# Exploring the Benefits of Sports and Physical Activity on Mental Health: A Review of the Research

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***Abstract***

Anxiety and depression have become widespread concerns among adolescents, with an increasing number of teens identifying mental health struggles as a significant issue among their peers. One of the most widely discussed treatments for mental health is physical activity, including organized sports and general exercise. While many studies confirm the overall benefits of sports, this paper seeks to identify which types of sports—or which combination of factors related to sports—produce the most significant positive impacts on mental health specifically. From the research reviewed, it was found that resistance training, aerobic exercise, team sports, individual sports, and competitive and leisure participation offer distinct benefits, no singular factor emerges as definitively superior. Instead, the key takeaway is that engagement in any form of physical activity benefits mental well-being. Individuals should focus on selecting a sport or exercise regimen that aligns with their preferences and lifestyle rather than searching for an objectively "best" option. Future research should delve deeper into sports participation's benefits and potential drawbacks. While much attention has been given to the positive aspects, there is a need to investigate the negative consequences, such as chronic stress, injury risks, and conditions like chronic traumatic encephalopathy (CTE) in contact sports, which require early detection and targeted interventions.

*Keywords: Sports, Adolescent Mental Health, Aerobic vs. Anaerobic, Leisure vs. Competitive, Individual vs. Team*

# Exploring the Benefits of Sports and Physical Activity on Mental Health: A Review of the Research

## *Introduction*

Anxiety and depression have become widespread concerns among adolescents, with an increasing number of teens identifying mental health struggles as a significant issue among their peers. According to a 2019 Pew Research Center survey, 70% of U.S. teens say anxiety and depression are significant problems in their community, surpassing concerns about bullying, drug addiction, and poverty (Horowitz & Graf, 2019). Another Pew report highlights a troubling rise in depressive symptoms, particularly among teenage girls, with rates of persistent sadness and hopelessness reaching record highs (Geiger & Davis, 2019). As these mental health challenges grow, researchers and policymakers continue to explore interventions that can improve psychological well-being.

One of the most widely discussed treatments for mental health is physical activity, including organized sports and general exercise. Participation in sports is associated with various physical benefits, including improved cardiovascular health, increased muscle strength, and enhanced coordination (Warburton & Bredin, 2017). Sports engagement has also been linked to cognitive benefits such as improved executive function, memory, and academic performance (Pesce et al., 2016), demonstrating the broad advantages of an active lifestyle. Furthermore, research highlights the social benefits of sports participation, as it fosters discipline, resilience, and teamwork skills (Eime et al., 2013). While many studies confirm the overall benefits of sports, this paper seeks to identify which types of sports—or which combination of factors related to sports—produce the most significant positive impacts on mental health specifically. In particular, the paper will examine resistance versus aerobic exercise, team versus individual sports, and competitive versus leisure participation to determine the most effective approach for improving and maintaining positive mental health among teenagers.

Although the term “sport” will be used throughout this paper, it refers broadly to any form of physical activity, even those not traditionally considered sports, such as jogging or hiking. By analyzing different types of movement and their psychological effects, this study aims to better understand how physical activity can be optimized as a mental health intervention.

## *Resistance vs. Aerobic Training*

Resistance and aerobic training represent two fundamental forms of physical exercise, each with distinct physiological and psychological impacts. Resistance training, also known as strength or weight training, involves exercises designed to enhance muscular strength, endurance, and hypertrophy by working against an external force. This external force may be free weights, resistance bands, machines, or even body weight, depending on the individual’s goals and available resources. Resistance training typically engages anaerobic energy pathways, as the intensity is high and the duration of each set is relatively short, usually ranging from 6 to 12 repetitions per set (Kraemer and Ratamess, 2004). Examples of resistance training exercises include deadlifts, squats, bench presses, and pull-ups, all of which target different muscle groups.

On the other hand, aerobic training, commonly referred to as cardiovascular or endurance training, emphasizes continuous, rhythmic physical activity that increases heart rate

and promotes cardiovascular and pulmonary endurance. Unlike resistance training, aerobic exercise primarily utilizes the aerobic energy system, which depends on oxygen to generate ATP, the body's primary energy currency. This type of exercise typically involves lower intensity over a prolonged period, making it more accessible to a wide range of individuals, from beginners to elite athletes (McArdle, Katch, and Katch, 2010). Typical forms of aerobic exercise include jogging, cycling, swimming, and brisk walking. Both forms of exercise are crucial for overall health, but their unique physiological mechanisms lead to differing effects on stress and mental health outcomes.

***Aerobic training***

Aerobic training has been extensively studied for its beneficial effects on stress management and overall mental health. One of the primary mechanisms through which aerobic exercise alleviates stress is modulating the hypothalamic pituitary adrenal (HPA) axis, the body's central stress response system. Regular aerobic activity reduces the reactivity of the HPA axis, leading to lower cortisol levels, a hormone that is elevated during periods of acute and chronic stress. Lower cortisol levels are associated with improved emotional regulation, reduced anxiety, and a more balanced mood. In addition to hormonal regulation, aerobic training stimulates the release of endorphins, serotonin, and dopamine, neurotransmitters that enhance mood and promote well-being (Anderson & Shivakumar, 2013). These changes often lead to what is referred to as the "runner's high," a state of euphoria and reduced perception of pain experienced during prolonged aerobic exercise. Furthermore, aerobic exercise improves cardiovascular function, indirectly reducing stress by enhancing physical fitness and reducing the risk of stress-related illnesses such as obesity and heart disease.

Despite the clear benefits of aerobic exercise, there are limitations to aerobic training. One drawback is the time and consistency required to experience significant stress-reducing benefits. Herring et al. (2012) suggest that interventions of at least 8 weeks resulted in the most considerable reduction while shorter interventions of less than 4 weeks were less effective in lasting changes. Some individuals may also find aerobic activities monotonous, leading to lower adherence and diminished psychological benefits, particularly if they lack variety in their exercise routines.

***Resistance training***

One of the key benefits of resistance training in stress management is its ability to reduce cortisol levels post-exercise (West and Phillips, 2012). Resistance training often results in a net decrease in cortisol over time, mainly when performed at moderate intensity and with adequate rest periods. Similar to aerobic exercise, in addition to its physiological effects, resistance training enhances psychological factors such as self-efficacy, self-esteem, and body image, which are closely linked to stress and anxiety reduction. Achieving incremental strength gains, mastering new exercises, and observing visible changes in body composition can foster a sense of accomplishment and control. The structured nature of resistance training programs also provides a sense of routine and predictability, which can be calming for individuals experiencing chronic stress.

However, resistance training also has potential drawbacks. High-intensity resistance exercises may initially elevate cortisol levels, especially in individuals new to training or those who overtrain without adequate recovery (Kraemer et al., 1999). This can lead to increased stress if not properly managed. Furthermore, some individuals may perceive resistance training

as intimidating or physically demanding, particularly if they lack experience or access to proper guidance. This can reduce adherence and limit the psychological benefits.

***Summary***

Both resistance training and aerobic exercise provide distinct psychological benefits while presenting potential challenges. Given that each form of exercise has limitations, there is no universally superior option; instead, individuals must determine which approach best aligns with their preferences and experience levels. For instance, some may find the repetitive nature of aerobic exercise preferable. In contrast, others may benefit more from resistance training, provided they have the necessary experience to avoid injury and overtraining. However, a study by Marinelli et al. (2023) found that the most significant reductions in depression and anxiety were observed when both aerobic and resistance training were combined. This suggests that framing the discussion as a direct comparison between the two may be oversimplified, as a balanced combination of both exercise types may yield the most significant mental health benefits. Instead, physically active students, regardless of their sport, tend to experience higher levels of positive affect than inactive students (Wunsch et al., 2017). Additionally, exercise has been found to alleviate symptoms of anxiety, depression, and stress (Mikkelsen et al., 2017), further supporting the mental health benefits of physical activity in general.

***Team Sports vs. Individual Sports***

In addition to the distinction between aerobic and anaerobic sports, another key difference often found is whether the sport is team-based or individual. This section will explore the differences between team and individual sports, examining how each impacts physical and mental well-being. Both types of sports offer numerous benefits, primarily due to their inherent nature as physical activities.

While some may assume there are significant differences between team and individual sports in terms of psychological benefits, research suggests otherwise. Johnston et al. (2019) found that both sports significantly reduce depression scores and show minimal differences in sleep quality, indicating no clear advantage of one over the other. However, understanding the nuanced differences between these two categories can help individuals select the type of sport that best aligns with their personal preferences and goals.

***Team sports***

Although exercise offers various benefits to participants, team sports provide unique advantages beyond physical fitness. In team sports, athletes collaborate with teammates toward a common goal (e.g., basketball, soccer, volleyball). In contrast, individual sports place greater emphasis on personal performance, even if there is a team component (e.g., track, swimming, gymnastics). The benefits of team sports go beyond the immediate activity and touch on important social and psychological factors. Engaging in a team sport requires athletes to develop strong social and communication skills, as they must work together with others to achieve success. This interaction helps participants build connections and foster a sense of community, which is less emphasized in individual sports. Camaraderie formed in team sports is also a key factor in fostering intrinsic motivation, as athletes feel a stronger sense of relatedness and group cohesion compared to those in individual sports. The need for social support is a theme explored by Abraham Maslow back in 1943 when Maslow created the “Hierarchy of

Needs" (McLeod, 2007). In this theory, Maslow showed how after fulfilling the most necessary aspects of life (food, water, shelter, etc.), many people require a social connection to feel fulfilled in life (McLeod, 2007). These social bonds are met in sports, allowing participants in team sports to feel a greater sense of happiness. Rees and Hardy (2000) highlight that the social support provided by teammates can mitigate stress and enhance emotional well-being, with athletes relying on each other to navigate challenges both on and off the field.

Beyond social support, recent research has provided neuroscientific evidence on how team sports enhance social connections at the brain level. A study by Deng et al. (2024) using hyperscanning EEG technology found that engaging in synchronized physical activities, such as tandem rope skipping, significantly increases inter-brain synchrony (IBS), a measure of neural synchronization between individuals. This effect was powerful in socially avoidant individuals, indicating that team sports may improve social cognitive abilities, foster emotional understanding, and enhance interpersonal communication (Deng et al., 2024). This suggests that team sports may provide social benefits in practice and actively rewire the brain to improve cooperation and social bonding.

Furthermore, being part of a team often enhances motivation and engagement. Teammates are aware of each other's strengths and weaknesses and hold each other accountable for performance, which can encourage continuous improvement. The competitive environment within team sports helps athletes stay motivated and push beyond their limits, knowing they are part of a group that relies on their contribution. More recent studies, such as Ji et al. (2020), highlight that while both team and individual sports are beneficial, team sports appear to offer more significant improvements in anxiety levels, with only minor differences in sleep quality. Another physiological mechanism that may explain the benefits of team sports is the endorphin boost associated with synchronized movement. Cohen et al. (2010) conducted a study on rowers. They found that those who engaged in synchronized rowing as a team experienced a greater endorphin release and increased pain tolerance compared to those who rowed individually. The study suggests that the shared physical effort and synchronization in movement may heighten opioid activity, contributing to an increased sense of euphoria and social bonding. This aligns with the broader idea that group activities—such as music-making, dancing, and laughter—stimulate the release of endogenous opioids, reinforcing the positive effects of social interactions (Cohen et al., 2010). These findings further support the notion that team sports foster social bonds and trigger physiological responses that enhance well-being and cohesion.

While team sports offer many benefits, they also come with certain challenges that may not be as prominent in individual sports. One of the primary drawbacks is the reliance on others for success. In a team setting, the performance of the entire group is dependent on each individual player's contribution, which can sometimes lead to frustration or tension when certain teammates do not meet expectations. Poor team cohesion, or the lack of alignment among players, can result in conflicts and decreased team effectiveness. This issue of team dynamics can be particularly stressful for athletes who feel their performance or efforts are hindered by others. Furthermore, in team sports, the pressure to conform to group norms or meet the expectations of teammates and coaches can sometimes lead to heightened anxiety, particularly for athletes who struggle with social interactions or performance anxiety. Some athletes in team sports experience increased stress due to interpersonal conflicts and the social pressures inherent in being part of a group.

Another potential con is the uneven distribution of playing time and recognition. In individual sports, an athlete's success or failure is largely self-determined, but in team sports, athletes who contribute less to the team's success may feel overlooked or undervalued. Athletes who do not receive equal play opportunities or perceive unfair treatment may experience lower self-esteem and motivation. Additionally, while synchronized movement in team sports can positively affect inter-brain synchrony and social bonding, not all athletes may experience these benefits equally. Deng et al. (2024) found that socially avoidant individuals showed increased inter-brain synchrony during successful cooperation but did not experience the same neural connectivity boost during failure feedback. This suggests that team sports may provide more incredible benefits for social confidence when an athlete performs well. Still, negative experiences, such as losing or being criticized by teammates, may reduce those positive effects (Deng et al., 2024).

***Individual Sports***

While team sports offer numerous benefits, individual sports also present distinct advantages that appeal to athletes seeking a different kind of experience. One of the primary benefits of individual sports lies in developing self-discipline and personal accountability. In individual sports such as tennis, gymnastics, or swimming, athletes are solely responsible for their performance. This level of responsibility requires athletes to be highly self-motivated, fostering a strong sense of discipline that often extends beyond the sport. The emphasis on personal improvement and self-reliance can help athletes build mental fortitude and resilience as they learn to set and achieve their own goals without relying on teammates. Research indicates that individual sports foster a greater personal accountability than team sports, as athletes must take sole responsibility for their performance outcomes. This responsibility can enhance self-discipline and intrinsic motivation (Šagát et al., 2021).

Additionally, a study by Wagnsson et al. (2014) found that young athletes in individual sports reported higher levels of self-determined motivation than those in team sports, suggesting that individual sports cultivate a greater sense of autonomy and personal mastery. Individual sports also allow athletes to compete at their own pace, providing a tailored environment for personal growth. For instance, sports like golf or track and field enable participants to focus on beating their records rather than solely competing against others. This emphasis on self-improvement can lead to higher intrinsic motivation as athletes experience satisfaction from their progress and achievements. Additionally, individual sports encourage a high degree of self-reflection and mental toughness, as athletes must analyze their performance and identify areas for improvement independently (Crust & Clough, 2005).

While individual sports often involve solitary competition, many occur in a team-like setting. For example, track and field or swimming teams still train together, allowing athletes to experience some social benefits in team sports, such as camaraderie and peer support (Evans et al., 2017). However, these settings often lack the same level of close-knit community found in traditional team sports, as the primary focus remains on individual performance. The sense of belonging and social cohesion may be less pronounced, impacting the athlete’s experience of social support and stress relief (Pluhar et al., 2019). Despite the benefits, individual sports also present unique challenges. One significant drawback is increased pressure on athletes to perform well without external support during competition. In team sports, athletes can rely on teammates for encouragement and support, but in individual sports, the burden of success or failure rests solely on the athlete's shoulders. This can lead to heightened levels of cognitive

anxiety, particularly in high-stakes or pre-competition scenarios. The absence of external validation and support can also exacerbate stress. According to the cognitive appraisal theory proposed by Lazarus and Folkman (1984), individual athletes are more likely to perceive stressful events as threats rather than challenges, potentially triggering a stronger physiological stress response, such as increased heart rate and cortisol levels.

***Leisure vs. Competitive Sports***

Although many people see sports as a strictly competitive field, the landscape of sports participation includes both leisure and competitive engagement. Leisure sports are physical activities performed primarily for enjoyment, relaxation, or personal well-being, with minimal pressure to win or outperform others. Examples include hiking, swimming for fun, or playing a casual game of basketball. In contrast, competitive sports are structured around formal rules, rankings, and performance outcomes, often requiring regular training, competition, and goal-oriented improvement. Understanding the differences between these two types is essential because they tend to produce different psychological outcomes. Leisure sports are often associated with lower stress and greater long-term enjoyment, while competitive sports may introduce more stress but also foster resilience, discipline, and higher physical performance. Exploring these contrasts offers insight into how athletes and casual participants might select the most suitable physical activity for maintaining mental health.

***Leisure Sports***

With respect to leisure sports, studies have examined different physical activities. For instance, a study has shown that significant positive physiological changes were observed in leisure swimmers that were not in competitive swimmers (Szabo et. al, 2018). The self-directed and flexible nature of leisure swimming contributed to the improvements in positive affect, mental and physical well-being, and general satisfaction. This allowed participants to gain the benefits of the exercise without the increased stress, making them more likely to continue it longer. This issue of stress seems to be one of the significant setbacks of competitive sports, as a 2007 study by Goodger et. al. has shown. This demonstrates that the increased stress brought upon athletes could lead to more chronic stress, causing burnout among athletes and stopping them from continuing the sport. These setbacks would not only prevent people from gaining the positive aspects of the sport and general exercise but may lead to even more significant harm in causing former athletes to develop chronic stress and stop the sport altogether.

***Competitive sports***

Although competitive sports may have the negative weight of causing more stress in athletes, this may, in a way, turn out to be a positive. When faced with constant sources of minor stress, athletes develop specific coping mechanisms to shield themselves from the stress (Nicholls & Polman, 2007). Although not directly stated in the study, these coping mechanisms may lead to a higher level of stress management outside of the sport as the development of general coping to external stress factors. This would lead to an overall decrease in the effect of stress on athletes as they learn to handle it through times of stress. On top of that, the competitive nature may lead athletes to push themselves harder while exercising, leading to more physical benefits that many leisure activities may not provide. By being in a competitive

field, athletes would be incentivized to work harder and push their physical boundaries, leading to higher physical well-being.

***Summary***

The fundamental difference in stress management between leisure and competitive sports lies in their psychological frameworks. Leisure sports act as a direct stress reduction tool, promoting mental wellness through enjoyable, low-pressure engagement, while competitive sports demand psychological fortitude and transform stress into a performance catalyst. Ultimately, leisure and competitive sports offer valuable pathways to stress management, each with distinctive psychological benefits and challenges. The key to optimal mental health is recognizing individual preferences, psychological resilience, and the capacity to transform physical activity into a meaningful stress reduction strategy. Future research should continue exploring these intricate relationships, providing more nuanced insights into how different sporting contexts contribute to holistic mental well-being.

***Conclusion***

The findings from this review highlight the complex and multifaceted relationship between physical activity and mental health. While resistance training, aerobic exercise, team sports, individual sports, and competitive and leisure participation offer distinct benefits, no singular factor emerges as definitively superior. Instead, the key takeaway is that engagement in any form of physical activity benefits mental well-being. Individuals should focus on selecting a sport or exercise regimen that aligns with their preferences and lifestyle rather than searching for an objectively "best" option. For those who have not yet incorporated physical activity into their routines, the most crucial step is simply to begin, choosing an enjoyable and sustainable activity. Encouraging participation in any form of exercise can be an accessible and effective intervention for mental health.

Despite the compelling evidence supporting the mental health benefits of physical activity, several limitations exist within the reviewed research. One major challenge is the heterogeneity of methodologies and participant groups across studies. Variability in study design, sample populations, and research questions makes it difficult to draw direct comparisons or establish universal conclusions. For instance, some studies examined elite athletes, while others focused on general populations, psychiatric patients, or individuals engaged in fitness activities, leading to health disparities. Additionally, studies often blended elements such as competitive versus leisure sports or aerobic versus anaerobic exercise, requiring extrapolation to isolate specific factors. Furthermore, research on younger populations, particularly adolescents and children, remains limited, highlighting an essential gap in understanding how early-life sports engagement influences long-term mental health.

Future research should delve deeper into sports participation's benefits and potential drawbacks. While much attention has been given to the positive aspects, there is a need to investigate the negative consequences, such as chronic stress, injury risks, and conditions like chronic traumatic encephalopathy (CTE) in contact sports, which require early detection and targeted interventions. Often as participants begin to put more emphasis on their selected sports, the desire to improve may lead to injuries and stress when their desired outcome is not achieved. Additionally, elite athletes may experience heightened stress levels and face unique challenges upon retirement, warranting further exploration. Another crucial direction is to

distinguish the effects of physical activity on athletes versus non-athletes. Understanding whether individuals with no prior athletic background derive the same mental health benefits as those accustomed to structured sports participation could provide valuable insights for future interventions. By addressing these gaps, future research can refine recommendations for optimizing sports and physical activity as a mental health tool for diverse populations.

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