

THE INFLUENCE OF WATCHING SPORTS ON THE BRAIN

Zuhur Mansurov

a first-year Master's student at Gulistan State Pedagogical Institute

Anotation: This article examines the neurological foundations of both athletic performance and spectators' fascination with sports. It explains how the premotor cortex stores and refines movement patterns, enabling athletes to perform complex skills automatically through practice. The article also discusses mirror neurons, which allow people to internally simulate the actions of others, helping spectators feel emotionally connected to athletes. Additionally, it highlights the role of the anterior cingulate cortex in detecting errors and improving performance under pressure. Overall, the article argues that our enjoyment of sports is deeply rooted in brain mechanisms that connect us to movement, competition, and human achievement.

Key words: Olympic Games, neuroscience, premotor cortex, mirror neurons, neural pathways, athletic performance.

The history of organized sport stretches back thousands of years. Around the time when the legendary poet Homer composed his famous works, the ancient Greeks established a sporting festival in which men competed in a footrace of approximately 200 metres. The winner did not receive money or material wealth; instead, he was honoured with a simple olive wreath that symbolized excellence and achievement. Over the centuries, this modest competition evolved into what we now know as the Olympic Games, one of the most celebrated international events in the world. Today, the Olympics represent far more than athletic contests. They symbolize determination, human potential, and the desire to push beyond physical and mental limits. Their enduring popularity raises an interesting question: why are millions of people so fascinated by watching sports? Are spectators attracted by the uncertainty of competition, the elegance of athletic movement, or is there a deeper neurological explanation hidden within the human brain? A possible answer emerged from an important scientific discovery made in 1996. Three Italian neuroscientists—Giacomo Rizzolatti, Leonardo Fogassi, and Vittorio Gallese—conducted a series of experiments on the premotor cortex of monkeys. During their research, they identified a remarkable group of brain cells involved in planning and controlling movement. These neural networks function almost like a language system for physical actions, storing and organizing complex movement patterns that can be refined through practice and repetition. In a sense, they provide the brain with a vocabulary and grammar of movement, enabling people to perform actions efficiently and accurately. The game of golf offers a useful example of this process. To casual viewers watching professional tournaments on television, a golfer's swing may appear smooth, natural, and effortless. However, beginners quickly discover that controlling a golf club and producing a consistent swing is far more difficult than it seems. Novice players must consciously think about every stage of the movement: their grip, posture, balance, timing, and follow-through. As a result, their performance often feels awkward and requires significant mental effort. Experienced golfers, on the other hand, operate very differently. Years of dedicated training allow the required movements to become deeply embedded within the neural circuits of the premotor cortex. Rather than consciously directing every action, experts rely on highly developed motor programs that guide their movements automatically. Their swings are executed with remarkable precision and balance, almost as if an internal autopilot has taken control. Because these actions have been practiced thousands

of times, they require very little conscious attention. This contrast between beginners and experts highlights an important fact about the human brain: long-term practice does not merely improve skill—it can actually reshape neural pathways, making complex actions more efficient, natural, and automatic over time.

The specialized neurons located within the premotor cortex do more than explain why elite athletes are capable of performing extraordinary physical feats. They also possess a remarkable property that led scientists Giacomo Rizzolatti, Leonardo Fogassi, and Vittorio Gallese to give them the name "mirror neurons." These neurons attracted significant attention because of their unique ability to respond not only when an individual performs an action, but also when that same individual observes someone else carrying out a similar action. Research has shown that mirror neurons become active when a primate engages in a purposeful movement, such as reaching for, grasping, or manipulating an object. Surprisingly, these neurons can also fire when the primate simply watches another individual perform the same task. This discovery suggested that the brain is capable of internally simulating the actions of others, allowing an observer to understand and interpret behaviour without directly participating in it. Humans possess an even more sophisticated neural system. Our brains constantly create internal representations of the external world, enabling us to recognize intentions, predict actions, and empathize with the experiences of other people. Through this mechanism, we are able to learn by observation and develop a deeper understanding of human behaviour. When we watch an athlete compete, for example, our brains may partially recreate aspects of the movement we are observing, helping us feel connected to the performance even though we remain physically inactive. However, scientists emphasize that mirror neurons do not respond to every visual stimulus. Their activation depends on what researchers call goal-directed actions. In other words, the observed movement must involve a clear purpose or intention. If we look at a still photograph of a runner frozen in motion, the mirror-neuron system remains largely inactive because no actual action is taking place. The image provides information about appearance, but not about movement itself. The situation changes dramatically when the runner begins to move. Whether the athlete is jogging, accelerating, or sprinting toward the finish line, the dynamic action immediately captures the brain's attention and activates the mirror-neuron network. This response demonstrates that the human brain is particularly sensitive to movement and purposeful behaviour. Ultimately, it is motion rather than stillness that communicates most effectively with our neural systems, helping explain why watching live sports can be such a powerful and engaging experience.

This mirror-neuron system plays a crucial role in shaping our experience as spectators. It helps explain why watching sports can feel so engaging and emotionally powerful, even though we are not physically involved in the action. When we observe an athlete performing an extraordinary skill, such as an acrobatic bicycle kick in football or a perfectly timed slam dunk in basketball, our brains do more than simply process what we see. The mirror-neuron network becomes activated, allowing us to internally recreate aspects of the movement within our own minds.

As a result, spectators often feel a strong psychological connection with athletes. Although we remain seated in a stadium or in front of a television screen, our brains partially simulate the actions being performed. This creates the impression that we are somehow sharing in the athlete's experience. The boundary between observer and performer becomes less distinct, making sporting events far more immersive than ordinary visual experiences. The effects of this neural process extend beyond simple observation. When mirror neurons are activated, they can influence the release of important neurotransmitters, including dopamine and endorphins. These chemicals are closely linked to feelings of pleasure,

satisfaction, motivation, and reward. Consequently, when an athlete achieves success, scores a decisive goal, or breaks a record, spectators may experience genuine excitement and happiness. The emotional response is not merely symbolic; it is supported by measurable biological processes occurring within the brain. On the other hand, sports can also generate negative emotions. When a favourite team loses a crucial match or an athlete makes a costly mistake, spectators often experience disappointment, tension, or anxiety. In some cases, these emotions can feel surprisingly intense because the brain has become emotionally invested in the outcome. Through the mirror-neuron system, viewers indirectly share both the victories and the setbacks of the athletes they support.

This ability to internally mirror the experiences of others helps explain why sports evoke such powerful emotional reactions around the world. The excitement, suspense, joy, and heartbreak associated with competition are not simply cultural phenomena; they are deeply connected to the way the human brain processes movement and social experience. Neural mirroring therefore provides an important biological foundation for the emotional highs and lows that millions of people experience whenever they watch sporting events.

The influence of the brain on athletic performance extends far beyond the premotor cortex and the mirror-neuron system. Another important region, known as the anterior cingulate cortex, plays a critical role in helping athletes perform effectively, particularly in demanding and high-pressure situations. Neuroscientists have identified this area as being heavily involved in monitoring performance, detecting mistakes, and making rapid corrections when necessary. During a competitive sporting event, athletes are constantly required to make quick decisions and execute precise movements. The anterior cingulate cortex functions as an internal monitoring system, continuously comparing the action an athlete intends to perform with the action that actually occurs. Whenever a mismatch is detected, the brain immediately recognizes the error and attempts to correct it. For instance, if a tennis player miscalculates the speed or direction of an incoming ball and mistimes a volley, this region of the brain rapidly identifies the mistake and helps adjust future movements to improve accuracy. This process occurs remarkably quickly, often without the athlete being consciously aware of it. The anterior cingulate cortex acts as a quality-control mechanism, ensuring that performance remains as accurate and efficient as possible. By constantly evaluating outcomes and learning from errors, it helps athletes adapt to changing circumstances and maintain a high level of performance throughout a competition. Importantly, this brain region works together with the mirror-neuron system rather than functioning independently. While mirror neurons assist in the smooth and automatic execution of skills that have been practiced repeatedly, the anterior cingulate cortex focuses on identifying weaknesses and making adjustments whenever something goes wrong. Together, these systems create a balance between automatic performance and ongoing improvement. As a result, athletes are able not only to perform complex movements effortlessly but also to refine their technique in real time, even under intense psychological pressure. Ultimately, the brain's remarkable ability to observe, imitate, evaluate, and improve movement is not relevant only to elite athletes. In many ways, it also explains why sport holds such a powerful attraction for people across different cultures and generations. The popularity of sport cannot be attributed solely to competition or entertainment; it is deeply connected to the way the human brain processes movement and human achievement.

When we watch athletes pushing themselves to extraordinary limits, we are witnessing far more than physical performance. Their actions activate sophisticated neural systems within our own brains, allowing us to engage with the experience on a deeper level. Through mechanisms such as mirror neurons, we are able to mentally participate in the movement,

effort, and determination displayed before us. This creates a sense of involvement that transforms us from passive observers into active psychological participants. Furthermore, the brain integrates what we see with our own stored motor experiences, enabling us to appreciate the skill, precision, and dedication required to perform at the highest level. Watching a sporting event therefore becomes more than a visual experience; it becomes an emotional and neurological one. We celebrate victories, feel tension during critical moments, and empathize with athletes who overcome obstacles in pursuit of success. For this reason, sport has maintained its appeal for thousands of years. From the simple footraces held in ancient Greece to the global spectacles of modern Olympic competition, people have remained captivated by athletic achievement. The reason lies not only in the athletes themselves but also in the extraordinary capabilities of the human brain. We do not merely watch movement unfold before our eyes—we internally experience it. Through this process, we connect with universal human qualities such as perseverance, ambition, excellence, and the desire to surpass limitations. It is this profound connection that continues to make sport one of humanity's most inspiring and enduring pursuits.