

Introduction

Physical Literacy (PL) has become a pivotal concept for the development of physical, cognitive, and social skills. This study repositions PL as a critical framework for understanding how sports can foster essential skills in individuals with visual impairments, aligning with recent research (Whitehead, 2013; Cairney et al., 2019) that emphasizes PL as foundational for lifelong physical activity. A literature review reveals a fundamental lack of recent studies concerning the development of relational skills in individuals with visual impairments compared to their non-disabled peers, highlighting the urgent need to address this scientific gap by providing current contributions to update the state of the art and contribute to the provision of best practices promoting the inclusion of the population under examination. Currently, the latest research dates back to the first decade of the 2000s, all converging in highlighting a greater tendency towards isolation among people with visual impairments compared to typically developing peers (Escribano et al., 2007). Analyzed studies have shown that young adults with visual impairments are more likely to experience social isolation (Wagner et al., 2005). Several past studies suggest that individuals with the same disability may face challenges in social functioning. Compared to their sighted peers, they often exhibit deficiencies in both verbal and non-verbal social skills. Additionally, they may have difficulty asserting themselves and actively participating in interactions with their peers, resulting in sometimes greater social isolation (Zabehazy et al., 2011). From the earliest years of life, children with visual impairments may encounter challenges in developing their social skills (Zabehazy et al., 2011). Since vision plays a crucial role in the early development of social behaviors and social cognition, the lack of visual information could hinder the ability to initiate and maintain social interactions. Without the ability to perceive such visual signals or compensate with adaptive skills, children may experience delays in the development of behaviors such as understanding others' perspectives and sharing attention, both considered fundamental for social cognition. The complete or partial loss of vision makes it difficult to obtain precise and accurate information about the social environment, as well as to understand the context of social activities and correctly interpret concepts (Runjic et al., 2015). Several studies indicate that these children are less likely to initiate interactions and often encounter difficulties in maintaining those already established (McGaha et al., 2001), exhibiting behaviors of refusal and self-centered orientation during external interactions. In light of the above, the purpose of the study is twofold: to update the state of the art in order to highlight the needs and requirements of the population under examination and, simultaneously, to respond to the resulting analysis of need which places blind and severely visually

impaired individuals in a position of vulnerability regarding the development of social skills. In this perspective, research is presented whose hypothesis is the existence of a positive correlation between sports participation and relational dimensions in a sample of individuals with visual impairments, responding to the research question as to whether sports can have an influence on the development of relational skills for the population under study. Recent research (Alcaráz-Rodríguez et al., 2021; Zull et al., 2019) highlights how sports can promote the development of social skills in individuals affected by the aforementioned condition, stating that specialized training and increased physical activity can enhance their inclusion, strengthening their relational skills. In this regard, a study involving the Disability Services Company for Visually Impaired Individuals S. Alessio Margherita di Savoia (hereinafter ASP) was conducted to recruit a sample of 29 blind and severely visually impaired individuals, both athletes and non-athletes, who were administered the ISFOL test (Farnese et al., 2007) to assess perceived self-efficacy in managing complex problems. The scale returns four sub-scores related to emotional maturity, relational fluidity, action finalization, and context analysis. The analysis of the collected data shows a significant relationship between sports participation and the aforementioned components. This evidence is consistent with the results of previous research and positions us to promote the importance of sports participation as an integral part of the lives of individuals with typical development and, even more so, atypical development, offering targeted sports interventions in rehabilitation programs for the benefit of individuals with visual impairments, so that sports can play a protective role in compensating for the relational difficulties resulting from visual impairment.

1 Literature Review

1.1 Sports Activities and Visual Impairment: State of the Art

La Visual impairment is a condition that deeply impacts the lives of many children and young people, affecting not only their ability to perceive the surrounding world but also their participation in daily activities, including physical ones. Numerous studies (Nastasi et al., 2022; De Cunha et al., 2015) have highlighted a disparity in the level of physical activity between young people with visual impairments and their sighted peers. These children and young people tend to be less physically active, engaging in lower levels of moderate to vigorous physical activity and showing a lesser propensity for physical activity in their free time. This reduced participation in physical activity can have significant consequences on their overall

health and well-being, contributing to lower levels of health-related physical fitness and motor skills (De Cunha et al., 2015). However, in recent years, there has been a growing interest and commitment to researching targeted interventions to promote physical activity among children and young people with visual impairments. Studies have explored a variety of approaches, including structured training programs, leisure-time physical activity initiatives, and educational strategies (Lieberman et al., 2010). The state-of-the-art sheds light on the primary objective of the proposed interventions for the population under study, concurring that it is to increase the involvement of people with visual impairments in physical activities to improve overall health and well-being. These research efforts represent an important step towards a better understanding of the specific needs and challenges faced by visually impaired individuals in pursuing an active and healthy lifestyle. Based on this evidence, it is essential to promote further initiatives aimed at ensuring equitable access and inclusion for all, regardless of their visual abilities, in the realm of physical and sports activities. This inclusive approach not only contributes to improving the health and well-being of people with visual impairments but also fosters a more equitable and inclusive society as a whole. Research in this area (Alcaraz-Rodriguez et al., 2021; Tatsuta et al., 2022; Caputo et al., 2022) reports that structured exercise interventions have shown positive effects on the physical fitness and motor skills of this population, while leisure-time physical activities have demonstrated the ability to adequately engage visually impaired individuals in moderate levels of physical activity. Additionally, educational strategies appear promising in improving motor learning experiences. However, current research is limited by several factors, including the lack of high-quality research designs, small sample sizes, the use of unvalidated outcome measures, and the lack of generalizability of results. Furthermore, the heterogeneity of participants, programs, and evaluated outcomes reduces the overall quality of available evidence. Addressing these challenges is crucial for developing more effective interventions and improving access to physical activity for visually impaired children and young people.

1.2 Neural Correlates of Movement

Ricerche In the scientific landscape, the idea that physical activity can play a significant role in enhancing certain cognitive processes and their corresponding neural substrates is supported. Neuroscience highlights the benefits that occur in the brain as a result of physical exercise: it allows for better oxygenation of tissues and consequently increases metabolic activity, leading to cerebral changes that enable the maturation of motor, cognitive, relational, and emotional skills and

abilities (Olivieri, 2017). Furthermore, movement triggers the release of hormones such as dopamine, which promotes motivation and attention, and serotonin, which acts as a mood regulator. During brain development, there are certain areas subject to neurogenesis, and various studies demonstrate that this process is facilitated by factors including physical activity, which promotes the production of brain-derived neurotrophic factor (BDNF), allowing the brain to function and consequently enhance, reinforce, and act on the growth and survival of neural connections. Several studies support the idea that movement influences the neuroplasticity of brain structures, improving cognitive functions, and consequently the quality of learning (De Bruijn et al., 2019). From an anatomical perspective, the thalamo-striatal system and the cerebellum are essential for the motor system and also play a role in more complex cognitive functions such as motor planning and organization. The connection between these areas and the prefrontal cortex is crucial for the effective execution of movement and cognitive functions. Additional studies have revealed a close connection between the cerebellum and the prefrontal cortex, responsible for executive functions. Therefore, altered cerebellar activity may compromise executive functions, while an active cerebellum may support these functions (Budde et al., 2008). In light of this, it is important to advocate for a systematic integration of sports activities into daily life, as sports are crucial in relational, physical, cognitive dimensions, and in managing complex issues related to fluidity, context analysis, action finalization, and emotional maturity, promoting a positive increase in quality of life and thus responding to the new vision of the individual from a purely biopsychosocial perspective.

1.2.1 Neural Correlates of Movement and Visual Impairment

In recent Visually impaired individuals undergo significant structural and volumetric changes in the brain, especially in areas associated with vision, such as the occipital lobe, which atrophies in response to the lack of visual input. Compensatory hypertrophy occurs in non-visual brain regions, particularly in the frontal and cerebellar areas, to adapt to blindness (Kupers et al., 2014; Maller et al., 2016). Studies have shown that the hippocampus, particularly its anterior part, undergoes significant changes, with volumetric enlargement associated with superior navigation abilities in congenitally blind individuals (Voss et al., 2015). These adaptations are thought to rely more on non-visual structures like the posterior parietal cortex for navigation.

Despite the absence of visual input, blind individuals develop complex neural networks that help process movement through other senses, such as touch and hearing. Key brain regions involved in motion perception include the middle

temporal area (MT), medial superior temporal area (MST), and the lateral intraparietal area (LIP), all of which contribute to movement comprehension in the blind (Amedi et al., 2008; Baumann et al., 2014). These findings suggest that the brain of the blind adapts to compensate for missing visual information by utilizing other sensory inputs to interpret movement and space. While visually impaired individuals show differences in spatial sense analysis, these are believed to result from limited access to spatial information rather than deficits in spatial representation itself (Schinazi et al., 2015). Some studies show that congenitally blind individuals may excel in certain tasks, such as sound localization, while others show deficiencies (Duz et al., 2020). This trade-off between spatial abilities in different planes suggests that their navigation strategies are shaped by their sensory input rather than an inherent deficit in spatial awareness. Recent advances in understanding the neural correlates of movement in blindness highlight the brain's capacity for adaptation. This also points to the potential role of physical literacy in the development of movement skills and spatial navigation abilities. Physical literacy, which encompasses the skills, knowledge, and confidence to engage in physical activities, is particularly relevant in visually impaired individuals, as it may facilitate their ability to use alternative sensory information for spatial awareness and navigation. Incorporating physical literacy interventions could support the development of neural networks involved in motion perception and improve the quality of life for visually impaired individuals through enhanced movement and navigation skills. Future research could investigate how these neural networks evolve and how physical literacy programs can enhance them over the lifespan.

1.3 Role of Sports Activities in Relational Dimensions

Sports, when considering the individual from a bio-psychosocial perspective, cannot be thought of solely as physical activity but rather as an educational opportunity for young people, as it offers a wide range of psychological and social benefits. Besides developing physical skills, engaging in sports enables young individuals to acquire fundamental skills for defining and structuring social relationships (Duz et al., 2020). The sporting experience provides a setting within which to develop skills fundamental to interpersonal relationships through teamwork, collaboration, and the need to achieve a common goal. Furthermore, sports teach goal-setting and determination, refining planning and time management skills (Kumar, 2017). Consistent with the principles of embodied cognition theory, scientific evidence shows how participation in sports promotes problem-solving and decision-making abilities, as young people encounter complex

situations and make quick decisions under pressure. Moreover, sports offer fertile ground for the development of cognitive, emotional, communicative, and social skills, as individuals learn to control their emotions, effectively communicate with teammates and coaches, and manage interpersonal relationships within a competitive and collaborative context (Duz et al., 2018). Thus, sports represent a crucial context for individual growth and development, providing the skills and capabilities necessary in life to establish functional relationships. In this perspective, considering the importance of the social dimension in terms of context and environment, the focus is placed on the role played by the sports environment within the aforementioned relational dynamics. Recent research highlights that regularly participating in sports activities, from childhood to old age, not only acts as a predictive factor in reducing various health risks but also serves as an environment where individuals can find emotional support and, simultaneously, develop a sense of belonging and participation, which are considered fundamental skills for human society, all contributing to the overall well-being of individuals (Di Maglie., 2019). Sports activities, in addition to engaging the body and health, deeply involve emotions and affective bonds. This assumption is coherent not only within a bio-psychosocial perspective, which takes into account the different levels defining the complexity of the individual but also aligns with the principles of embodied cognition theory, which dignifies the body in individual assessment and development (Damiani et al., 2019). Through a structured dimension, the sports environment offers moments of gratification, reinforcement, and reassurance, but also experiences of tension, frustration, and anxiety. In this perspective, physical exercise becomes an effective opportunity for education, especially for young people, to recognize, understand, and manage their emotions. Sports activities also possess educational value as they require participants to actively engage, take on roles, and face the possibility of making mistakes and experiencing failures. Furthermore, a dimension of empathy is created between adults involved in activities and young participants, facilitating communication through sensory channels and promoting constructive, non-judgmental exchanges in support of the activities themselves (Di Maglie, 2019). Through play and sports, individuals have the opportunity to interact with reality, testing their abilities both individually and in relation to others. This occurs because, through participation in physical and sports practices, individuals can undertake a path to a deeper understanding of their emotions and their impact on social interactions (Di Maglie, 2019). Educating to the needs of a holistic approach that respects the complexity of the individual and considers the dynamic interaction between thoughts, feelings, physical sensations, and behaviors, in a perspective where mind and body are defined as a

single entity, is essential. Therefore, the role that sports can play in promoting the well-being of the individual, encouraging individuals to understand, explore, and manage their emotions, not only through cognitive reflection but also through bodily experience, is crucial in defining concrete possibilities for structuring satisfying relational dimensions. Thus, overcoming Cartesian dualism by embracing the now-assumed interconnectedness of these two entities, body and mind, which mutually influence how a person thinks, feels, and behaves (Lembo et al., 2023), is essential. Allowing young people to develop a positive relationship with their bodies, learn the rules in a safe environment, manage conflict and competition healthily, collaborate with others, and establish meaningful relationships with coaches and peers represents a significant contribution to their emotional and relational development, thereby facilitating the construction of their own identity (Di Maglie, 2019). In light of the above, considering the existing interrelationship between the individual, environment, and body, the focus is placed on the dimension that these factors assume in a context of disability. People with disabilities may encounter greater difficulties in social integration and emotional expression due to social barriers, discrimination, or physical and cognitive limitations (Tortorelli et al., nd). Therefore, outlining the potential of the sports context for the benefit of the relational dimension of visually impaired individuals becomes not only fundamental but also a determining factor in promoting full participation and integration into society. Engaging in sports and physical activities appropriately can bring significant advantages for people with disabilities, as it fosters social integration, helps overcome isolation, offers an opportunity for community involvement, contributes to the construction of individual identity, and teaches communication and collaboration with others within groups (Tortorelli et al., nd). Physical exercise and sports practice thus offer the opportunity to fully explore the capabilities of one's own body, promoting a positive attitude towards it, making the body a means rather than an obstacle to be valued and used to improve cognition and society.

2 Research Project

2.1 Research Hypothesis

The research hypothesis posits a positive correlation between sports participation and relational dimensions in a sample of individuals with visual impairments. This hypothesis is based on the idea that sports can play a significant role in the development of relational skills, even for individuals with visual impairments. The

research aims to answer the question of whether sports activities have a positive impact on the interpersonal relationships of this specific population. Through a thorough analysis of the collected data, the research confirms the hypothesis and provides a better understanding of the potential benefits of sports in the realm of relational skills for people with visual impairments.

2.2 Methods and Tools

We have chosen to use the "Perceived Self-Efficacy Scale in Managing Complex Problems" (Farnese, 2007) as the main tool for the research. The scale consists of 24 items that allow obtaining four distinct scores related to four components:

- Emotional maturity: beliefs that individuals have about their abilities to manage stressful situations, deal with unexpected events, and exercise good self-control over difficult events and situations.

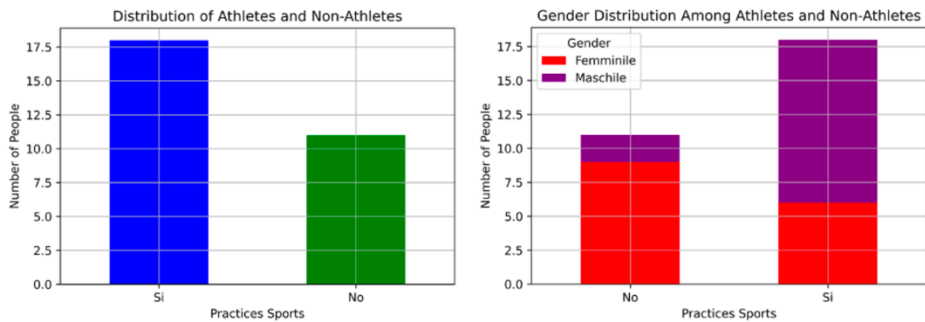
- Goal finalization: beliefs that individuals have about their abilities to set concrete and achievable goals, prioritize them, and adapt them to their skills, and to pursue established goals.

- Relational fluidity: beliefs that individuals have about their abilities to interact and engage with others, give and ask for help, maintain good relationships with others, and manage interpersonal conflicts.

- Context analysis: beliefs that individuals have about their abilities to "read" the context in which they operate, understanding the connections between different events and situations, comprehend the demands coming from people in the environment, and use appropriate language in different circumstances. The test was administered in two different modalities based on the subjects' capabilities. Some subjects independently responded with the assistance of voice synthesis technology, while others, lacking the same equipment, received hetero-administration.

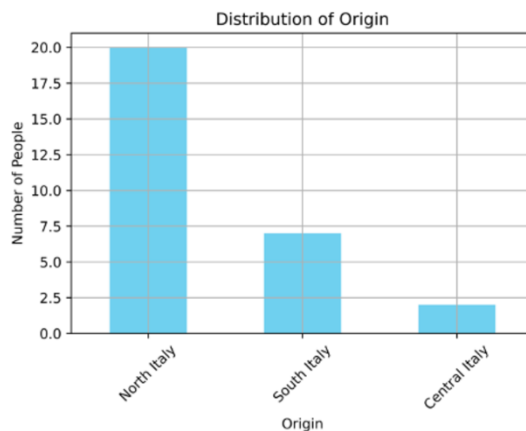
2.3 Sample

The sample was recruited through an independent random selection process. This means that individuals were chosen randomly and not influenced by the selection of other participants. For recruitment, we approached relevant authorities such as the Disability Services Company S. Alessio - Margherita di Savoia (hereinafter referred to as ASP) and the Italian Union of the Blind and Visually Impaired of Grosseto.



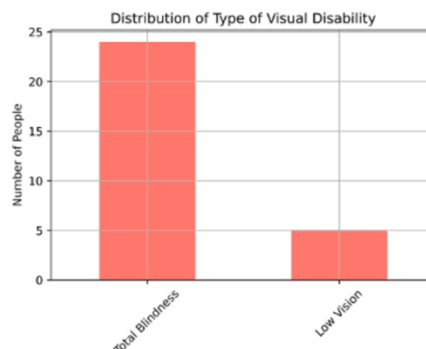
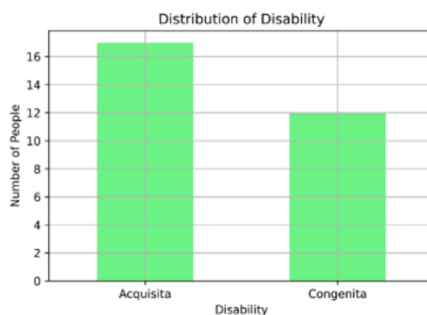
Graph 1 - Distribution of Athletes and Non-Athletes. Graph 2 - Gender Distribution.

The sample consists of 29 individuals, with a majority of female participants; 15 out of 29 (Graph 2). The age of the participants ranges from 17 to 67 years, with an average age of approximately 41.5 years. The age distribution shows a standard deviation of about 15.4, indicating a wide range of ages among the participants. Out of the 29 individuals, 18 reported engaging in sports (Graph 1).



Graph 3 - Distribution of Origin.

The histogram displays the number of participants categorized by their geographical origin. The graph 3 illustrates a variation in the number of participants from different origins, indicating a diverse geographical representation in the sample.



Graph 4 - Distribution of Disability. Graph 5 - Distribution of Type of Visual Disability.

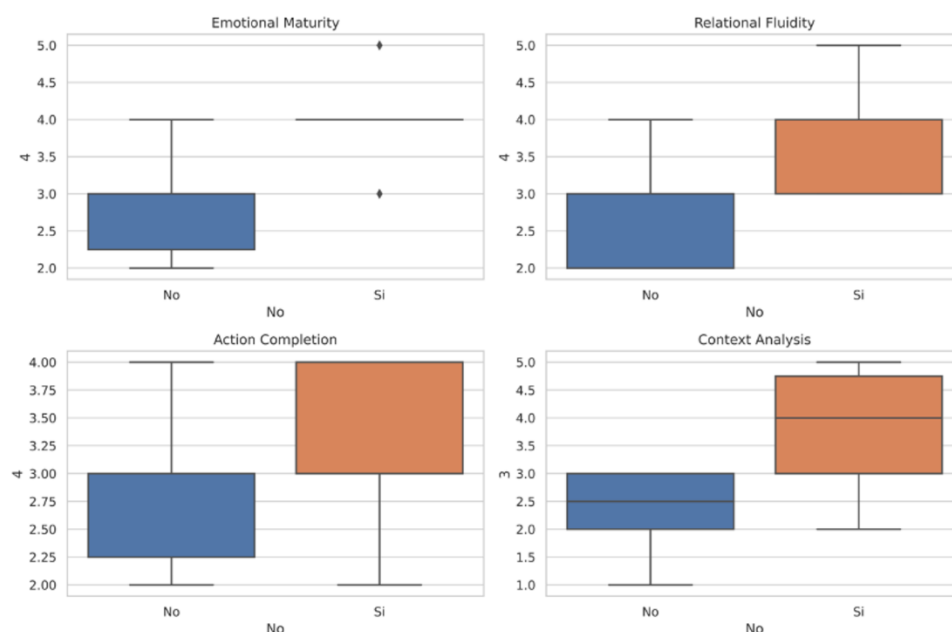
From the graphs, it can be observed that the analyzed sample presents a distribution of disabilities among participants, divided into two categories: acquired and congenital disabilities (Graph 4). Acquired disabilities, representing 58.62% of cases, are those that individuals develop during their lifetime due to factors such as accidents or illnesses. On the other hand, congenital disabilities account for 41.38% of cases and are present from individuals' birth. Focusing on visual disabilities in the dataset, it emerges that total blindness, representing 82.76% of visual disabilities, is the most prevalent type (Graph 5). This term refers to complete lack of visual perception. Low vision and other visual disabilities constitute the remaining 17.24%, indicating the presence of visual function but at a significantly reduced level compared to typical vision.

3 Results and Data Analysis

To compare the results obtained in the four subscales of the test between the two distinct groups, the non-parametric Mann-Whitney test was used, given the small sample size.

Attribute	Statistic Test	Value	P-value
Emotional Maturity	Mann-Whitney U	157.5	< 0.05
Relation Fluidity	Mann-Whitney U	157.5	< 0.05
Action Finalization	Mann-Whitney U	138.5	< 0.05
Context Analysis	Mann-Whitney U	161	< 0.05

The results of the Mann-Whitney U test to assess differences in the four dimensions of personal and social development between individuals who engage in sports and those who do not. Regarding emotional maturity, the very low p-value indicates statistically significant differences between the groups, suggesting a positive association between sports participation and higher emotional maturity. The same is observed for relational fluidity, where sports participants demonstrate greater relational capacity. Also, concerning action finalization, although the p-value is slightly higher, it still indicates significant differences between the two groups, highlighting an advantage for those who engage in sports. Finally, for context analysis, the low p-value confirms further significant differences, suggesting that sports participants have a greater ability to analyze and interpret the context compared to non-sports participants. Overall, these results indicate that sports participation can positively influence various areas of personal and social development, confirming the importance of sports not only for physical health but also for emotional and social well-being. The results highlight statistically significant differences between groups of individuals who engage in sports and those who do not in various dimensions of personal and social competence. In particular, the very low p-values observed for emotional maturity, relational fluidity, and context analysis robustly indicate that sports participation is associated with a positive impact on these abilities. These results suggest that individuals engaged in sports may demonstrate greater ability to regulate and understand their emotions, interact effectively with others, and interpret complex situations with greater discernment. Additionally, the significant difference in action finalization scores, underscored by a p-value <0.05 , highlights that sports participants have a greater propensity to successfully complete actions compared to their non-sports peers. In summary, these results provide a robust empirical basis for the hypothesis that sports can positively influence various dimensions of personal and social well-being, suggesting that promoting sports activity could be an effective strategy to foster overall individual development.



Graph 6 - Dimensions' Box-plots.

Graph 6 shows how the distributions between groups concerning dimensions of emotional maturity and relational fluidity exhibit differences in medians and score dispersion, supporting the use of the Mann-Whitney U test. Also, for the dimensions of action finalization and context analysis, the distributions show variations between groups, with differences in medians that are visible. This graph indicates that the distributions, while not identical, are sufficiently similar in shape to justify the application of the Mann-Whitney U test, satisfying the assumption of similar distribution shapes. This supports the validity of the performed Mann-Whitney U test results. The assumption of independence of samples is met as the groups of individuals who engage in sports and those who do not were selected independently of each other. This means that one individual's choice to belong to one of the two groups does not influence the choices of other individuals. The data indeed come from a survey in which individuals were selected without interference between choices; thus, this assumption can be considered satisfied. The assumption of ordinality of data is satisfied as the analyzed data are scores that can be ordered. In fact, the data under analysis are scores on a 1 to 5 rating scale reflecting levels of perceived competence, measurable in an ordinal manner, so this

assumption can also be considered satisfied. In the Box Plot representing Emotional Maturity, the first quartile (Q1) and the third quartile (Q3) for the sports group are higher than those for the non-sports group, indicating that most scores of sports participants are higher. The median for sports participants is higher than for non-sports participants, suggesting a general tendency towards higher scores. The distribution of scores in the sports group is less variable and more concentrated around higher values. In the Box Plot representing Relational Fluidity, the quartiles for sports participants are positioned higher, showing that scores tend to be higher. Again, the median is higher for sports participants, indicating a better average relational fluidity. The distribution is narrower for sports participants, with less variability compared to non-sports participants. In the Box Plot representing Action Finalization, the quartiles for sports participants are slightly higher, but the difference is not as pronounced as in the other attributes. The median is slightly higher for sports participants, suggesting a slight tendency towards better performance in action finalization. The distribution is similar between the two groups but with a slight tendency towards higher scores for sports participants. In the Box Plot representing Context Analysis, the quartiles show that sports participants' scores are generally higher. The median is higher for sports participants, indicating a better average ability in context analysis. The distribution for sports participants is more concentrated, with fewer outliers compared to non-sports participants. In all dimensions, sports groups tend to have higher medians and more concentrated distributions, suggesting overall better performance in these areas of personal and social development. No significant outliers were observed in the box plots, indicating that there are no extremely anomalous scores that could distort the analysis. These observations confirm that sports participation may be associated with improvements in various areas of personal and social competence, as evidenced by the higher positions of quartiles and medians in groups of individuals engaged in sports.

4 Discussion

Based on the presented results, it is evident that sports participation is associated with significant differences in scores of perceived emotional maturity, relational fluidity, action finalization, and context analysis compared to non-participants. These differences are visually well-represented through box plots, which highlight a trend toward higher scores in sports participants. Particularly significant is the fact that sports participants demonstrate greater consistency in scores of perceived emotional maturity and relational fluidity, indicating emotional stability and

stronger social interaction within this group. These findings align with the concept of Physical Literacy (PL), which emphasizes the development of emotional, social, and cognitive skills alongside physical competencies. The supportive environment created through sports may facilitate not only physical development but also the broader dimensions of PL, allowing individuals to navigate various social contexts with confidence and competence. These findings may suggest that sports provide a conducive environment for the development of emotional and relational skills, perhaps through interaction with teammates, learning stress management skills, or leadership within the sports context. This study's results are consistent with and corroborate previous research (Alcaráz-Rodríguez et al., 2019; Zull et al., 2019), which highlights how sports can promote the development of social skills in individuals affected by the aforementioned condition. This underscores the value of structured, inclusive sports programs in nurturing key elements of PL, such as self-efficacy, confidence, and social inclusion, all of which are essential for an active and engaged lifestyle. Furthermore, sports participants exhibit a greater perception of their ability to finalize actions and analyze the context, indicating an advantage in problem-solving and situational interpretation—skills that are core to PL. These results may be attributed to the competitive nature of sports, which requires rapid assessment of situations and timely response, thus contributing to the development of decision-making and problem-solving skills. Within the framework of PL, such experiences are valuable for fostering lifelong engagement in physical activity, enabling individuals to apply these adaptive skills across various contexts. Overall, these results support the idea that sports participation can play a significant role in personal and social development, providing individuals not only with physical benefits but also a fertile ground to acquire and strengthen a range of crucial skills for success in everyday life and professional settings. The PL framework highlights that these skills are integral to developing a physically active lifestyle that encompasses mental and social well-being. It is also important to consider the pattern of data dispersion represented in the box plots. For instance, the lower variability and concentration of scores around higher values in sports participants suggest greater uniformity in the perception of emotional and relational skills within this group. This phenomenon may stem from the structure and discipline typical of the sports environment, promoting group cohesion, individual commitment, and emotion management under pressure—elements that reinforce the PL dimension of confidence in one's abilities and resilience in facing challenges. Furthermore, the observation of outliers in the data, although present in both groups, can provide important insights. Outliers may represent individuals with particularly high or low skills compared to the group average. In the context of

PL, these outliers, especially if they represent elite athletes, might demonstrate exceptional levels of perceived emotional maturity, relational fluidity, or action finalization. Studying these cases could enhance our understanding of the mechanisms driving the development of these PL-related skills, potentially informing strategies to foster growth even among other participants. The statistical analysis of p-values provides robust confirmation of the observed differences, emphasizing that these are not random but indicate a real association between sports participation and the improvement of personal and social skills. This aspect is crucial for supporting the role of PL, demonstrating that sports can positively impact the overall development of individuals, extending beyond the physical to encompass emotional, relational, and cognitive dimensions. These findings underscore the importance of PL in holistic development, reinforcing that a physically active lifestyle involves skills that contribute to overall well-being and successful integration into various life contexts.

Conclusions

The research results suggest that sports participation is significantly correlated with the improvement of perceived personal and social skills in individuals with visual impairments, a fundamental aspect of the concept of Physical Literacy (PL). The data indicate that those who engage in sports show higher levels of perceived emotional maturity, relational fluidity, action finalization, and contextual analysis skills compared to those not involved in sports activities. These findings confirm and expand on previous evidence, emphasizing the importance of sports as a vehicle for the overall development of individuals, including those with visual disabilities (Alcaráz-Rodríguez et al., 2019; Zull et al., 2019). The greater consistency in scores of perceived emotional maturity and relational fluidity among sports participants suggests that sports participation within the framework of PL may promote emotional stability and strengthen social interaction skills. These results are particularly relevant considering the context of social vulnerability in which individuals with visual impairments often find themselves (Zebehazy et al., 2011). Furthermore, the higher perception of action finalization and contextual analysis abilities among sports participants indicates an advantage in terms of problem-solving and situational interpretation, crucial aspects for success in daily life and professional settings. Statistical analysis of the data confirmed that the observed differences are not random but indicate a real association between sports participation and the improvement of personal and social skills, which are essential components of PL. This suggests that promoting targeted sports programs could be

an important strategy to support the overall development of individuals with visual impairments, offering them a safe and inclusive context in which to grow emotionally, socially, and cognitively. The results of this research thus provide empirical support for the belief that sports can play a significant role in the personal and social development of people with visual disabilities, contributing to their PL. Incorporating sports activities into rehabilitation programs and daily activities could, therefore, contribute significantly to improving the quality of life and social inclusion of this population, laying the foundation for a physically active and aware lifestyle.

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