

REVIEW ARTICLE

Social skills and motor coordination in children aged 4 and 5 years: a literature review

Habilidades sociales y coordinación motora en niños de 4 y 5 años:
una revisión de la literatura

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Abstract Social skills and motor coordination are interdependent dimensions of integral development in early childhood. This narrative review analyzes scientific evidence published between 2015 and 2026 on both dimensions and their relationship in children aged 4 and 5 years. A search was conducted in databases such as Scopus, Web of Science, ERIC, SciELO, and Redalyc, using descriptors in Spanish and English. Original articles and reviews addressing preschool populations without specific pathologies or an exclusive focus on competitive sport were included. The results show that motor competence and social skills develop in a parallel and interactive manner during the preschool years, and that motor play, psychomotricity, and structured physical activity programs act as integration mechanisms for both domains. Relevant pedagogical implications for early childhood education are identified, and the main limitations of available research and perspectives for future work are noted.

Keywords social skills, motor coordination, early childhood, psychomotricity, child development, preschool education.

Resumen Las habilidades sociales y la coordinación motora constituyen dimensiones interdependientes del desarrollo integral en la primera infancia. Esta revisión bibliográfica analiza diversos estudios publicados entre 2015 y 2026 sobre ambas dimensiones y su relación en niños de 4 y 5 años. Se realizó una búsqueda en bases de datos como Scopus, Web of Science, ERIC, SciELO y Redalyc, utilizando descriptores en español e inglés. Se incluyeron artículos originales y revisiones sobre población preescolar sin patologías específicas ni enfoque exclusivo en deporte competitivo. Los resultados muestran que la competencia motora y las habilidades sociales se desarrollan de forma paralela e interactuante durante los años preescolares, y que el juego motor, la psicomotricidad y los programas de actividad física estructurada actúan como mecanismos de integración de ambos dominios. Se identifican implicaciones pedagógicas relevantes para la educación inicial y se señalan las principales limitaciones de la investigación disponible, así como perspectivas para el trabajo futuro.

Palabras clave habilidades sociales, coordinación motora, primera infancia, psicomotricidad, desarrollo infantil, educación preescolar.

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Introduction

The holistic development of preschool children aged 4 to 5 involves the simultaneous interaction of cognitive, emotional, motor, and social dimensions, which are closely interconnected and should not be analyzed independently. During this stage, children experience a period of high neurological and psychological plasticity, in which everyday experiences—particularly those related to play and peer interaction—have a significant impact on future developmental trajectories (Peguero Guerrero, 2020). Within this framework, social skills and motor coordination emerge as two key dimensions of children's holistic development; therefore, their joint analysis is essential for designing appropriate pedagogical practices in early childhood education.

Social skills are understood as the set of acquired behaviors, abilities, and competencies that enable children to interact effectively, empathetically, and appropriately with their peers and the adults in their environment (Caicedo & Vega, 2026; Maleki et al., 2019). Their development during the preschool stage lays the foundation for school coexistence, emotional regulation, and adaptation to formal educational settings (Frogner et al., 2022; Luo et al., 2022).

Motor coordination, on the other hand, refers to the nervous system's ability to plan, organize, and execute body movements efficiently and in accordance with environmental demands. It includes both gross motor skills, associated with actions such as running, jumping, and climbing, and fine motor skills, related to the precise control of movements performed by small muscle groups. Both are highly important in early childhood education (Erazo-Verdezoto et al., 2024; Guapi & Arias, 2022).

Several studies conducted over the past decade have indicated the existence of a positive and bidirectional relationship between social skills and motor coordination. These abilities are closely linked because they jointly contribute to children's holistic development during the preschool stage. Participation in motor activities promotes interaction with others, facilitating the development of behaviors such as cooperation, communication, and respect for rules. In turn, adequate social skills facilitate active participation and shared motor experiences (Herrmann et al., 2021; Salaj & Masnjak, 2022). However, the specific mechanisms underlying this relationship, as well as the contextual factors that influence it, have not yet been sufficiently clarified.

In the Latin American context, this issue is particularly relevant. Numerous early childhood education systems in the region face structural challenges related to teacher training, the availability of adequate spaces, and access to resources for play-based and motor activities. These factors directly affect both children's motor and social development (Cañizares et al., 2025; Vaca, 2025). Educational regulations, such as the Constitution of the Republic of Ecuador (Asamblea

Constituyente, 2008), recognize holistic development as a right of children from the earliest years of life, thereby providing a legal and ethical framework for the pedagogical concerns that motivate this review.

This study aims to systematize the scientific evidence available from 2015 to 2026 on social skills and motor coordination in children aged 4 and 5, with particular attention to the relationship between these dimensions, the integrative mechanisms offered by play and psychomotor education, and their implications for educational practice. The findings of this review seek to provide updated and relevant information for researchers, early childhood educators, and educational policymakers.

Methodology

A literature review was conducted to identify, analyze, and synthesize the available scientific evidence on social skills, motor coordination, and the relationship between these two dimensions in children aged 4 and 5 years.

This design is appropriate for fields in which the methodological heterogeneity of the available studies makes it difficult to apply the procedures commonly used in systematic reviews with meta-analysis. It also allows theoretical perspectives and empirical findings to be integrated comprehensively. The process of searching, selecting, and analyzing the sources followed a structured protocol, as described below.

The literature search was conducted in the Scopus, Web of Science (WoS), ERIC, PubMed, SciELO, Redalyc, and Dialnet databases between January and March 2026. Descriptors in both Spanish and English were combined using the Boolean operators AND and OR. The main search combinations were: (social skills AND motor coordination AND preschool), (motor competence AND social skills AND early childhood), (fundamental motor skills AND social behavior AND children), (psychomotricity AND social development AND preschool), and (motor learning AND social skills AND preschool children).

Documents were included when they met the following criteria: studies published between 2015 and 2026; research involving samples composed entirely or partially of children aged 4 and/or 5 years; original empirical articles using quantitative, qualitative, or mixed methods; review articles; and studies published in peer-reviewed scientific journals.

Studies were excluded when they focused exclusively on clinical populations with specific neurodevelopmental disorders or motor disabilities and their main objective was therapeutic intervention. Articles without full-text access, theses, books, book chapters, and technical reports were also excluded, except when they provided essential regulatory or theoretical context.

The information was analyzed through a thematic synthesis process. The selected studies were grouped according to the main conceptual themes identified during the review, which were organized into the following categories: 1) development of social skills in early childhood education, 2) motor coordination and motor competence in preschool children, 3) relationship between social skills and motor coordination, 4) the role of play and psychomotricity in child development, and 5) research gaps and future perspectives. Based on these categories, the results reported by the different authors were critically integrated, identifying areas of agreement, discrepancies, and emerging trends.

This critical integration of the findings provided a broader understanding of the relationship between social skills and motor coordination during the preschool stage.

The review was conducted in accordance with standards of academic rigor and scientific ethics, ensuring appropriate acknowledgment of the sources consulted through proper bibliographic citation. In addition, efforts were made to provide a critical and objective synthesis of the available evidence by considering the methodological strengths and limitations of the studies analyzed and avoiding extrapolations or conclusions that were not sufficiently supported by the reported findings.

Results and discussion

Social skills in early childhood

Social skills in early childhood comprise a set of learned behaviors and dispositions that include effective communication, cooperation, empathy, self-control, assertiveness, and the ability to establish and maintain positive relationships with peers and adults (Maleki et al., 2019).

Their acquisition during the preschool years has a documented impact on school adjustment, academic performance, and mental health throughout development (Frogner et al., 2022; Luo et al., 2022).

Between the ages of 4 and 5, children make significant progress in understanding social norms, regulating their own emotions, and interpreting the emotional states of others. Emotional development during this period is both a condition and an outcome of the socialization process, since interactions with peers require and simultaneously strengthen emotional and relational competencies (Alwaely et al., 2021). Likewise, the preschool environment provides a particularly favorable setting for practicing and refining these competencies (Gutiérrez et al., 2023; Özbey & Köyceğiz, 2019).

The reviewed literature indicates that the family and school contexts play a determining role in the development of social skills during the preschool stage. Caregivers' educational level, parenting practices, the quality of teacher-student inter-

actions, and the availability of structured social experiences significantly influence the pace and quality of the acquisition of these competencies (Aubone et al., 2016; Luminita et al., 2022). Among vulnerable populations, the implementation of specific social-skills training programs has shown positive effects on children's social competence, motivation, and well-being (Arabacıoğlu & Kahraman, 2020; Carrillo, 2016; Dávila, 2018).

From an assessment perspective, the studies included in this review used a variety of evaluation strategies. The most common approaches included teacher-rating scales, parent-reported behavioral scales, and direct observation in natural settings (Maleki et al., 2019; Muchiut et al., 2019). The heterogeneity of the instruments used constitutes a recurring limitation that hinders direct comparison of findings across studies and contexts.

A particularly relevant aspect identified in the literature is the relationship between social skills and language. Language competencies—including verbal comprehension, vocabulary, and oral expression—facilitate social development during the preschool stage by enabling children to communicate their needs, negotiate conflicts, and participate more effectively in shared play situations (Mulvey & Jenkins, 2021). This interdependence between language and social skills reinforces the importance of adopting a holistic perspective when designing early childhood development programs.

Motor coordination and holistic development

Motor coordination is a central capacity in child development that encompasses both the control of locomotor and object-manipulation movements and the precision required to handle small objects, which is characteristic of fine motor skills (Erazo-Verdezoto et al., 2024; Guapi & Arias, 2022).

Between the ages of 4 and 5, children consolidate fundamental movement patterns such as running, jumping, throwing, and catching, which form the basis for the development of more complex motor skills at later stages (Bolger et al., 2021; Figueroa & An, 2017). The quality of these movement patterns depends on both neurological maturation and the opportunities for practice provided by the family and school environments (Matarma et al., 2020; Zeng et al., 2017).

Available longitudinal evidence indicates that early motor competence significantly predicts participation in physical activity, physical fitness levels, and overall well-being later in life (Barnett et al., 2022; Robinson et al., 2015).

Motor-development trajectories are neither linear nor homogeneous. Children with higher levels of motor competence at an early age tend to actively seek opportunities for practice, which reinforces their motor development and

strengthens their perceived competence and self-confidence in physical activity settings (Ryu et al., 2021).

Fine motor skills, including object manipulation, the use of writing tools, and construction activities, have a documented relationship with social development. This is because many of these activities take place in group-interaction contexts, such as arts and crafts, board games, or collaborative construction projects, which require and promote social competencies such as communication, cooperation, negotiation, and turn-taking (Dehghan et al., 2017; Mullo & Núñez, 2025).

In the Latin American context, studies conducted in Ecuador, Colombia, and Peru indicate that a significant proportion of preschool children experience difficulties in motor development. These difficulties are associated with factors such as the limited availability of safe spaces for active play, restricted access to teaching materials, and insufficient teacher training in motor education (Carrillo et al., 2024; Reyes et al., 2023; Rodríguez et al., 2024). These conditions highlight the need to strengthen both infrastructure and pedagogical practices in early childhood education programs throughout the region.

Evidence on the relationship between social skills and motor coordination

The relationship between social skills and motor coordination in children aged 4 and 5 has been examined from complementary perspectives, including correlational, longitudinal, and intervention studies. The available evidence consistently points to a positive association between these two dimensions, although the mechanisms explaining this relationship and the factors influencing it vary according to the context, the specific skills considered, and the methodological designs employed.

At the empirical level, several studies have documented significant correlations between motor competence and measures of social skills in preschool samples. The relationship between social interactions and basic motor competencies in early childhood is statistically significant, and children with higher levels of motor competence also tend to obtain higher scores in dimensions such as cooperation, assertiveness, and teacher-rated prosocial behavior (Herrmann et al., 2021). This pattern remains evident even after controlling for variables such as sex, socioeconomic status, and chronological age (Salaj & Masnjak, 2022).

From an approach integrating motor development and socioemotional well-being, motor competence and socioemotional well-being in preschool children are positively correlated. This suggests that successful bodily experiences—such as confidently participating in motor games with peers—promote the development of a positive self-image

and relational competencies (Salaj & Masnjak, 2022). This relationship is particularly relevant for understanding how motor difficulties may lead to the avoidance of active play, with consequences for social participation and the development of interpersonal skills.

The relationship between fine motor skills and social development has been documented in studies examining social maturity as a correlate of manipulation skills and precise movement control. Fine motor skills are significantly associated with levels of social maturity and adjustment to school settings among children aged 4 and 5 (Dehghan et al., 2017), reinforcing the need to consider both dimensions when analyzing the relationship between motor development and social competence.

The implementation of motor-learning programs is positively associated with improvements in social skills among preschool children (Marheni et al., 2021). Similarly, interventions based on fundamental movement skills have significant effects not only on motor competence but also on executive functions and preschool children's socioemotional competence (Li et al., 2026). These findings have direct implications for the design of integrated physical education and social-development programs during the preschool stage.

The role of perceived competence as a mediating variable in the relationship between motor coordination and social skills has received increasing attention. Perceived motor competence, actual motor skills, and participation in physical activity form a reciprocal and dynamic system in which each variable reinforces or inhibits the others over time (Ryu et al., 2021). Children who perceive themselves as competent in physical activities tend to participate more actively in games with peers, thereby expanding their opportunities to practice social skills in motivating and meaningful contexts.

From a gender perspective, multiple studies have identified differences in both motor and social development patterns during the preschool stage. Sex differences and activity- and family-related correlates have been observed in the motor skills of 5-year-old children (Matarma et al., 2020), suggesting that sex acts as a relevant moderating variable in the relationship between motor coordination and social competence. These differences have implications for the design of interventions that avoid reproducing gender stereotypes in children's participation in motor activities.

Emotions also represent an important link between motor skills and social competencies. Emotional education influences motor instability among children aged 4 and 5, indicating that negative emotional states—such as anxiety, frustration, and insecurity—may interfere with the development and expression of motor competencies (Vélez et al., 2022). This bidirectional relationship suggests that interventions aimed at socioemotional development may have indirect positive effects on motor coordination, and vice versa.

Role of play and psychomotricity as integrative mechanisms

Play is the primary context in which motor and social development are integrated during early childhood. Through play, children learn to negotiate roles, follow rules, manage conflicts, cooperate, and communicate with peers in dynamic and motivating situations (González-Grandón et al., 2021; Pincay et al., 2023). This integrative function of play has been recognized by classical constructivist and socio-cultural perspectives and continues to receive consistent support from contemporary empirical research.

Play provides unique opportunities for the simultaneous development of motor and social competencies. Play-based activities and free movement in preschool settings promote the development of motor skills while also stimulating peer interaction and the practice of prosocial behaviors (León et al., 2024). Play-based activities aimed at developing gross motor coordination in 4-year-old children also produce positive effects on the quality of social interactions in the classroom (Banda et al., 2025).

Motor games constitute a particularly powerful bridge between motor and social development. Motor games and fundamental movement skills have a bidirectional relationship: mastery of these skills facilitates effective participation in group games, while participation in such games reinforces and consolidates motor competencies (Pol-Rondón et al., 2021). Within this cycle, social skills are simultaneously a prerequisite for and an outcome of participation.

Goal-oriented play as a pedagogical strategy has positive effects on motor development among preschool children, especially when it includes cooperation and teamwork components (Sutapa et al., 2021). Similarly, games based on enjoyment and clearly defined motor objectives promote the development of coordination and social adjustment in children aged 5 and 6 (Masrun et al., 2025). These findings indicate that not all physical activities produce the same effects. The quality of pedagogical design, intentionality, task structure, and teacher guidance largely determine the impact on both dimensions of development.

Psychomotricity, as a pedagogical approach that recognizes the unity of the body, emotion, and cognition, provides a coherent framework with growing empirical support for integrating motor and social development in early childhood education. Psychomotricity is positively related to the development of social skills in early childhood, and psychomotor programs implemented in preschool settings improve both motor competence and dimensions such as cooperation, empathy, and self-regulation (Cañizares et al., 2025; Zamboni et al., 2025).

Structured-play programs have demonstrated significant effects on the development of social skills in children en-

rolled in early childhood education (Loukatari et al., 2019; Tersi & Matsouka, 2020). These programs, implemented at regular weekly intervals over periods ranging from 8 to 16 weeks, produce improvements in teamwork, communication, conflict resolution, and prosocial behavior, as assessed through teacher-rating scales and systematic observation.

The deliberate-play and motor-preparation approach has shown mediated and moderated effects on both motor and cognitive development among preschool children (Pesce et al., 2016). This line of research suggests that activities combining motor, cognitive, and social demands—such as rule-based games, active role-playing, or cooperative activities involving movement—produce broader and more integrated developmental effects than activities focused exclusively on a single domain.

Educational drama and arts education incorporating bodily movement represent another pedagogical approach with positive evidence regarding social skills in preschool settings. Educational drama programs produce significant improvements in interaction skills and social competence among preschool children, including those in inclusive education settings (Şenol & Metin, 2021). These practices, which combine bodily expression, narrative, and symbolic play, expand the psychomotor environment and offer substantial potential for socialization.

Early stimulation in childcare centers also plays an important role as an integrative mechanism for motor and social development. Early-stimulation activities simultaneously promote social and motor development in young children, and childcare centers providing higher-quality interventions demonstrate better outcomes in both dimensions (Vaca, 2025). These findings have direct implications for public policy on early childhood education and care, particularly in Latin American contexts where the coverage of early-care programs has increased but their quality remains heterogeneous.

Trends, limitations, and future perspectives

The analysis of the reviewed literature identifies several relevant trends characterizing the current state of the field. First, there has been a gradual shift from perspectives that examine social skills and motor coordination as separate domains toward integrated approaches that explore their joint development and interactions (Herrmann et al., 2021; Salaj & Masnjak, 2022; Zhang et al., 2025). This trend is reflected in the design of multidimensional instruments, the implementation of interventions addressing both domains simultaneously, and the growing attention given to the neuropsychological mechanisms underlying the relationship between motor development and social competence.

Second, there has been an increase in the use of longitudinal and intervention designs involving control or comparison groups, which make it possible to examine causal relationships more rigorously than cross-sectional studies. The longitudinal perspective on fundamental movement skills and their relationship with overall health has gained strength in recent literature (Barnett et al., 2022), and studies specifically involving preschool children show that the relationships among motor competence, physical activity, and social skills develop dynamically and reciprocally over time (Ryu et al., 2021).

Third, the literature reflects growing interest in the contextual and cultural factors that influence the relationship between motor development and social skills. Differences in opportunities for active play, pedagogical practices, the availability of physical spaces, and cultural norms concerning children's movement shape heterogeneous developmental trajectories that are not adequately captured by universal models (Caicedo et al., 2024; Reyes et al., 2023; Vaca, 2025).

Among the limitations identified in the reviewed literature, methodological heterogeneity occupies a central position. The diversity of assessment instruments, study designs, participant age ranges, and operational definitions of variables complicates the quantitative synthesis of findings and direct comparisons among studies. This heterogeneity has been identified as a structural limitation of the field and highlights the need for the scientific community to move toward greater standardization of protocols and measures (Bolger et al., 2021).

Publication bias represents another relevant limitation. Studies reporting positive or statistically significant findings are more likely to be published, potentially leading to an overestimation of the magnitude of the associations reported in the literature and an underestimation of the heterogeneity of effects.

The limited representation of Latin American contexts in international research on these topics is also an important limitation. Most highly visible international studies originate from European, Australian, and North American contexts, whose socioeconomic, cultural, and pedagogical conditions differ from those of Latin America. The studies conducted in Ecuador, Colombia, and Peru included in this review represent valuable progress, but they remain insufficient for establishing findings that can be generalized across the region.

The tendency to examine social skills and motor coordination asymmetrically limits understanding of their reciprocal relationship. Future research should design studies in which both dimensions are examined with equal depth and through instruments that have been equally validated for the target population.

Future research directions include, first, the development

of longer longitudinal studies capable of tracing the developmental trajectories of both dimensions from early childhood education through primary school. Second, opportunities exist for designing and evaluating integrated interventions that combine motor activity and socioemotional development using experimental or quasi-experimental designs that enable more precise estimates of effect sizes. Third, future research should more systematically incorporate qualitative and participatory perspectives to understand developmental processes and meanings from the viewpoints of children, families, and teachers.

Finally, the field requires further progress in the development and validation of assessment instruments adapted to the linguistic and cultural realities of Latin America. Such instruments would make it possible to investigate social skills and motor coordination among preschool populations in the region with the same level of rigor as the instruments currently available in English-speaking and European contexts.

Conclusions

The reviewed evidence indicates that social skills and motor coordination in children aged 4 and 5 are closely interrelated dimensions whose joint analysis provides a more comprehensive understanding of early childhood development. Early motor competence, particularly when accompanied by a positive perception of physical ability, promotes cooperation, group participation, and peer interaction. Play, psychomotor education, structured activities, and goal-oriented physical programs emerge as effective mechanisms for strengthening both motor and social development, supporting their systematic inclusion in early childhood curricula. These findings are especially relevant in Latin America, where many programs still lack adequate motor education, active-play environments, and validated assessment tools. Future research should therefore prioritize longer longitudinal studies, culturally appropriate instruments, and integrated interventions that equally examine bodily, emotional, and social development.

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Conflicts of interest

The authors declares that she has no conflict of interest.

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Data availability statement

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Statement on the use of AI

The author acknowledges the use of generative AI and AI-assisted technologies to improve the readability and clarity of the article.

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