Physical Education Theory and Methodology
Теорія та методика фізичного виховання

ISSN 1993-7989 (print)
ISSN 1993-7997 (online)
ISSN-L 1993-7989

Review Article

The Role of Sport in Promoting Mental Health Among Adolescents

Fabrizio Liguori[1ABCD] **and Concetta Paola Pelullo**[1ABCD]

[1]University of Naples "Parthenope"

Authors' Contribution: A – Study design; B – Data collection; C – Statistical analysis; D – Manuscript Preparation; E – Funds Collection

Corresponding Author: Fabrizio Liguori, e-mail: fabrizio.liguori@collaboratore.uniparthenope.it
Accepted for Publication: April 28, 2026
Published: May 30, 2026

DOI: 10.17309/tmfv.2026.3.07

Abstract

Objective. Adolescence, a critical transitional phase of life, is characterised by biological, psychological, and social changes that may increase vulnerability to mental health problems. This review aims to provide an integrative synthesis of the role of sport and physical activity in promoting mental health among adolescents, with a specific focus on biological, psychological, and social mechanisms.

Materials and Methods. A narrative review was conducted using studies retrieved from major scientific databases, including PubMed, Scopus, and Web of Science. Relevant articles were selected based on their focus on adolescents (aged 10–24 years), physical activity or sport participation, and mental health outcomes. The evidence was analysed using a thematic approach to identify patterns, relationships, and inconsistencies across studies.

Results. The review identified four main domains: neurobiological, psychological, social, and contextual. Overall, the evidence indicates that physical activity contributes to adolescent mental health through multiple interconnected pathways, including neurobiological mechanisms (e.g., regulation of neurotransmitters such as serotonin and dopamine), psychological mechanisms (e.g., improved self-esteem), and social mechanisms (e.g., peer interaction). However, the magnitude and direction of these effects appear to be strongly moderated by contextual and environmental factors.

Conclusions. Sport represents a multidimensional factor in promoting mental health during adolescence. Its effects should be interpreted within an integrated framework in which biological, psychological, and social mechanisms interact dynamically. Rather than being universally beneficial, sport participation may produce both positive and negative outcomes depending on the quality of the environment and the level of competitiveness. Future research should focus on clarifying causal pathways and contextual moderators, as well as on developing context-sensitive and mechanism-informed interventions.

Keywords: adolescent, mental health, sport, physical activity, health promotion.

Introduction

Adolescence is a transitional stage of development characterised by profound biological, psychological, and social changes that influence mental health trajectories into adulthood. According to the World Health Organisation (WHO), mental health is a state of well-being that enables people to cope with life's stresses, realise their potential, learn effectively, work and contribute to their community; health, therefore, is more than the mere absence of illness. It is a multidimensional construct influenced by biological, psychological, and social factors, particularly during adolescence (WHO, 2021).

Anyone can experience mental health problems at any stage of their life. No single factor contributes to the development of a mental health condition: this is the result of a complex interaction of factors within the individual and their social environment. In adolescence, a crucial aspect of mental health is prevention and early intervention. There is considerable evidence to suggest that the timely identification of signs of psychological distress (such as social withdrawal, a decline in academic performance, sleep disturbances or behavioural changes) helps to reduce the risk of mental health disorders becoming chronic. School-based interventions, which include social-emotional learning programmes, life skills promotion and psychological support, have proven effective in improving psychological well-being and reducing symptoms of anxiety and depression (WHO, 2021; OECD 2025).

The prevalence of mental health disorders continues to rise at an alarming rate. In the European Region, one in six people (around 140 million) lives with a mental health disorder, with an impact on daily life ranging from mild to severe (WHO, 2024). Furthermore, adolescents' mental health is also strongly influenced by the social determinants of health, including socioeconomic status, family background, access to health services and educational opportunities. Adolescents from disadvantaged backgrounds are at greater risk of developing mental health disorders, partly due to chronic stress and fewer opportunities for social participation. Such inequalities require structural interventions and equity-oriented policies.

The WHO also draws attention to technology and electronic devices: "The use of technology affects young people's mental health in complex and contradictory ways. It can connect, inspire and educate, but it can also expose young people to serious risks. The most common online dangers include cyberbullying, unrealistic body ideals, self-harming content, harmful marketing and invasive data collection" (WHO, 2024). Another factor that is often underestimated but can be crucial for mental health in adolescence is the quality and quantity of sleep. Sleep deprivation, which is increasingly common partly due to the evening use of electronic devices, is associated with an increased risk of anxiety, depression, irritability and cognitive difficulties. Ensuring adequate sleep habits is therefore an important protective factor for psychological well-being. Recent data from studies conducted on Italian populations confirm the high prevalence of sleep disorders among young people, highlighting a close association between poor sleep quality, use of digital devices and a deterioration in psychological well-being (Gallè et al., 2025).

The latest CENSIS report indicates that 74.1% of Italians say they have had direct or indirect experience of mental health issues (34.2% personally, 36.3% through family members or friends); 29.4% of people say they think about their mental health every day or often (41.9% among young people) and 44.3% at least occasionally (CENSIS, 2026).

During childhood and adolescence, anxiety disorders are the most common psychiatric condition, and it is estimated that, by the age of 18, one third of adolescents will meet the criteria for an anxiety disorder (Merikangas et al., 2010). Anxiety disorders have a multifactorial origin, with genetic and neurobiological factors, environmental and social factors, and temperamental factors all potentially contributing.

According to Masi, children of a parent with an anxiety disorder are seven times more likely to develop the same condition during childhood (Masi et al., 2000). In children, anxiety generally manifests in connection with school or sporting performance, or the anticipation of social engagements which the child experiences with a sense of tension and anticipatory agitation, due to situations they foresee or perceive as unpleasant or even threatening. In pre-adolescence and adolescence, anxiety is instead linked above all to exposure to social judgement and the avoidance of situations that might expose them to negative judgements.

'Drop-out', i.e. the early abandonment of sport and a retreat into a sedentary lifestyle, is a common phenomenon in adolescence. The reasons are linked to psychological factors of demotivation and rejection of an environment too often focused on performance, excessive competition, and results as the sole objective.

Adolescence is the period of life, lasting approximately 10 years, that marks the transition from childhood to adulthood, that is, from the onset of puberty to the age of 24 (Sawyer et al., 2018). During this ontogenetic period, profound physical, physiological and neuropsychological changes occur, which are responsible for the vulnerability specifically associated with adolescence; these changes can influence behaviour and mental health in adulthood. It is during this phase that the brain refines its efficiency in processing information and acquires speed of communication between neurons whilst remaining particularly plastic ('brain plasticity') and thus becoming highly sensitive and receptive to stimuli from the external environment (Giedd et al., 1999; Andrews et al., 2021).

Adolescence, following childhood, can be considered the 'second critical period' of neurobehavioral development which, as regards the central nervous system, particularly affects certain brain areas involved in the processing of gratification (deriving from pleasant and fulfilling experiences) and emotional states, such as fear, anger, happiness, sadness and aggression. In adolescents, these emotional states manifest with extremely variable intensity, often with moments of extreme happiness rapidly alternating with others of profound distress or depression.

Experimental and clinical evidence suggests that temperament and certain behavioural traits characteristic of adolescence, such as high emotional reactivity, risk underestimation and a strong propensity for novelty seeking (the pursuit of new experiences and sensations), are partly attributable to a delayed physiological maturation of the neural circuits in the prefrontal cortex that underlie executive functions such as: the ability to reason critically, control impulses and inhibit inappropriate behaviour. Whilst novelty-seeking behaviour has significant adaptive value-as it drives adolescents to separate from their parents, motivating them to explore the world beyond the family sphere and to construct their own identity-it can also lead to the pursuit of risky activities that strongly stimulate the brain's reward mechanisms, such as extreme sports and, more generally, danger-defying behaviour, or the use of psychoactive substances.

During adolescence, a period in which the ability to feel empathy and understand the intentions and perspectives of others is refined, socialisation plays an important role in the construction of one's identity. Being socially connected is a fundamental human need, rooted in our evolutionary history and therefore crucial for survival and emotional well-being. Younger individuals may be more vulnerable to negative social experiences at a stage of life when identity, social skills and emotional regulation abilities are developing (Lamblin et al., 2017). Indeed, extensive evidence shows that, in the case of children and adolescents, the number of friends, the quality of these relationships, and peer relationships act as protective factors for mental health (Schwartz-Mette et al., 2020), whilst early school leaving (and the consequent loss of peer socialisation processes) and social isolation represent significant risk factors (Egger et al., 2003; Finning et al., 2019). This evidence highlights how the promotion of protective social connections (support networks) and the fight against stigma and discrimination are crucial actions in the early stages of development and can act as a buffer against the emergence of mental health disorders. Conversely, negative peer experiences, such as bullying, represent a significant risk factor for psychological well-being. Recent studies highlight how victimisation is associated with a poorer perception of oneself and one's physical appearance, particularly in adolescents who are overweight or obese, contributing to reduced self-esteem and increased emotional distress (Ballarin et al., 2023). However, despite the large body of literature supporting the positive role of sport, findings are not always consistent. While many studies report beneficial effects on mental health, others highlight neutral or even negative outcomes, particularly in highly competitive or performance-oriented contexts. This inconsistency suggests that the relationship between sport participation and mental health is dependent on multiple factors.

Therefore, an issue in the literature is the lack of a multidimensional model explaining how physical activity influences adolescent mental health considering biological, psychological, and social domains. This gap limits the ability to design effective and targeted interventions for mental health promotion. Moreover, existing studies often examine isolated outcomes, and as a result, it remains unclear how different mechanisms interact.

Therefore, the aim of this narrative review is to provide an integrative synthesis of the role of sport and physical activity in promoting mental health among adolescents, with particular attention to the biological, psychological, and social mechanisms underlying these effects. This narrative review addresses the following research questions: 1)What are the main biological, psychological, and social mechanisms through which physical activity influences adolescent mental health? 2) How do different types of sport participation moderate these effects? 3) What are the main inconsistencies in the current literature?

Materials and Methods

Study design

This study was conducted as a narrative review aimed to provide an integrative synthesis of the relationship between sport participation and mental health among adolescents. Given the heterogeneity of study designs, outcomes, and conceptual approaches in the existing literature, a narrative approach was considered appropriate to explore and interpret the complex biological, psychological, and social mechanisms underlying this association. A systematic review approach was not considered appropriate due to the high heterogeneity of study designs, outcome measures, and conceptual frameworks, which limits the feasibility of quantitative synthesis and requires an interpretative approach. However, to enhance transparency and reproducibility, explicit criteria for study selection, analytical boundaries, and synthesis procedures were defined a priori. This review adopted a structured narrative synthesis approach, informed by established methodological guidance, to ensure transparency in study identification, selection logic, and interpretation. Although not designed as a systematic review, efforts were made to reduce selection bias by applying consistent inclusion criteria and prioritising studies that contributed to the understanding of underlying mechanisms rather than simple associations.

Literature search strategy

The literature search was carried out using major scientific databases, including PubMed, Scopus, and Web of Science. Additional sources were identified through manual screening of reference lists of relevant articles. The search was conducted between January and March 2026 and included combinations of the following keywords: "adolescents", "youth", "sport", "physical activity", "mental health", "well-being", "anxiety", and "depression". Search strings were adapted for each database using Boolean operators (e.g., "adolescent AND (sport OR physical activity) AND (mental health OR well-being OR anxiety OR depression)").

The search focused on studies published between 2010 and 2025, in order to capture the most recent and methodologically robust evidence on adolescent mental health and physical activity. Earlier seminal studies were included when considered theoretically relevant to the interpretation of mechanisms. The initial search yielded a broad pool of records, which were progressively refined through screening procedures. The selection process followed a structured and iterative logic aimed at identifying conceptually relevant and methodologically sound studies.

Study selection and analytical boundaries

Studies were selected based on predefined inclusion and exclusion criteria. Inclusion criteria were: 1) studies involving adolescents aged 10–24 years; 2) studies examining sport participation or physical activity as the main exposure; 3) studies reporting mental health outcomes (e.g., anxiety, depression, well-being, self-esteem); 4) peer-reviewed articles published in English; 5) empirical studies, systematic reviews, or meta-analyses.

Exclusion criteria were: 1) studies focusing exclusively on adults; 2) studies not addressing mental health outcomes; 3) editorials, commentaries, conference abstracts, or non-peer-reviewed publications; 4) studies lacking sufficient methodological clarity.

Adolescence was defined as the age range of 10–24 years, in line with recent developmental frameworks that extend adolescence to include young adulthood due to prolonged social and neurodevelopmental transitions. However, variability in age definitions across studies was considered during the interpretation of findings.

The study selection process was conducted in two stages. First, titles and abstracts were screened to exclude clearly irrelevant studies. Second, full texts of potentially eligible articles were assessed according to the inclusion and exclusion criteria. The selection process followed a structured and iterative logic aimed at ensuring conceptual relevance and coverage of the main domains. Priority was given to systematic reviews, meta-analyses, and longitudinal studies, while cross-sectional studies were included when they contributed to the identification of specific mechanisms or contextual factors.

The analytical boundaries of the review were defined to focus on mechanisms linking sport participation to mental health outcomes, rather than on clinical treatment effects or diagnostic processes. Studies were included if they contributed to understanding at least one of the following domains: neurobiological, psychological, social, or contextual mechanisms.

Data synthesis and analytical approach

The selected literature was analysed using a thematic and interpretative approach.

Initially, the selected studies were grouped according to the type of mechanisms and outcomes investigated. Subsequently, studies were compared to identify recurring patterns, convergences, and inconsistencies across the literature (e.g., differences related to type of sport, intensity, and context), to move beyond descriptive reporting toward analytical interpretation).

This process allowed the identification of four main analytical domains:

1) neurobiological mechanisms;
2) psychological mechanisms;
3) social mechanisms;
4) contextual and behavioural factors.

Rather than providing a purely descriptive summary, the analysis aimed to interpret how these domains interact and under which conditions sport participation may influence mental health outcomes. Attention was given to identifying variations in findings related to type of sport, intensity, and contextual factors.

Results

The analysis of the included literature resulted in the identification of four main domains through which sport participation influences adolescent mental health: 1) neurobiological mechanisms; 2) psychological mechanisms; 3) social mechanisms; 4) contextual and behavioural factors. Across the included studies, evidence consistently converges on the multidimensional nature of the relationship between sport and mental health, although the strength and direction of effects vary depending on contextual and individual factors.

These domains interact dynamically, shaping mental health outcomes through complex interactions between individual and environmental conditions. Across the analysed literature, three overarching evidence patterns emerged: 1) a consistent positive association between sport participation and mental health outcomes; 2) significant variability in effect size and direction depending on contextual and individual factors; and 3) the presence of conditional or adverse effects in highly competitive or unsupportive environments. These patterns indicate that the relationship between sport and mental health is not uniform, but conditional upon multiple interacting variables.

Sedentary behaviour and lifestyle factors

The WHO report from 2020 states that only 19% of adolescents worldwide get enough physical activity (WHO, 2020). A 2021 ISTAT survey showed that, in Italy, the situation is better; around 70% of adolescents aged between 11 and 17 take part in sport regularly, an increase from 67% in 2019 (ISTAT, 2021), supporting the growing awareness of the benefits of sport and physical activity in general.

Across studies, there is strong convergence in identifying sedentary behaviour as a risk factor for poorer mental health outcomes. However, the direction of causality remains unclear, as several studies suggest a bidirectional relationship in which lower mental well-being may also lead to increased sedentary behaviour. Taking part in sport during adolescence plays a relevant role for physical and mental health. A consistent pattern across studies indicates that sedentary behaviour is associated with poorer mental health outcomes, particularly increased symptoms of anxiety and reduced well-being. Importantly, several studies suggest that lifestyle behaviours (e.g., physical activity, diet, sleep and screen time) tend to cluster, creating cumulative effects on both physical and mental health. Furthermore, adolescents who play sport develop better cardiovascular endurance, muscle strength and flexibility, promoting balanced physical development and preventing chronic diseases such as type 2 diabetes and cardiovascular disease (Janssen & LeBlanc, 2010).

Regular physical exercise is also associated with better stress regulation and healthier behavioural patterns. In adolescents, it has been observed that engaging in regular physical activity promotes the adoption of healthy behaviours, including good eating habits and abstaining from alcohol and smoking. Furthermore, recent studies conducted among the Italian population highlight how a sedentary lifestyle is frequently associated with unhealthy eating habits, creating a combined risk pattern that can negatively affect both physical and mental health (Calella et al., 2024). In parallel, digital behaviours represent a growing component of sedentary lifestyles. Media use among adolescents has increased significantly over the last decade, facilitated by constant access to mobile devices and the internet. Across studies, increased screen time is consistently associated with poorer mental health indicators, whereas sport participation appears to act as a protective factor. However, the direction of causality remains unclear, as physically active adolescents may already differ in baseline psychosocial characteristics.

This finding is confirmed by the latest national Health Behaviour in School-aged Children (HBSC) survey from 2022, which shows that, as children get older, both boys and girls spend more time on social media and watching online content, while patterns of gaming differ by age and gender (HBSC, 2022).

Overall, these findings suggest that sedentary and digital behaviours should be interpreted as part of a broader lifestyle pattern, interacting with physical activity and contributing to mental health outcomes. Sport participation may therefore represent a potentially protective behavioural alternative, reducing excessive screen time and promoting more adaptive daily routines. Taking part in sport can be a powerful strategy for preventing internet and video game addiction, as sport offers an active and engaging alternative to time spent online, reducing the risk of digital addiction (García-Ortiz et al., 2025). This suggests that sedentary behaviour should not be interpreted as an isolated factor, but as part of a broader behavioural pattern in which physical activity, digital engagement, and lifestyle habits interact cumulatively.

Neurobiological mechanisms

Physical activity also has a positive influence on emotional well-being: regular exercise helps, for example, to reduce levels of aggression and tension (Cantoia et al., 2017). This effect is partly attributable to the release of endorphins, molecules naturally produced by the brain that act in a similar way to antidepressants, promoting a general sense of well-being. Evidence across experimental and observational studies suggests a convergent association between physical activity and neurobiological regulation mechanisms, particularly involving neurotransmitter systems related to mood and reward.

Among the main neurotransmitters involved in regulating physical and mental well-being are:

- serotonin, associated with mood regulation and the perception of happiness;
- dopamine, linked to reward and motivation mechanisms;
- endorphins, which help to generate feelings of relaxation and calm;
- oxytocin, which promotes the development of interpersonal trust and positive emotions.

These neurobiological processes represent underlying mechanisms through which physical activity exerts its effects, interacting with psychological and social dimensions.

Across the literature, evidence on neurobiological mechanisms shows a general convergence in short-term experimental findings, particularly regarding neurotransmitter regulation. However, inconsistencies emerge in relation to the long-term stability and magnitude of these effects, largely due to the limited availability of longitudinal and directly measured neurobiological data.

However, the magnitude and persistence of these effects remain uncertain, as many studies rely on indirect measures and short-term observations rather than longitudinal neurobiological data.

Psychological mechanisms

Evidence suggests that regular physical activity improves mood and can reduce symptoms of depression and anxiety (Biddle & Asare, 2011). A robust and recurrent finding across the literature is the positive association between sport participation and self-esteem, emotional regulation, and reduction of depressive symptoms. However, some studies report null or context-dependent effects, indicating that psychological benefits are not universal and may depend on factors such as motivation, perceived competence, and type of sport. However, evidence also highlights that sport participation may produce adverse psychological outcomes under specific conditions. In particular, highly competitive and performance-oriented environments have been associated with increased levels of stress, performance anxiety, burnout, and reduced self-esteem. These findings indicate that the psychological effects of sport are not universally beneficial, but rather depend on the interaction between individual characteristics and contextual factors such as coaching style, motivational climate, and perceived pressure. Participating in team sports, moreover, helps develop social skills, self-esteem and a strong sense of belonging (Eime et al., 2013). At a stage of life full of emotional and social challenges, these benefits are particularly valuable. Indeed, sport is an important vehicle for teaching adolescents to work proactively and constructively within a group sharing the same objectives. Furthermore, according to Eccles and Barber, "Participation in sport and other extracurricular activities has been associated with lower levels of delinquent behaviour and other problematic behaviours in adolescents" (Eccles & Barber, 1999). Taking part in sporting activities therefore provides a positive environment where young people can form friendships and receive social support, reducing the risk of isolation. These psychological benefits are closely linked to both biological regulation and social experiences within sport contexts.

Social mechanisms

Taking part in sport not only improves physical and mental health, but also school life. Indeed, by acquiring discipline, young athletes learn to manage their time better, as they must balance study and training. This organisational skill often translates into greater efficiency in their studies and fewer late submissions.

There is strong and consistent evidence supporting the mediating role of social factors, particularly peer relationships and sense of belonging. However, the strength of these effects varies depending on the quality of the social environment, indicating that not all sport contexts equally promote positive social outcomes.

Social mechanisms emerge as a central pathway, with consistent evidence showing that peer interaction, sense of belonging, and social support mediate the relationship between sport and mental health.

Some research has highlighted how physical activity contributes to improved brain function by increasing blood and oxygen supply and promoting neurogenesis in the hippocampus, a key area of the brain for learning and memory processes. These findings suggest that social factors not only have a direct effect, but also reinforce psychological and emotional benefits, indicating a mediating and moderating role.

Jacquelynne Eccles has demonstrated that students involved in sporting activities tend to achieve better academic results than their sedentary peers. These results are said to stem not only from the development of good time management but also from the enhancement of problem-solving skills and the ability to work under pressure (Fredericks & Eccles, 2006). Social mechanisms therefore play a mediating role, reinforcing or attenuating the psychological effects of sport participation.

Potential negative effects of sport participation

The analysis also revealed that sport participation is not universally beneficial and may produce adverse outcomes under specific conditions. An important inconsistency in the literature concerns the dual nature of sport participation: while most studies report beneficial effects, others highlight adverse outcomes under specific conditions. Although the benefits of sport are well documented, it is also important to consider certain potential risks, particularly when it is characterised by excessive competitive pressure or unsupportive environments. In such contexts, adolescents may develop stress, performance anxiety, burnout or reduced self-esteem. Therefore, it is essential to promote educational and inclusive sporting models, focused on the individual's overall well-being. In particular, highly competitive and performance-oriented environments are more frequently associated with stress, anxiety, and burnout, whereas recreational and autonomy-supportive contexts tend to produce positive outcomes.

Adolescents who play sport regularly tend to develop a greater sense of belonging and are less likely to become isolated (Eime et al., 2013). In particular, team sports, by promoting social interaction and interpersonal skills, are thought to be more effective in countering social withdrawal. A further benefit of participating in sport, in addition to improving physical, mental, social and academic health, is its significant contribution to preventing 'addiction' and dysfunctional behaviours associated with technology. Society, parents and educators should therefore always promote physical activity among young people, given its crucial role in their overall development.

Among the variables associated with psychological well-being, self-esteem plays an important role; it is a complex component linked to cognitive aspects (the image people have of themselves or the way they describe themselves), affective aspects (how satisfied people are with themselves) and social aspects, namely the assessment people make of themselves in relation to the groups to which they belong, and the extent to which they receive approval from the members of those groups. Self-esteem has the fundamental characteristic of being a purely subjective, dynamic and changeable perception. It has been shown that physical activity, particularly sport, as well as promoting social integration, can boost self-esteem by helping to build community relationships, involving everyone-each according to their abilities, skills and knowledge-in the creation of collective well-being. The link between physical activity and self-esteem is not direct but stems from the individual's perception of improvement in skills and abilities, as well as in physical appearance and fitness. Therefore, an important responsibility of sports and physical education teachers is to help individuals who are new to physical activity and sport, or who practise it regularly, to perceive these improvements.

Sport and mental health in contextual conditions

Across the world, the recent COVID-19 pandemic has had a significant impact on people's mental health and social well-being (Francia et al., 2023; Valeriani et al., 2023). Contextual disruptions such as the COVID-19 pandemic provide further evidence that the relationship between sport and mental health is highly context-dependent and sensitive to environmental constraints. In addition to large-scale contextual disruptions, evidence also indicates that sport-specific environments play a crucial moderating role. In particular, factors such as coaching style, motivational climate, and levels of competitive pressure can either enhance psychological well-being or contribute to adverse outcomes such as anxiety, burnout, and dropout. The strict social distancing measures (including school closures) and restrictions on peer-based sporting and recreational activities, implemented to curb infections, have consequently led to disruptions in teaching/learning and socialisation processes. Children, adolescents and young adults around the world have experienced disruptions to their daily routines and have been exposed to various risk factors for mental health – including social isolation, loss of income and family stress – which, as has long been noted, lead to a consequent increase in levels of anxiety and depression (Egger et al., 2003; Finning et al., 2019). During lockdown, in our country too, there was an increase in requests for help from parents regarding their children's mental health issues, confirming the many negative effects of prolonged quarantine on adolescents' lives: difficulty concentrating, boredom, irritability, restlessness, nervousness, feelings of loneliness, distress and worry. As might be expected, adolescents spent more time using screens and digital devices and engaged in less physical activity (Caffo et al., 2020; Gallè et al., 2020; Orgilès et al., 2020; Muzi et al., 2021; Gallè et al., 2022). Lockdown has also been linked to the adoption of unhealthy lifestyles (poor diet, alcohol and cannabis use, physical inactivity and prolonged screen time), which represent a risk factor for adolescents' growth and development (Calella et al., 2024). The pandemic and social containment measures have not only exposed adolescents and young adults to particularly worrying risks (especially given that most mental health disorders typically emerge during this stage of life) but have also worsened the condition of those already suffering from mental health issues.

International organisations and institutions are increasingly focusing on the promotion and prevention of mental health for what has been termed the 'COVID Generation', including initiatives to encourage greater participation within communities, schools, workplaces and families.

Adolescents and young adults who engage in outdoor activities and spend time in green spaces (including sporting activities) build resilience to environmental stressors, thereby mitigating their potential long-term consequences. A study conducted by the Reference Centre for Behavioural Sciences and Mental Health (SCIC) at the Italian National Institute of Health examined the behaviours and habits of Italians regarding their use of green spaces during the pandemic. Contrary to expectations, changes in leisure habits appeared more significant among younger people, for whom, in particular, a decrease in time spent outdoors and in green spaces was observed. Older people, by contrast, were less likely to give up outdoor activities, socialising and the use of green spaces (Medda et al., 2021). Promoting psychological well-being and socio-emotional skills and ensuring access to early interventions for adolescents and young adults, are public health priorities, particularly given that mental health problems and social exclusion can extend into adulthood, compromising health and limiting opportunities for a healthy and peaceful life (UNICEF, 2021).

Based on the identified domains, a structured synthesis of the main mechanisms linking sport participation and adolescent mental health is summarized in Table 1.

Overall, these results highlight that the relationship between sport and mental health is multidimensional and context-dependent, emerging from the interaction between biological, psychological, and social processes rather than from a single causal pathway. Importantly, the synthesis suggests that sport participation should be conceptualised not as a uniform exposure, but as a context-sensitive system whose effects depend on the interaction between individual, social, and environmental factors.

Discussion

This narrative review provides an integrative synthesis of the relationship between sport participation and mental health

Table 1. Thematic synthesis of mechanisms about sport participation and mental health in adolescents

Domain	Mechanism	Evidence pattern	Inconsistencies	Implications
Neurobiological domain	Neurotransmitter regulation (serotonin, dopamine, endorphins, oxytocin)	Convergent evidence of short-term effects of physical activity on neurochemical regulation	Limited longitudinal and direct neurobiological measurement data	Need for longitudinal and mechanistic studies to confirm causal pathways
Psychological domain	Self-esteem, emotional regulation, anxiety and depression reduction	Strong and consistent association between sport participation and improved psychological well-being	Effects vary according to motivation, perceived competence, and sport type	Promote autonomy-supportive and psychologically safe sport environments
Social domain	Peer interaction, social support, sense of belonging	Consistent evidence for mediating role of social relationships in mental health benefits	Variation depending on quality of social environment and group dynamics	Enhance inclusive, cooperative, and socially supportive sport contexts
Contextual domain	Coaching style, motivational climate, competitive pressure, sedentary behaviour, digital/screen use, sport drop-out risk	Strong evidence that contextual factors moderate both positive and negative outcomes	High heterogeneity across sport settings and digital exposure patterns	Design interventions focused on quality of experience rather than participation alone
Contextual domain (adverse effects)	Performance pressure, burnout, overtraining, anxiety, dropout	Evidence of negative outcomes in high-performance or controlling environments	Highly dependent on competitive level and psychosocial climate	Implement safeguarding strategies in youth sport systems

among adolescents, highlighting the multidimensional and context-dependent nature of this association. This synthesis is structured around a 4-domain model (neurobiological, psychological, social, and contextual), which emerged from the thematic analysis of the included studies. Overall, the findings suggest that sport participation should be conceptualised not as a uniform protective factor, but as a complex and context-sensitive exposure, whose effects emerge from the interaction between biological, psychological, and social mechanisms (Biddle & Asare, 2011; Eime et al., 2013). A key contribution of this review is the conceptual integration of evidence into a multidimensional framework, in which biological, psychological, and social mechanisms interact dynamically rather than operating as independent pathways. This integrative perspective supports the conceptualisation of sport participation as a dynamic and context-sensitive system, rather than a uniform behavioural exposure. Within this system, mental health outcomes emerge from the interaction between neurobiological regulation, psychological processes, and social experiences, moderated by contextual and environmental factors (Lamblin et al., 2017; Schwartz-Mette et al., 2020).

Rather than representing a uniformly protective factor, sport emerges as a context-dependent exposure whose effects vary according to environmental, motivational, and relational conditions. However, the evidence also highlights that these benefits are not automatic or universal but are strongly influenced by contextual and organisational factors. This variability represents one of the central findings of the present review.

The literature analysed indicates that the mental health benefits of sport are mediated by multiple mechanisms. Across studies, three main interacting pathways emerge: 1) neurobiological regulation; 2) psychological processes; and 3) social integration (Biddle & Asare, 2011; Eime et al., 2013; Lamblin et al., 2017). These pathways should be interpreted as interdependent rather than additive.

These findings are consistent with previous systematic reviews indicating a positive association between physical activity and mental health in young populations (Biddle & Asare, 2011; Eime et al., 2013). However, compared to previous reviews, the present study explicitly highlights the interactions between mechanisms and the role of contextual moderators.

At the same time, the literature shows variability in effect size and consistency, suggesting that not all forms of sport are equally beneficial (Eime et al., 2013; Francia et al., 2023). This heterogeneity suggests that the relationship is not linear, but conditional. In particular, the evidence suggests that the same sport participation may produce divergent outcomes depending on the quality of the environment in which it occurs, highlighting the central role of contextual moderators (Eccles & Barber, 1999; Fredericks & Eccles, 2006).

In particular, competitive and performance-oriented environments may attenuate psychological benefits or even contribute to stress-related outcomes. This may be explained by increased external pressure and reduced autonomy, which are known to negatively affect intrinsic motivation.

A key finding of this review is that the relationship between sport and mental health is dependent on the context. Factors such as motivational climate, peer relationships, and perceived pressure significantly influence outcomes. More specifically, contextual variables act as moderators that can either enhance or reverse the expected benefits of sport participation.

Supportive and autonomy-oriented environments tend to enhance psychological benefits, whereas overly competitive or controlling contexts may increase anxiety, burnout, and dropout risk (Eime et al., 2013; Francia et al., 2023). This supports a socio-ecological interpretation, in which individual outcomes are shaped by interactions between personal and environmental factors (WHO, 2021; OECD, 2025).

Socioeconomic and structural factors further influence both access to sport and its potential benefits, reinforcing health inequalities. Although sport is generally associated with positive outcomes, this review also highlights potential adverse effects. These include performance anxiety, overtraining, burnout, and early dropout, particularly among adolescents exposed to highly competitive pressure (Francia et al., 2023; Eime et al., 2013). This distinction is essential for both research interpretation and intervention design.

Therefore, the assumption that sport is inherently beneficial for mental health should be reconsidered, as its effects are contingent upon specific contextual and organisational conditions.

These findings underline the importance of distinguishing between recreational, educational sport and elite, performance-driven sport when evaluating mental health outcomes (Biddle & Asare, 2011; Eime et al., 2013).

Building on this synthesis, sport participation can be conceptualised as a dynamic system of interacting pathways rather than a single behavioural factor. This model contributes to advancing the literature by explaining not only whether sport is beneficial, but under which conditions and through which mechanisms these benefits occur. The findings have implications for the design of sport-based interventions targeting adolescent mental health. Interventions should therefore prioritise quality of experience (e.g., supportive environments, autonomy) over mere participation rates. In particular, school-based programmes represent a key setting for implementing such approaches (WHO, 2021; OECD, 2025).

Overall, this review contributes to advancing the literature by shifting the focus from whether sport is beneficial to how, for whom, and under which conditions it may promote or hinder mental health outcomes (Biddle & Asare, 2011; Eime et al., 2013; Francia et al., 2023). This perspective enables a more nuanced interpretation of existing evidence and supports the development of targeted, context-sensitive interventions.

Limitations

This narrative review has limitations related to its non-systematic approach and the potential for selection bias in the included literature. Additionally, the narrative nature of this review does not allow for quantitative estimation of effect sizes, which should be addressed in future systematic research. Indeed, future research should aim to clarify causal pathways using longitudinal designs and to differentiate more clearly between types of sport, competitive levels, and contextual conditions.

Conclusion

This narrative review highlights that sport participation represents a relevant and multidimensional factor influencing adolescent mental health through biological, psychological, and social mechanisms. However, its effects are not uniform and depend strongly on contextual conditions such as the motivational climate, type of sport, and level of competitiveness.

Overall, sport should not be considered a universally protective factor, but rather a complex intervention that can either enhance or hinder psychological well-being in adolescence.

An active and healthy lifestyle is a key determinant of psychological and physical well-being, particularly when supported by positive social and environmental conditions. Furthermore, when physical activity is undertaken collectively, its beneficial effects on mental health are enhanced by social interaction and peer support.

Maintaining regular physical activity from an early age may contribute to long-term cognitive, emotional, and behavioural benefits across the life course. These findings highlight the need for integrated, context-sensitive approaches to sport promotion that prioritise psychological well-being alongside physical health. Future interventions should focus on creating supportive, inclusive, and non-competitive environments that maximise the positive effects of sport while minimising potential risks such as burnout, anxiety, and dropout.

Reframing sport as a context-dependent system rather than a universally protective factor represents a critical step toward more effective and evidence-informed mental health promotion strategies in adolescence.

Conflicts of Interest

The authors declare no conflicts of interest.

Ethics Statement

Not applicable.

Data Availability Statement

Data are not applicable because no new data were created or analyzed.

Funding

This research received no external funding.

AI Transparency Statement

The authors used AI-assisted tools for some language editing only and take full responsibility for the content.

References

World Health Organization. (2021). *Guidelines on mental health promotive and preventive interventions for adolescents: helping adolescents thrive. Executive summary.* Geneva: World Health Organization; 2021. Licence: CC BY-NC-SA 3.0 IGO. https://www.who.int/publications/i/item/guidelines-on-mental-health-promotive-and-preventive-interventions-for-adolescents

Organisation for Economic Co-operation and Development. (2025). *Mental health promotion and prevention.* https://doi.org/10.1787/88bbe914-en

World Health Organization. (2024). *Mental health atlas 2024. Geneva: World Health Organization; 2025.* Licence: CC BY-NC-SA 3.0 IGO. https://www.who.int/publications/i/item/9789240114487

Gallè, F., Grassi, F., Valeriani, F., Albertini, R., Angelillo, S., Caggiano, G., Bargellini, A., Bianco, A., Bianco, L., Dallolio, L., Della Polla, G., Di Giuseppe, G., Gioffrè, M. E., Laganà, P., Licata, F., Liguori, F., Lo Moro, G., Marchesi, I., Martella, M., Masini, A., … Protano, C. (2025). Sleep quality among Italian university students: The UnSleep multicenter study. *Annali di Igiene, 37*(1), 141–153. https://doi.org/10.7416/ai.2024.2655

CENSIS. (2026). *Rapporto sulla salute mentale*. https://www.censis.it/sanita-il-benessere-del-cervello-e-della-mente-come-dimensione-essenziale-della-salute/

Merikangas, K. R., He, J. P., Burstein, M., Swanson, S. A., Avenevoli, S., Cui, L., Benjet, C., Georgiades, K., & Swendsen, J. (2010). Lifetime prevalence of mental disorders in U.S. adolescents. *Journal of the American Academy of Child & Adolescent Psychiatry, 49*(10), 980–989. https://doi.org/10.1016/j.jaac.2010.05.017

Masi, G., Favilla, L., Millepiedi, S., & Mucci, M. (2000). Somatic symptoms in children and adolescents. *Psychiatry, 63*(2), 140–149. https://doi.org/10.1080/00332747.2000.11024905

Sawyer, S. M., Azzopardi, P. S., Wickremarathne, D., & Patton, G. C. (2018). The age of adolescence. *The Lancet Child & Adolescent Health, 2*(3), 223–228. https://doi.org/ 10.1016/S2352-4642(18)30022-1

Giedd, J. N., Blumenthal, J., Jeffries, N. O., Castellanos, F. X., Liu, H., Zijdenbos, A., Paus, T., Evans, A. C., & Rapoport, J. L. (1999). Brain development during childhood and adolescence. *Nature Neuroscience, 2*(10), 861–863. https://doi.org/10.1038/13158

Andrews, J.L., Ahmed, S.P., & Blakemore, S.J. (2021). Navigating the social environment in adolescence: The role of social brain development. *Biological Psychiatry, 89*(2), 109–118. https://doi.org/10.1016/j.biopsych.2020.09.012

Lamblin, M., Murawski, C., Whittle, S., & Fornito, A. (2017). Social connectedness and the adolescent brain. *Neuroscience & Biobehavioral Reviews,* 80, 57–68. https://doi.org/10.1016/j.neubiorev.2017.05.010

Schwartz-Mette, R. A., Shankman, J., Dueweke, A. R., Borowski, S., & Rose, A. J. (2020). Relations of friendship experiences with depressive symptoms and loneliness in childhood and adolescence: A meta-analytic review. *Psychological bulletin, 146*(8), 664–700. https://doi.org/10.1037/bul0000239

Egger, H.L., Costello, E.J., Angold, A. (2003). School refusal and psychiatric disorders: A community study. *Journal of the American Academy of Child & Adolescent Psychiatry, 42*(7), 797–807. https://doi.org/10.1097/01.CHI.0000046865.56865.79

Finning, K., Ukoumunne, O. C., Ford, T., Danielsson-Waters, E., Shaw, L., Romero De Jager, I., Stentiford, L., & Moore, D. A. (2019). The association between child and adolescent depression and poor attendance at school: A systematic review and meta-analysis. *Journal of Affective Disorders,* 245, 928–938. https://doi.org/10.1016/j.jad.2018.11.055

Ballarin, G., Gallè, F., Dinacci, L., Liberti, F., Liguori, F., Nisco, M. C., Cunti, A., & Valerio, G. (2023). Bullying victimization, real and perceived physical fitness, and self-perception profiles in middle-school students with overweight or obesity. *Nutrients, 15*(24), 5019. https://doi.org/10.3390/nu15245019

World Health Organization. (2020). *WHO guidelines on physical activity and sedentary behaviour. Geneva: World Health Organization; 2020.* Licence: CC BY-NC-SA 3.0 IGO. https://www.who.int/publications/i/item/9789240015128

ISTAT. (2021). *Sport, attività fisica, sedentarietà.* https://www.istat.it/comunicato-stampa/sport-attivita-fisica-sedentarieta/

Janssen, I., & LeBlanc, A.G. (2010). Health benefits of physical activity in youth. *International Journal of Behavioral Nutrition and Physical Activity,* 7, 40. https://doi.org/10.1186/1479-5868-7-40.

Calella, P., Di Dio, M., Pelullo, C. P., Di Giuseppe, G., Liguori, F., Paduano, G., Valerio, G., Liguori, G., & Gallè, F. (2024). Sedentary behaviors and eating habits in active and inactive individuals: A cross-sectional study in a population from Southern Italy. *Behavioral Sciences,* 14, 208. https://doi.org/10.3390/bs14030208

Gruppo di Coordinamento HBSC-Italia. (2022). *Attività fisica e sedentarietà.* https://www.epicentro.iss.it/hbsc/pdf/temi2022/attivita-fisica-2022.pdf

García-Ortiz, C., Lorenzo-González, M., Fernández-Sánchez, J., Solano-Lizcano, V., Del Coso, J., & Collado-Mateo, D. (2025). Recommendations for physical exercise as a strategy to reduce problematic use of the internet and digital devices: a perspective. *International Journal of Environmental Research and Public Health, 22*(5), 753. https://doi.org/10.3390/ijerph22050753

Cantoia, M., Crippa, M. C., Simoncelli, C., & Vagli, M. (Eds.). (2017). *Vivere lo sport: Motivazione e benessere.* New York: PsyPrint – Kindle Direct Publishing. ISBN 9781546536031. https://s949405d67a5e407c.jimcontent.com/download/version/1704297287/module/11169785697/name/Vivere%20lo%20sport.pdf

Biddle, S.J.H., & Asare M. (2011). Physical activity and mental health in children and adolescents: A review of reviews. *British Journal of Sports Medicine, 45*(11), 886–895. https://doi.org/10.1136/bjsports-2011-090185.

Eime, R. M., Young, J. A., Harvey, J. T., Charity, M. J., & Payne, W. R. (2013). A systematic review of the psychological and social benefits of participation in sport for children and adolescents. *International Journal of Behavioral Nutrition and Physical Activity,* 10, 98. https://doi.org/10.1186/1479-5868-10-98

Eccles, J.S., & Barber, B.L. (1999). Student council, volunteering, basketball, or marching band: What kind of extracurricular involvement matters? *Journal of Adolescent Research, 14*(1), 10–43. https://doi.org/10.1177/074355849914100

Fredericks, J.A., & Eccles, J.S. (2006). Is extracurricular participation associated with beneficial outcomes? *Developmental Psychology, 42*(4), 698–713. https://doi.org/10.1037/0012-1649.42.4.698

Francia, N., Borgi, M., Cirulli, F., Collacchi, B., & Calamandrei, G. (2023). Lo sport per la promozione della salute mentale negli adolescenti. *Notiziario Istituto Superiore di Sanità, 36*(7–8), 3–7. PublISS

Valeriani, F., Protano, C., De Giorgi, A., Mazzeo, E., Liguori, G., Romano Spica, V., Vitali, M., & Gallè, F. (2023). Analysing features of home-based physical activity during COVID-19. *Public Health,* 222, 100–114. https://doi.org/10.1016/j.puhe.2023.06.040

Caffo, E., Scandroglio, F., & Asta, L. (2020). Debate: COVID-19 and psychological well-being of children and adolescents in Italy. *Child and Adolescent Mental Health, 25*(3), 167–168. https://doi.org/10.1111/camh.12405

Gallè, F., Sabella, E. A., Ferracuti, S., De Giglio, O., Caggiano, G., Protano, C., Valeriani, F., Parisi, E. A., Valerio, G., Liguori, G., Montagna, M. T., Romano Spica, V., Da Molin, G., Orsi, G. B., & Napoli, C. (2020). Sedentary behaviors and physical activity of Italian undergraduate students during lockdown. *International Journal of Environmental Research and Public Health,* 17, 6171. https://doi.org/10.3390/ijerph17176171

Orgilés, M., Morales, A., Delvecchio, E., Mazzeschi, C., & Espada, J. P. (2020). Immediate psychological effects of COVID-19 quarantine. *Frontiers in Psychology,* 11, 579038. https://doi.org/10.3389/fpsyg.2020.579038

Muzi, S., Sansò, A., & Pace, C. S. (2021). What's happened to Italian adolescents during the COVID-19 Pandemic? A preliminary study on symptoms, problematic social media usage, and attachment: relationships and differences with pre-pandemic peers. *Frontiers in Psychiatry,* 12, 590543. https://doi.org/10.3389/fpsyt.2021.590543

Gallè, F., Sabella, E. A., Bianco, L., Maninchedda, M., Barchielli, B., Liguori, F., Da Molin, G., Liguori, G., Orsi, G. B., Ferracuti, S., & Napoli, C. (2022). How the COVID-19 pandemic has impacted daily life? Assessing the use of web resources for recreational activities in the Italian adult population. *International Journal of Environmental Research and Public Health,* 19, 15136. https://doi.org/10.3390/ijerph192215136

Medda, E., Gigantesco, A., Picardi, A., Carluccio, E., D'Ippolito, C., Ferri, M., Brescianini, S., Toccaceli, V., & Stazi, M.A. (2021). La pandemia da covid-19 in Italia: l'impatto sulla vita e la salute mentale. *Rivista di Psichiatria, 56*(4), 182–188. https://www.rivistadipsichiatria.it/archivio/3654/articoli/36345/

UNICEF. (2021). *The state of the world's children 2021.* https://www.unicef.org/reports/state-worlds-children-2021

Роль спорту у зміцненні психічного здоров'я підлітків

Фабріціо Лігуорі[1ABCD], Кончетта Паола Пелулло[1ABCD]

[1]Університет Неаполя «Партенопе»

Авторський вклад: A – дизайн дослідження; B – збір даних; C – статаналіз; D – підготовка рукопису; E – збір коштів

Реферат. Стаття: 10 с., 1 табл., 35 джерел.

Мета. Підлітковий вік, як критичний перехідний етап життя, характеризується біологічними, психологічними та соціальними змінами, що можуть підвищувати вразливість до психічних розладів. Метою цього огляду є інтегративний аналіз ролі спорту та фізичної активності у зміцненні психічного здоров'я підлітків із особливим акцентом на біологічних, психологічних і соціальних механізмах.

Матеріали та методи. Наративний огляд проведено на основі досліджень, відібраних із провідних наукових баз даних, зокрема PubMed, Scopus і Web of Science. До аналізу включалися статті, присвячені підліткам (віком 10–24 роки), фізичній активності або участі у спортивній діяльності, а також показникам психічного здоров'я. Доказову базу аналізували із застосуванням тематичного підходу для виявлення закономірностей, взаємозв'язків і суперечностей між дослідженнями.

Результати. У результаті огляду визначено чотири основні домени: нейробіологічний, психологічний, соціальний і контекстуальний. Загалом отримані дані свідчать, що фізична активність сприяє психічному здоров'ю підлітків через декілька взаємопов'язаних механізмів, зокрема нейробіологічних (наприклад, регуляція нейромедіаторів, таких як серотонін і дофамін), психологічних (наприклад, підвищення самооцінки) і соціальних (наприклад, взаємодія з однолітками). Водночас вираженість і спрямованість цих ефектів значною мірою залежать від контекстуальних і середовищних чинників.

Висновки. Спорт є багатовимірним чинником зміцнення психічного здоров'я у підлітковому віці. Його вплив слід розглядати в межах інтегрованої моделі, у якій біологічні, психологічні та соціальні механізми динамічно взаємодіють. Участь у спортивній діяльності не є універсально корисною, оскільки може мати як позитивні, так і негативні наслідки залежно від якості середовища та рівня змагальності. Подальші дослідження мають бути спрямовані на уточнення причинно-наслідкових механізмів і контекстуальних модераторів, а також на розроблення контекстно чутливих і механізм-орієнтованих втручань.

Ключові слова: підлітки, психічне здоров'я, спорт, фізична активність, зміцнення здоров'я.

Information about the authors:

Liguori Fabrizio: fabrizio.liguori@collaboratore.uniparthenope.it; https://orcid.org/0009-0008-8170-5032; Department of Medical, Human Movement and Well-being Sciences, University of Naples "Parthenope", Via Medina 40, Naples, 80133, Italy.

Pelullo Concetta Paola: concettapaola.pelullo@uniparthenope.it; https://orcid.org/0000-0003-4228-8703; Department of Medical, Human Movement and Well-being Sciences, University of Naples "Parthenope", Via Medina 40, Naples, 80133, Italy.

Cite this article as: Liguori, F., & Pelullo, C. P. (2026).The Role of Sport in Promoting Mental Health Among Adolescents. *Physical Education Theory and Methodology, 26*(3), 465-474. https://doi.org/10.17309/tmfv.2026.3.07

Received: 01.04.2026. Accepted: 28.04.2026. Published: 30.05.2026