawati, I. (2022). The Effect of Manipulative Games to Improve Fundamental Motor Skills in Elementary School Students. *International Journal of Education in Mathematics, Science and Technology*, 10(1), 24–37. <https://doi.org/10.46328/ijemst.2163>
- Dhuli, K., Naureen, Z., Medori, M. C., Fioretti, F., Caruso, P., Perrone, M. A., Nodari, S., Manganotti, P., Xhufi, S., Bushati, M., Bozo, D., Connelly, S. T., Herbst, K. L., & Bertelli, M. (2022). Physical activity for health. *Journal of Preventive Medicine and Hygiene*, 63(2), E150–E159. <https://doi.org/10.15167/2421-4248/jpmh2022.63.2S3.2756>
- DiPietro, L., Al-Ansari, S. S., Biddle, S. J. H., Borodulin, K., Bull, F. C., Buman, M. P., Cardon, G., Carty, C., Chaput, J. P., Chastin, S., Chou, R., Dempsey, P. C., Ekelund, U., Firth, J., Friedenreich, C. M., Garcia, L., Gichu, M., Jago, R., Katzmarzyk, P. T., ... Willumsen, J. F. (2020). Advancing the global physical activity agenda: recommendations for future research by the 2020 WHO physical activity and sedentary behavior guidelines development group. *International Journal of Behavioral Nutrition and Physical Activity*, 17(1). <https://doi.org/10.1186/s12966-020-01042-2>
- Doolittle, S. (2016). Engaging Middle School Students in Physical Education and Physical Activity Programs. *Journal of Physical Education, Recreation & Dance*, 87(6), 29–34. <https://doi.org/10.1080/07303084.2016.1192940>
- Elmagd, M. A., Mossa, A. H., Sami, M. M., Al Jadaan, O., Salah, M., Assistant, E. M., Affairs, D.-S., Khaimah, A., Sami, M., El-Marsafawy, S., & Mudawi, E. (2015). The Impact of Physical Activity on the Academic Performance among Medical and Health Sciences Students: A Cross Sectional Study from RAKMHSU-Ras Alkhaimah-UAE. ~ 92 ~ *International Journal of Physical Education, Sports and Health*, 2(1), 91–95. www.kheljournal.com
- Erwin, H., Beighle, A., Carson, R. L., & Castelli, D. M. (2013). Comprehensive School-Based Physical Activity Promotion: A Review. *Quest*, 65(4), 412–428. <https://doi.org/10.1080/00336297.2013.791872>
- Forneris, T., Whitley, M. A., & Barker, B. (2013). The Reality of Implementing Community-Based Sport and Physical Activity Programs to Enhance the Development of Underserved Youth: Challenges and Potential Strategies. *Quest*, 65(3), 313–331. <https://doi.org/10.1080/00336297.2013.773527>
- Ha, A. S., Lonsdale, C., Lubans, D. R., Ng, F. F., & Ng, J. Y. Y. (2021). Improving children's fundamental movement skills through a family-based physical activity program: results from the “Active 1 + FUN” randomized controlled trial. *International Journal of Behavioral Nutrition and Physical Activity*, 18(1). <https://doi.org/10.1186/s12966-021-01160-5>
- Haapala, E. (2012). Physical Activity, Academic Performance and Cognition in Children and Adolescents. A Systematic Review. *Baltic Journal of Health and Physical Activity*, 4(1). <https://doi.org/10.2478/v10131-012-0007-y>

- Hakim, L., Gede, I., Utamayasa, D., Triatmojo, M., & Megawati, I. (2023). Physical education learning is based on a base project to improve student literacy and numeracy. *Jurnal Penelitian Pembelajaran*, 9(1), 26–39. https://doi.org/10.29407/js_unpgri.v9i1.19379
- Haverkamp, B. F., Wiersma, R., Vertessen, K., van Ewijk, H., Oosterlaan, J., & Hartman, E. (2020a). Effects of physical activity interventions on cognitive outcomes and academic performance in adolescents and young adults: A meta-analysis. *Journal of Sports Sciences*, 38(23), 2637–2660. <https://doi.org/10.1080/02640414.2020.1794763>
- Haverkamp, B. F., Wiersma, R., Vertessen, K., van Ewijk, H., Oosterlaan, J., & Hartman, E. (2020b). Effects of physical activity interventions on cognitive outcomes and academic performance in adolescents and young adults: A meta-analysis. *Journal of Sports Sciences*, 38(23), 2637–2660. <https://doi.org/10.1080/02640414.2020.1794763>
- Iivonen, K. S., Sääkslahti, A. K., Mehtälä, A., Villberg, J. J., Tammelin, T. H., Kulmala, J. S., & Poskiparta, M. (2013). Relationship between fundamental motor skills and physical activity in 4-year-old preschool children. *Perceptual and Motor Skills*, 117(2), 627–646. <https://doi.org/10.2466/10.06.PMS.117x22z7>
- Jaakkola, T., Hillman, C., Kalaja, S., & Liukkonen, J. (2015a). The associations among fundamental movement skills, self-reported physical activity and academic performance during junior high school in Finland. *Journal of Sports Sciences*, 33(16), 1719–1729. <https://doi.org/10.1080/02640414.2015.1004640>
- Jaakkola, T., Hillman, C., Kalaja, S., & Liukkonen, J. (2015b). The associations among fundamental movement skills, self-reported physical activity and academic performance during junior high school in Finland. *Journal of Sports Sciences*, 33(16), 1719–1729. <https://doi.org/10.1080/02640414.2015.1004640>
- Ji, yuqin, tian, hao, ye, qiang, ye, zhuoyan, & zheng, zeyu. (2022). *Effectiveness of exercise intervention on improving fundamental motor skills in children with autism spectrum disorder: A systematic review and Meta-analysis*. <https://doi.org/10.37766/inplasy2022.12.0013>
- Joshi, D., & Dodge, T. (2022). Compensatory physical activity: Impact on type of physical activity and physical activity habits among female young adults. *Journal of American College Health*, 70(1), 39–48. <https://doi.org/10.1080/07448481.2020.1719113>
- Kahan, D., McKenzie, T. L., Satnick, M., & Hansen, O. (2023). U.S. Islamic Schools' Promotion of Physical Education and Physical Activity. *Journal of Education in Muslim Societies*, 5(1), 86–105. <https://doi.org/10.2979/jems.5.1.06>
- Kane, K. J., & Staples, K. L. (2016). A group motor skills program for children with coordination difficulties: Effect on fundamental movement skills and physical activity participation. *Physical and Occupational Therapy in Pediatrics*, 36(1), 28–45. <https://doi.org/10.3109/01942638.2014.978934>
- Kokstajn, J., Musalek, M., Wolanski, P., Murawska-Cialowicz, E., & Stastny, P. (2019). Fundamental motor skills mediate the relationship between physical fitness and soccer-specific motor skills in young soccer players. *Frontiers in Physiology*, 10(MAY). <https://doi.org/10.3389/fphys.2019.00596>
- Lindsay, A. R., Starrett, A., Brian, A., Byington, T. A., Lucas, J., & Sigman-Grant, M. (2020). Preschoolers build fundamental motor skills critical to an active lifestyle: The all 4 kids© intervention study. *International Journal of Environmental Research and Public Health*, 17(9). <https://doi.org/10.3390/ijerph17093098>
- Liong, G. H. E., Ridgers, N. D., & Barnett, L. M. (2015). Associations between skill perceptions and young children's actual fundamental movement skills. *Perceptual and Motor Skills*, 120(2), 591–603. <https://doi.org/10.2466/10.25.PMS.120v18x2>
- Lorenz, K. A., Van Der Mars, H., Kulinna, P. H., Ainsworth, B. E., & Hovell, M. F. (2017). Environmental and behavioral influences of physical activity in junior high school

- students. *Journal of Physical Activity and Health*, 14(10), 785–792. <https://doi.org/10.1123/jpah.2016-0709>
- Lubans, D. R., Plotnikoff, R. C., & Lubans, N. J. (2012). Review: A systematic review of the impact of physical activity programmes on social and emotional well-being in at-risk youth. *Child and Adolescent Mental Health*, 17(1), 2–13. <https://doi.org/10.1111/j.1475-3588.2011.00623.x>
- Marques, A., Gómez, F., Martins, J., Catunda, R., & Sarmento, H. (2017). *Association between physical education, school-based physical activity, and academic performance: a systematic review Asociación entre la educación física, la actividad física en la escuela, y el rendimiento académico: una revisión sistemática*. 31, 316. www.retos.org
- Morano, M., Colella, D., Rutigliano, I., Fiore, P., Pettoello-Mantovani, M., & Campanozzi, A. (2014). A multi-modal training programme to improve physical activity, physical fitness and perceived physical ability in obese children. *Journal of Sports Sciences*, 32(4), 345–353. <https://doi.org/10.1080/02640414.2013.824602>
- Newman, T., Black, S., Santos, F., Jefka, B., & Brennan, N. (2023). Coaching the development and transfer of life skills: a scoping review of facilitative coaching practices in youth sports. *International Review of Sport and Exercise Psychology*, 16(1), 619–656. <https://doi.org/10.1080/1750984X.2021.1910977>
- Pierce, S., Gould, D., & Camiré, M. (2017). Definition and model of life skills transfer. *International Review of Sport and Exercise Psychology*, 10(1), 186–211. <https://doi.org/10.1080/1750984X.2016.1199727>
- Polero, P., Rebollo-Seco, C., Adsuar, J. C., Pérez-Gómez, J., Rojo-Ramos, J., Manzano-Redondo, F., Garcia-Gordillo, M. Á., & Carlos-Vivas, J. (2021). Physical activity recommendations during COVID-19: Narrative review. *International Journal of Environmental Research and Public Health*, 18(1), 1–24. <https://doi.org/10.3390/ijerph18010065>
- Prajapati, R., & Sharma, D. (2017). Significance Of Life Skills Education. *Contemporary Issues in Education Research-First Quarter*, 10(1).
- Quinaud, R. T., Possamai, K., Nascimento Júnior, J. R. A. do, Gonçalves, C. E., & Carvalho, H. M. (2023). The positive impact of sports participation on life skills' development: a qualitative study with medical students. *Sport in Society*, 26(4), 687–702. <https://doi.org/10.1080/17430437.2022.2033220>
- Rafiei Milajerdi, H., Sheikh, M., Najafabadi, M. G., Saghaei, B., Naghdi, N., & Dewey, D. (2021). The Effects of Physical Activity and Exergaming on Motor Skills and Executive Functions in Children with Autism Spectrum Disorder. *Games for Health Journal*, 10(1), 33–42. <https://doi.org/10.1089/g4h.2019.0180>
- Raiola, G., & Di Domenico, F. (2021). Physical and sports activity during the COVID-19 pandemic. *Journal of Physical Education and Sport*, 21, 477–482. <https://doi.org/10.7752/jpes.2021.s1049>
- Rasberry, C. N., Lee, S. M., Robin, L., Laris, B. A., Russell, L. A., Coyle, K. K., & Nihiser, A. J. (2011). The association between school-based physical activity, including physical education, and academic performance: A systematic review of the literature. *Preventive Medicine*, 52(SUPPL.). <https://doi.org/10.1016/j.ypmed.2011.01.027>
- Sallis, J. F., Cerin, E., Kerr, J., Adams, M. A., Sugiyama, T., Christiansen, L. B., Schipperijn, J., Davey, R., Salvo, D., Frank, L. D., De Bourdeaudhuij, I., & Owen, N. (2020). *Built Environment, Physical Activity, and Obesity: Findings from the International Physical Activity and Environment Network (IPEN) Adult Study*. <https://doi.org/10.1146/annurev-publhealth>
- Shepherd, H. A., Evans, T., Gupta, S., McDonough, M. H., Doyle-Baker, P., Belton, K. L., Karmali, S., Pawer, S., Hadly, G., Pike, I., Adams, S. A., Babul, S., Yeates, K. O., Kopala-

- Sibley, D. C., Schneider, K. J., Cowle, S., Fuselli, P., Emery, C. A., & Black, A. M. (2021). The impact of COVID-19 on high school student-athlete experiences with physical activity, mental health, and social connection. *International Journal of Environmental Research and Public Health*, 18(7), 3515–2529. <https://doi.org/10.3390/ijerph18073515>
- Smedegaard, S., Christiansen, L. B., Lund-Cramer, P., Bredahl, T., & Skovgaard, T. (2016). Improving the well-being of children and youths: a randomized multicomponent, school-based, physical activity intervention. *BMC Public Health*, 16(1), 1–11. <https://doi.org/10.1186/s12889-016-3794-2>
- Smith, N. J., Lounsbery, M. A. F., & McKenzie, T. L. (2014). Physical activity in high school physical education: Impact of lesson context and class gender composition. *Journal of Physical Activity and Health*, 11(1), 127–135. <https://doi.org/10.1123/jpah.2011-0334>
- Syväoja, H. J., Kantomaa, M. T., Ahonen, T., Hakonen, H., Kankaanpää, A., & Tammelin, T. H. (2013). Physical activity, sedentary behavior, and academic performance in Finnish children. *Medicine and Science in Sports and Exercise*, 45(11), 2098–2104. <https://doi.org/10.1249/MSS.0b013e318296d7b8>
- Toivonen, H. M., Wright, P. M., Hassandra, M., Hagger, M. S., Hankonen, N., Hirvensalo, M., Talvio, M., Gould, D., Kalaja, S., Tammelin, T., Laine, K., & Lintunen, T. (2021). Training programme for novice physical activity instructors using Teaching Personal and Social Responsibility (TPSR) model: A programme development and protocol. *International Journal of Sport and Exercise Psychology*. <https://doi.org/10.1080/1612197X.2019.1661268>
- Vazou, S., & Mavilidi, M. F. (2021). Cognitively Engaging Physical Activity for Targeting Motor, Cognitive, Social, and Emotional Skills in the Preschool Classroom: The Move for Thought preK-K Program. *Frontiers in Psychology*, 12. <https://doi.org/10.3389/fpsyg.2021.729272>
- Visier-Alfonso, M. E., Álvarez-Bueno, C., Sánchez-López, M., Cavero-Redondo, I., Martínez-Hortelano, J. A., Nieto-López, M., & Martínez-Vizcaino, V. (2021). Fitness and executive function as mediators between physical activity and academic achievement: Mediators between physical activity and academic achievement. *Journal of Sports Sciences*, 39(14), 1576–1584. <https://doi.org/10.1080/02640414.2021.1886665>
- Wagemakers, A., Mulderij, L. S., Verkooijen, K. T., Groenewoud, S., & Koelen, M. A. (2018). Care-physical activity initiatives in the neighbourhood: Study protocol for mixed-methods research on participation, effective elements, impact, and funding methods. *BMC Public Health*, 18(1). <https://doi.org/10.1186/s12889-018-5715-z>
- Wang, X., & Zhou, B. (2024). Motor development-focused exercise training enhances gross motor skills more effectively than ordinary physical activity in healthy preschool children: an updated meta-analysis. *Frontiers in Public Health*, 12. <https://doi.org/10.3389/fpubh.2024.1414152>
- Weiss, M. R., Bolter, N. D., & Kipp, L. E. (2014). Assessing impact of physical activity-based youth development programs: Validation of the life skills transfer survey (LSTS). *Research Quarterly for Exercise and Sport*, 85(3), 263–278. <https://doi.org/10.1080/02701367.2014.931558>
- Yu, C. C. W., Chan, S., Cheng, F., Sung, R. Y. T., & Hau, K. T. (2006). Are physical activity and academic performance compatible? Academic achievement, conduct, physical activity and self-esteem of Hong Kong Chinese primary school children. *Educational Studies*, 32(4), 331–341. <https://doi.org/10.1080/03055690600850016>
- Yun, J., & Beamer, J. (2018). Promoting Physical Activity in Adapted Physical Education. *Journal of Physical Education, Recreation and Dance*, 89(4), 7–13. <https://doi.org/10.1080/07303084.2018.1430628>

- Zhang, D., Shi, L., Zhu, X., Chen, S., & Liu, Y. (2023). Effects of intervention integrating physical literacy into active school recesses on physical fitness and academic achievement in Chinese children. *Journal of Exercise Science and Fitness*, 21(4), 376–384. <https://doi.org/10.1016/j.jesf.2023.09.004>