EFFECTS OF PHYSICAL EDUCATION AND PHYSICAL ACTIVITY ON LEARNING ABILITY AND EMOTIONAL INTELLIGENCE IN CHILDREN: A REVIEW

GLI EFFETTI DELL'EDUCAZIONE FISICA E DELL'ATTIVITÀ FISICA SULL'APPRENDIMENTO E SULL'INTELLIGENZA EMOTIVA NEI BAMBINI: UN ANALISI DELLA LETTERATURA

Elisa Pugliese
Pegaso University/University of Camerino
elisa.pugliese@unicam.it

Maheen Bashir
Pegaso University/University of Camerino
maheenbashir5@gmail.com

Pasqualina Forte
Pegaso University/University of Camerino
pasqualina.forte@unicam.it

Cristiana D'Anna
Pegaso University
cristiana.danna@unipegaso.it

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ABSTRACT
Educational Neuroscience highlights the link between emotions and learning, promoting the integration of social-emotional education into pedagogical practice. This review analyses the impact of physical education on learning and emotional intelligence in children. Participation in physical education programs improves emotional intelligence, cognitive function, and social skills. Research in this field is crucial to understand the underlying mechanisms and optimize the benefits of motor activities at school.

La Neuroscienza Educativa evidenzia il collegamento tra emozioni e apprendimento, promuovendo l'integrazione dell'educazione socio-emotiva nella pratica pedagogica. Questa recensione analizza l'impatto dell'educazione fisica sull'apprendimento e l'intelligenza emotiva nei bambini. La partecipazione a programmi di educazione fisica migliora l'intelligenza emotiva, le funzioni cognitive e le competenze sociali. La ricerca in questo campo è cruciale per comprendere i meccanismi sottostanti e ottimizzare i benefici delle attività motorie a scuola.

KEYWORDS
Cognitive Skills, Emotional Intelligence, Physical Education, School Context, Teaching & Learning
Capacità Cognitive, Contesto Scolastico, Educazione Fisica, Insegnamento e Apprendimento, Intelligenza Emotiva

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Introduction[1]

Over the last 25 years, there has been substantial development in the concept of emotional intelligence (EI), leading to extensive research from many perspectives. The emotional intelligence (EI) can be defined as the ability to identify, incorporate, evaluate, and regulate one's own emotions and the emotions of others (Salovey & Mayer,1990). In other words, emotional intelligence encompasses both intrapersonal and interpersonal encounters (Goleman, 1995). Intrapersonal linkages are more prevalent among the two. From a particular perspective, the ability to perceive, evaluate, and regulate one's own emotions is seen essential for the establishment of intrapersonal relationships. Interpersonal relationships, conversely, are established by the capacity to see and understand the emotions of others, namely the capacity to empathize with them and cultivate positive connections with them. Three emotional intelligence (EI) methodologies have been proposed so far to facilitate the conceptualizing process (Kumar et al., 2016; Rajasekaran & Selvan 2018). The first model is built around a four-branch paradigm, which focuses on the recognition, comprehension, regulation, and expression of both one's own and others' emotions. The second perspective reveals that possessing emotional capabilities facilitates the comprehension and regulation of one's own emotions. The third model examined is that of emotional intelligence. According to the aforementioned paradigm, emotional learning is predicated upon an individual's personal, social, and emotional knowledge and capabilities, which subsequently impact their capacity to effectively navigate distressing circumstances (Zysberg & Hemmel 2018; Amado-Alonso et al., 2019). The interconnectedness between emotions and emotional intelligence suggests a strong correlation between individuals' cognitive processes and behavioural patterns. Therefore, the stimulation of emotional intelligence in our daily existence starts throughout early infancy. The individuals who possess the capacity to proficiently regulate their emotions exhibit elevated levels of happiness and demonstrate enhanced ability to exert control over their daily routines, effectively managing various facets of their lives, including motivation, empathy, anxious impulses, and self-control. Conversely, those with diminished emotional intelligence constantly grapple with internal tensions that impede their ability to perform effectively and think clearly (Herazo-Beltrán, 2019). To provide a

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contextual framework, including emotional competence education into the early stages of preschool or kindergarten education is a valuable opportunity for children to enhance their behavioural and cognitive abilities, hence potentially influencing their future outcomes. From this perspective, motor activity, which consistently exposes children to situations that enhance their emotional competence, offers a greater opportunity to facilitate the development of emotional intelligence (Petsos & Gorozidis, 2019; Herrera et al., 2020). Regular physical activity offers lifelong benefits for health. Among children and adolescents, engaging in physical activity enhances several aspects such as musculoskeletal and cardiometabolic health, cognitive growth, motor abilities, self-confidence, social interaction, academic achievement, and overall welfare (WHO, 2020).

Consequently, this enables children to develop self-regulation skills for managing their own emotions and actions in response to those of others. The development of emotional intelligence is influenced by three essential components: affectivity, experiences, and bodily movements. Physical education provides a suitable setting for the development of this particular skill (Méndez Giménez et al., 2020).

Educational neuroscience, commonly known as neuroeducation, is a rapidly growing field within the realm of Mind Brain and Education. This field examines the correlations between educational environments and neural regions, exploring a wide array of themes, such as educational technology, educational psychology, education theory, cognitive neuroscience, developmental cognitive neuroscience, and educational technology.

Individuals with learning aptitude have the ability to absorb, analyse, and remember knowledge that they have directly encountered (Sulistiya & Komarudin, 2020). The impact of this phenomenon on the scholastic achievement and holistic growth of children is significant as a better understanding of learning processes increases the acquisition of information by adapting educational experiences accordingly. (Trigueros et al., 2020).

Understanding the cognitive abilities of youngsters is a multifaceted and crucial undertaking. People have the ability to efficiently acquire and remember new knowledge, which they then apply to new circumstances (Fenanlampir, A., & Mutohir, T. C. (2021). It encompasses a set of procedures and skills that enable persons to carry out each of these duties. The ability to absorb information is a very important skill that involves the cognitive process of extracting meaning from new words, pictures, and ideas. Memory is a crucial cognitive skill that allows youngsters to store and recall knowledge for future use, which may be used to both current work and future pursuits (Kliziene et al., 2021). Children have the ability to overcome obstacles creatively and find solutions through the process of problem-

solving, a talent that has significant value. A strong inclination towards information acquisition is associated with the attributes of concentration and attention, which are characterized by the capacity to concentrate on a particular subject matter while avoiding any type of distraction (Malinauskas & Malinauskiene, 2021). The development of each of these skills is interconnected and starts at infancy, with a specific focus on the critical phase of childhood. Enabling the development of lifelong learning abilities in youngsters may be accomplished by creating engaging settings, fostering curiosity, and providing many chances for the practical application of these talents. In elementary and secondary schools, physical education (PE) and other types of physical exercise play a vital role in promoting students' cognitive growth, fundamental for the acquisition of essential transversal skills useful for daily life and social cohesion (Muñoz Parreño et al., 2021; Pugliese et al., 2023). Physical exercise has a crucial role in promoting cognitive growth by enhancing cerebral blood flow. The role of action in the learning process takes on an innovative and fundamental role, which goes beyond the simple execution of a movement allowing, through an articulated interaction with the surrounding environment, to capture as much information as possible (Forte et al., 2023).

Effective learning requires three results: increased focus, improved ability to absorb knowledge, and strengthened memory. However, the effects extend beyond the domain of cognition. There exists a favourable correlation between academic accomplishment and physical exercise with critical cognitive functions such as attention, planning, and problem-solving. Furthermore, it has been observed that physical education and motor activities include inherent stress-relieving properties, thus providing a significant benefit to teenagers who are grappling with scholastic demands. Engaging in physical exercise fosters an atmosphere conducive to optimum learning for children by effectively reducing stress and anxiety. Physical education and physical activity fundamentally construct an effective educational apparatus (Portela-Pino et al., 2022). The comprehension of a wide range of academic topics is significantly improved as a result of significantly boosted cognitive powers. This might have a significant effect, particularly for pupils who have difficulties in certain disciplines. There is a potential for individuals to overcome these challenges by cultivating a mindset focused on learning and improving their capacity to focus and solve difficulties (Vaquero-Solís et al., 2022). The prioritization of physical education and exercise contributes to the development of persons who possess not only physical fitness, but also intellectual maturity and a comprehensive skill set. This approach guarantees their preparedness for future pursuits and achievement in academic context. (Gil-Moreno & Rico-González, 2023).

A survey conducted in 2019, comparing school curricula across various European countries, revealed that in some European Union member states, the amount of time spent on physical education does not comply with the guidelines set by the World Health Organization. In some cases, physical education has been relegated to a secondary role in the school curriculum, highlighting not only an inertia in action but also the importance of adopting innovative and effective policy solutions (D'Anna et al., 2019).

The inclusion of physical education and exercise in the curriculum has been shown to have a positive impact on students' academic performance. This is attributed to the creation of a learning environment that is favourable to cognitive capacities, attention, and stress management (Luna et al., 2021). Institutions have the co-responsibility of planning interventions aimed at acting on the individual and the community in order to guarantee a better quality of life with a view to lifelong learning starting from the developmental age (D'Anna et al., 2024). Therefore, it is the task of educational institutions and researchers to verify which methodologies and teaching approaches prefer the participation and promotion of motor activities also from an inclusive perspective, encouraging the active participation of students through stimulating and meaningful experiences, which allows the development of new competences (Minghelli et al., 2023).

Keeping in view all the above introduction and background the objective of this review paper is to identify and discuss the studies on emotional intelligence, learning abilities, educational performance and cognitive learning of school going children particularly checking the effect of physical education or physical activity on all these parameters. Moreover, in this review paper the underline factors of educational performance like school grades, attention, focus, concentration, punctuality, thinking abilities, ideas generation and overall physical health etc. will be explored.

1. Materials and Methods

1.1. Data Sources and Search Strategies

An analysis of the scientific literature was conducted by analysing a series of studies published between 2010 and 2024. A scoping review is a technique that involves reviewing a body of literature in order to provide an overview of the current body of knowledge pertaining to a specific topic (Munn et al., 2018). It draws attention to various research studies and scientific discoveries related to the topic. PRISMA guidelines were followed in conducting this review (Liberati et al., 2009). Relevant studies were identified by searching the databases Google

Scholar, Scopus and Science Direct using the following keywords: emotional intelligence, physical education, physical activity, educational neuroscience, teaching and learning, cognitive function, school context, children. Studies focusing on the relationship between physical education, physical activity, learning ability, and emotional intelligence in children were identified. Various explanatory variables, such as duration and intensity of physical activity, type of physical education curriculum, and age and gender of participants, were considered.

1.2. Eligibility Criteria

The studies included in this review were selected following the PICOS strategy (participants - interventions - comparison – outcomes - study design) (Liberati et al., 2009). In particular, Table 1 details the eligibility criteria. Two reviewers carried out the search and independently chose the studies based on predetermined standards determined by looking at the abstracts and titles. The chosen abstracts were then examined by each author separately to ascertain their final eligibility in light of the inclusion and exclusion criteria. Only studies published in peer-reviewed journals written in English language were considered.

Table 1. Eligibility criteria

PICOS strategy	**Inclusion criteria**
Participants	Age range: 3-13 years old
Interventions	Students involved in physical education program or physical activities
Comparison	none
Outcomes	Articles evaluating the correlation between physical activity and emotional intelligence.
Other criteria	Only peer reviewed, original, full-text studies written in English

1.3. Study Procedures

Following the selection of titles in the first phase, the suitability of the abstracts was assessed. The full texts of all the abstracts that did not meet the eligibility requirements were also analysed, in addition to the full texts of the abstracts that did meet the requirements. The figure 1 shows the flow of information through the different phases of this review; these included the identification of literature, screening of studies, eligibility assessment, and final included articles. The search initially turned up fifty-three potentially relevant studies. A total of thirty-four full-text articles were retrieved after duplicates were eliminated and titles and abstracts were screened. Ten

of these studies met the requirements for inclusion. In order to provide a synthetical framework highlighting the correlation between structured physical activity and the development of emotional intelligence, the selected studies were placed in a table, specifying parameters and variables analysed by each (Table 2).

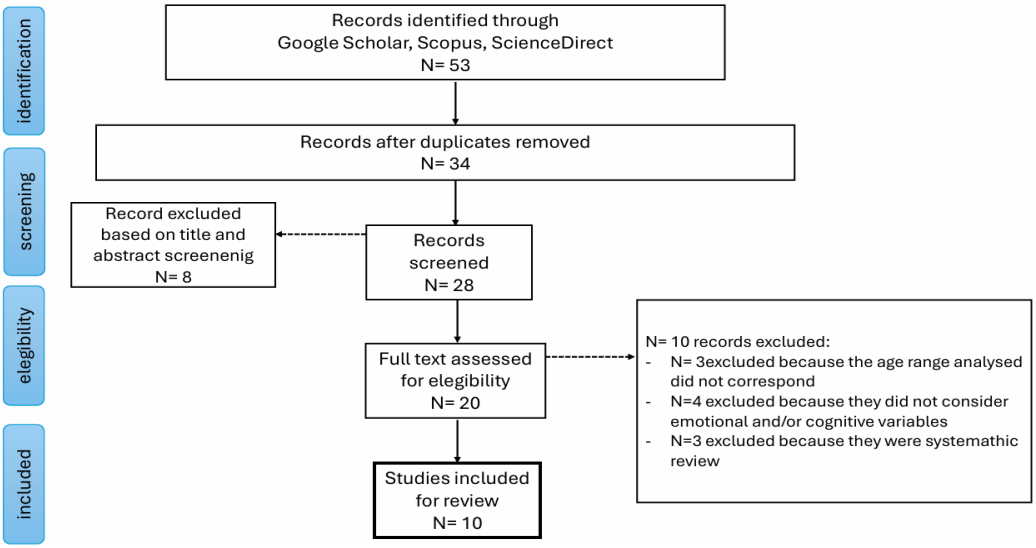

Figure 1. Flow chart of study selection process

2. Results

A total of ten studies were selected, data from each included study were processed and inserted into Table 2, divided by significant items. The items in the table were divided as follows: source (author, year of publication), title, sample of the study (sample size and age of participants), aim, parameter and variable observed, tools and main results.

	Author, year	Title	Sample (n) & age rage	Aim	Parameters and variable observed	Tools	Main Results
1	Kliziene, et al., 2020	The relationship between school age children's academic performance and innovative physical education programs.	89 6 to 7 years	to establish a link between the academic performance of primary school children and an innovative physical education program.	number and calculations, equations and inequalities, measurements and geometry measures, statistics, problem solving skills, movement and sports skills, athletics, physical activity, lifestyle	-mathematical diagnostic progress tests (MDPTs) - Distribution of Mathematical Learning Achievements by Curriculum Content	An innovative physical education program to first graders demonstrated a higher-level math program in the areas of geometry, measurements, and measurements; statistics; and communication and general problem-solving skills. This study complements new scientific literature, which reveals that innovative physical education programs can help to achieve the goal of enhancing cognitive activation and thus facilitate the learning process promoted by schools. Participation in physical activity can improve children's academic performance and act as a mechanism that addresses educational lacks.
2	Mulvey et al., 2020.	SKIPing together: A motor competence intervention promotes gender-integrated friendships for young children	Control 37 and intervention group 56. 3-10 years KinderGarten (3-10 Years)	to examine whether an evidence-based motor competence intervention, Successful Kinesthetic Instruction for Preschoolers led by physical education teachers, also to promote gender-integrated friendships in young children.	gender integrated friendships, test of gross motor development-2 (TGMD-2)	TGMD-2 (test of gross motor development-2) Gender-Integrated Friendships (interview)	Results documented that children assigned to the SKIP condition (n = 56) as compared to a control free-play condition (n = 37) showed higher motor skill competence and were more likely to report gender-integrated friendships post intervention. Growth in girls' reports of gender-integrated friendships drove the intervention effect on gender-integrated friendships. These findings highlight one example of how motor competence interventions can also result in benefits in social-emotional domains.
3	Pramandhika et al., 2020.	The Emotional Intelligence and Age Relationships Towards Basic Movement Locomotor in Kindergarten Students.	118 students from State Kindergarten Pembina	to analyze the EI linkage towards locomotor basic movement abilities in kindergarten, the age relationship towards locomotor basic movement abilities in kindergarten, the emotional intelligence and age relationship towards locomotor basic movement abilities in kindergarten	locomotor basic movement, emotional intelligence, age, (emotional intelligence and age)	Data collection Techniques: *Scale* (data on children's EI) *Documentation* (for age stages) Observation (for students' locomotor basic motion skills in the form of sheets assessment)	there is a significant influence between the emotional intelligence ability with locomotor basic movement in kindergarten. There is a relationship between emotional intelligence ability and age on locomotor basic movement in kindergarten
4	Sánchez-Miguel, 2020.	The mediating role of the self-concept between the relationship of the body satisfaction and the intention to be physically active in primary school students.	N=302 (10-13 years)	to analyse the extent to which anthropometric values, in line with body image and physical ability, predict physical self-concept, and the latter, in turn, predicts the practice and intention to pursue physical activity.	6-minute walk test (6MWT), body mass index, waste to height ratio, aerobic capacity, body image, physical activity, agility, and resistance	- anthropometric measure - 6-min walk test (to test aerobic capacity) -Stunkard Figure Rating Scale (to assess self and ideal body sizes) - Physical Self-Perception Profile (to assess physical self-concept) - Physical Activity Questionnaire for Adolescents (PAQ-A) - Intention to be physically active (questionnaire, Likert scale)	The indirect effects of the model showed significant relationship between physical condition ($p = 0.001$) and PA levels, according to the perception of self-concept. However, anthropometric variables proved not to be related to any significant extent ($p < 0.05$). The second level covered the indirect effects between the intention to be physically active and self-concept: significant relationship between the perception of self-concept ($p = 0.000$) and the intention to be physically active. significant relationships between physical condition ($p = 0.001$) and the intention to pursue physical activity. The present investigation concluded that physical condition, anthropometric variables, and body image predict the perception of physical self-concept in adolescents.

5	Klizien e, et al., 2021	Effects of a physical education program on physical activity and emotional well-being among primary school children.	89 (1st grade), 94 (2nd grade) experiment al group 6 to 9 years	to establish the effect of physical education programs on the physical activity and emotional well-being of primary school children.	somatic anxiety (of depression, seclusion, somatic complaints, aggression, and delinquent behaviours) personality anxiety, and social anxiety	-Children's Physical Activity Questionnaire (based on the Children's Leisure Activities Study Survey questionnaire) -Emotional well-being status (to explore three main dimensions: somatic anxiety, personality anxiety, and social anxiety) -The Revised Children's Manifest Anxiety Scale (RCMAS)	The eight-month physical education program intervention was effective at increasing levels of physical activity. it turned out that both the First Grade and Second Grade participants in the experimental group were physically active during physical education lessons. When both before and after the experiment, we established that somatic anxiety in EG was 4.55 ± 1.00 points after the intervention program, demonstrating lower levels of depression, seclusion, somatic complaints, aggression, and delinquent behaviours ($F = 4.785$, $p < 0.05$, $P = 0.540$)
6	Fenanl ampir & Mutohi r, 2021	Emotional intelligence and learning outcomes: Study in physical education.	75 fourth grade students	to analyse the correlation between emotional intelligence and students' physical education learning outcomes in elementary schools	recognizing your own emotions, managing your emotions, motivating yourself, recognising other people's emotions, building relationship	-test questions in the form of pretest and post-test questions to measure cognitive learning outcomes in physical education. -Emotional Intelligence Questionnaire	No correlation between emotional intelligence and students' cognitive learning outcomes in physical education subjects. Factors that contribute to the absence of a relationship between emotional intelligence and learning outcomes include implementing online learning that is less than optimal because it is not supported by adequate facilities and learning participation by all students. The other factors are reduced or limited interaction between students and the learning environment, the economic burden that causes parents' emotional problem that impacts children's emotions.
7	Wang, 2022	The role of physical activity promoting thinking skills and emotional behaviour of preschool children. *Psicologia:*	366 students ages of 5 years (N = 191) and 6 years (N = 174)	to determine the relationship between physical education, social and emotional development of preschool children	social and emotional behaviour	Ages & Stages Questionnaires: Social-Emotional (ASQ:SE), which was completed by the parents.	The influence of physical education on social and emotional behaviour of children were established. Based on the results of the study, it was determined that there is a positive correlation between age, physical education, and social-emotional behaviour (r +—= 0.668).
8	Eduard o-Melgui zo et al., 2023	Study of the Effects of Physical-Activity Practice and Adherence to the Mediterranean Diet on Emotional Intelligence in Elementary School Education Students	N=567 Primary school students 9to 12 years	1) to develop a structural-equation model formed by the variables of emotional intelligence, physical-activity practice, and adherence to the Mediterranean diet and 2) to consider that model through a multigroup analysis	emotional attention (EA); emotional clarity (EC); emotional reparation (ER); physical activity (PA); Mediterranean-diet adherence (MDA)	-Self-prepared questionnaire (to collect socio-demographic data) -Trait Meta Mood Scale (to collect data related to emotional intelligence) -KIDMED Questionnaire (to collect data related to Mediterranean-diet adherence) -PAQ-C questionnaire (collect data related to the practice of physical activity)	all the factors have positive impact on the emotional intelligence (EI) of the children, there are differences in the effects of the practice of physical activity and adherence to the Mediterranean diet on the emotional domain and during adolescence, gender is a key element in acquiring a healthy and active lifestyle.
9	Özkan & Kale, 2023	Investigation of the effects of physical education activities on motor skills and quality of life in children with intellectual disability.	34 children 8-12 years	to examine whether there is a difference between the quality of life and motor skills of children with intellectual disability who participate in physical education activities and those who do not participate.	fine motor precision, fine motor integration, manual dexterity, bilateral coordination, balance, speed and agility, upper limb coordination, strength tests and all dimension scores for quality of life	Bruininks Oseretsky test of motor proficiency II edition brief form 2010 (to measure the motor performance) and "Paediatric Quality of Life Inventory (PedsQL)" for children with intellectual disability.	The experimental group were evaluated, significant improvements in all the parameters studied for the physical functioning score ($p < 0.05$). More significant improvement was observed in motor skills and quality of life in children with intellectual disability who participated in the 14-week physical education program compared to the control group.
10	Gabour et al., 2024	The association of physical activity duration and intensity on emotional intelligence in 10–13-year-old Children	a cohort of 2.029 adolescents 10–13 years	to cross-sectionally assess the relationships between PA duration, moderate, vigorous, and group-based PA, and GEI in children 10–13 years of age. To determine the association of PA categories with the five do mains of EI	Intrapersonal, Interpersonal, Adaptability, General Mood, stress management domains, correlated to PA intensity	EQ-i: YV brief version tool for assessing the 5 domains of EI derived from the Bar-On Model + Questionnaires for assessing PA and GEI. PA was measured using intensity classifications (moderate and vigorous) and duration (minutes).	PA duration and VPA are associated with statistically significant increase overall GEI score. In addition to the several health benefits derived from meeting PA guidelines, our study, even though observational, adds to the body of evidence that PA duration and vigorous PA are beneficial to GEI in adolescents.

Table 2. *Summary of literature analysis*

3. Discussions

The selected studies examined the effects of physical activity on the development of emotional intelligence and the development of cognitive functions. The authors placed significant emphasis on the use of physical education as a context for fostering emotional intelligence, contending that the content is intricately linked to heightened self-awareness, proficient communication, and expressiveness. In particular, the study by Melguizo-Ibáñez et al. (2023) analysed the effects of Physical Education practice on the three variables that make up EI, hypothesizing that:1) the Mediterranean diet associated with the practice of physical activity has positive effects on emotional intelligence; 2) the effects of sports practice are differentiated by gender. In fact, male adolescents showed a greater commitment to following a Mediterranean diet and practicing physical activity. The results of the research confirm the two hypotheses initially established and prove to be effective in the development of EI domains. This study focused on gender differences in adolescents and to achieve this it is important that teachers take into account the motivational climate and interests of students in order to orient their physical education lessons.

The results of Wang's (2022) study determined a positive correlation between age, physical education, and critical thinking, while gender has no statistical significance regarding the effect of physical activity on children's critical thinking. The age of the child is important, as statistically significant differences have been found. In addition, it has been determined that physical education has a positive effect on the emotional and social behaviour of preschoolers. The study observed, particularly interestingly, a significant improvement in the results of critical thinking tests in children only with the intensification of already existing and tested physical development programs, taking into account adequate rest and the rhythm of classes, even without the use of additional specialized methods of physical development. Recalling the latter aspect, the study by Gabour et al., (2024) also analysed PA from the point of view of intensity, demonstrating once again that a Vigorous PA is associated with a statistically significant increase in the overall GEI score.

Pramandhika et al., (2020) also highlighted the link between PA and EI, specifically analysing the relationship between: EI and the development of locomotion skills; locomotion skills and age range; EI and Locomotion Skills. Through the analysis of the results, it was possible to significantly highlight the existence of a dense intertwining between the variables taken into consideration.

Another study (Kliziene et al., 2021) sought to establish the effects of a structured and physical education program on the emotional well-being of primary school

children, emphasizing the importance of balancing and adapting physical education lessons by determining that an 8-month physical education program, properly constructed and applied in a targeted manner, It impacted the physical activity and emotional well-being of primary school children (i.e., 6-7 and 8-9 years old) in three main dimensions: somatic anxiety, personality anxiety, and social anxiety.

Sánchez-Miguel et al., (2020) also investigate emotional well-being, focusing on the adolescent phase, characterized by a critical period for the development of body image and the perception of the physical concept of self, pointing out that a poor development of these constructs would lead to an increase in problems related to depression, anxiety, eating disorders and imbalances in the perception of body image and self-concept. The results of this paper support that the intention to pursue and practice physical activity is predicted by body image, anthropometric values, physical condition, and self-esteem. In this regard, individuals who demonstrate a healthy body image, accompanied by anthropometric values and adequate physical condition, will be more likely to have a good perception of self-concept, as well as being more likely to practice physical activity.

Another interesting study (Özkan & Kale, 2023) addressed research on children with ID who participated in a 14-week physical education program. In the study, it was found that children who participated in the PE program performed better in motor skills than children who did not participate. Improvements were found in several skills, including fine motor accuracy, manual dexterity, bilateral coordination, balance, speed and agility, upper limb coordination, and strength assessed in motor skills. From an emotional and cognitive point of view, the data collected provided a clear positive signal for the development of physical functioning, psychosocial health, school functioning, emotional functioning, and social functioning skills, which are dimensions of the quality of life of children with ID.

The close connection between emotional and social development and physical activity was also supported by the study by Mulvey et al., (2020) designing a structured intervention with precise conditions that not only aim to implement the learning of gross motor skills, but also to foster the development of friendships between males and females. The results collected did not observe significant differences with regard to boys, on the contrary, girls, after the intervention, were more inclined to integrate between the sexes as well as to show improvements related to the gross motor skills acquired. This suggests that school context, through the implementation of targeted interventions, can promote positive intergroup gender relationships in young children.

The results of the various studies examined so far provide important information on the close interconnection between motor activity and emotional intelligence,

emphasizing in particular the importance and need to provide a physical education that is planned, balanced, and well structured, especially in developmental age, attributing it a fundamental role for the emotional and cognitive development of children and adolescents.
It is clear that structured physical activity contributes to the development of emotional intelligence which in turn has a marked influence on cognitive functions, inevitably bringing tangible improvements also from the point of view of academic performance.
Kliziene (2020) conducted research to determine that an innovative physical education program designed for primary school children can improve academic performance. In fact, the children who underwent the surgery developed good skills related to mathematics, geometry, statistics, communication, and more generally problem-solving skills.
The only contribution that showed an absence of relationship between students' emotional intelligence and cognitive outcomes was that of Fenanlampir & Mutohir (2021), but the authors themselves wanted to point out and justify that this lack could be due to a number of factors. Suboptimal implementation of learning could be due to inadequate facilities, lack of participation by students and an economic burden for parents, affecting the emotional state of children.

Conclusions

Through the analysis of the studies, it was possible to outline a synthetic framework of what is supported by the scientific evidence. Almost all the contributions showed a positive correlation between structured physical activity, emotional intelligence and the development of cognitive functions, bringing out a sort of circular relationship between these three dimensions, influencing each other in a constant and relatively proportional way. The WHO report (1997) entitled “Life skills education in school", remains a reference point for the identification and definition of the "personal and relational" skills essential to manage interactions with the outside world and positively face daily challenges. It also recognises the crucial role of education and the various contexts and opportunities that foster the development of these skills. The need to develop these skills is also underlined by the recent “LifeComp” conceptual framework, whose goal is to establish a shared understanding and common language on "personal", "social" and "learning to learn" competences. Each area includes three competencies: Self-Regulation, Flexibility, Well-Being (Personal Area), Empathy, Communication, Collaboration (Social Area), Growth mindset, Critical Thinking, and Learning Management

(Learning to Learn Area).The term "skills for life" (also called non-cognitive skills) refers to all those skills-competences that need to be learned in order to relate to others and to deal with the problems, pressures and stresses of everyday life. The lack of these social-emotional skills can cause, particularly in young people, the onset of negative and risky behaviors with respect to stress. To teach young people skills for life, it is necessary to introduce specific programmes in schools (Sala et al., 2020).

In accordance with the documents just cited and summarizing the assumption shared by all the contributions selected within this review, it is clear that there is a need to promote an active and healthy lifestyle from a young age to promote optimal cognitive, social-emotional and motor development in children and adolescents. Nevertheless, there is a continuous presence of various factors that hinder the proper functioning of organizational, structural, human resources, and project implementation variables, which in fact do not allow the implementation of interventions of this type. It is important to emphasise the complexity of motor learning that requires a systemic and non-linear perspective that can guide the educator's choices to implement meaningful learning (Pugliese et al., 2023). At this point, it should be specified that motor activity must be designed and well structured, including education in emotional skills in order to produce effective results in terms of emotional intelligence and cognitive functions. Future research should further explore the mechanisms underlying these effects and identify optimal strategies to maximize the benefits of physical education and physical activity in children.

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