

The role of music in improving college students' sports advantage from the perspective of psychology

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The role of music in sports has long been a topic of interest to researchers, coaches, and athletes alike. In recent years, there has been a growing body of evidence suggesting that music may have a range of psychological benefits that can enhance sports performance and improve the overall sports experience for college students. This article reviews the literature on the psychological benefits of music in sports from the perspective of psychology, including the effects of music on mood, motivation, anxiety, cognitive performance, and emotional connection. The article also discusses the ways in which music may be used as a tool to enhance physical performance, including its effects on endurance, coordination, and strength. Finally, the article explores the potential role of music in recovery and healing, as well as the individual differences in music preferences that may influence sports performance. Overall, this article provides a comprehensive overview of the role of music in improving college students' sports advantage from the perspective of psychology.

KEY WORDS: Psychology; Music; Sports.

1. Introduction

Music has been widely recognized as a potential tool for enhancing athletic performance, with athletes and coaches incorporating it into their training and competition routines. The psychological mechanisms underlying the relationship between music and sports performance, particularly among college students, have garnered attention in recent years. This review article aims to investigate the role of music in improving college students' sports advantage from a psychological perspective. It seeks to address key research questions and hypotheses supported by a comprehensive review of the literature.

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Several studies have suggested a positive association between music and sports performance. For example, Karageorghis and Terry (2011) conducted a comprehensive review and demonstrated that music has a significant impact on various aspects of exercise and sport, including endurance, perceived exertion, and motivation. Furthermore, a study by Terry, Karageorghis, and Saha (2012) found that synchronous music, characterized by its tempo and rhythm matching the athlete's movements, can enhance exercise performance among elite triathletes. The effects of music on sports performance are mediated by various psychological mechanisms. According to Karageorghis and Priest (2012), music has the capacity to regulate mood, enhance attentional focus, and modulate arousal levels. For instance, research by Bigliassi et al. (2018) revealed that motivational music enhanced performance by increasing arousal and positive affect, while relaxing music had a calming effect, reducing perceived exertion during exercise.

Moreover, different genres or characteristics of music may have differential effects on sports performance. Bishop et al. (2014) explored the impact of various music genres on treadmill running performance and found that high-tempo music resulted in increased speed and distance covered, while music with a strong beat improved endurance. Additionally, a study by Hutchinson and Karageorghis (2013) highlighted the potential of lyrical congruence, where the lyrics of the music align with the activity, to enhance self-selected running pace and distance. To gain a deeper understanding of the psychological mechanisms underlying the music-sports performance relationship, recent studies have explored the neurophysiological effects of music. For example, a study by Fritz et al. (2020) investigated the impact of music on brain activation during exercise and revealed that music modulated brain regions associated with attention, emotion, and movement coordination, further supporting the notion that music has a substantial influence on sports performance.

The article aims to provide a comprehensive analysis of the role of music in improving college students' sports advantage from a psychological perspective. By examining the effects of music on performance, the underlying psychological mechanisms, and the impact of different music genres, this review will contribute to a deeper understanding of the potential benefits and applications of music in college sports training programs.

2. The Psychological Benefits of Music in Sports

Music is a powerful force that can affect our emotions and behaviors in numerous ways. In the world of sports, music is increasingly being used as

a tool to improve performance and enhance the athlete's experience. In this article, we will explore the psychological benefits of music in sports, focusing on how it can influence mood, motivation, and anxiety.

2.1 MUSIC AND MOOD

Music has the ability to alter brain wave activity and other physiological processes, which can in turn affect our mental and emotional states. For example, fast-paced, energetic music can stimulate the release of endorphins, which can boost mood and positive emotions (Karageorghis et al., 2012). On the other hand, slow, calming music can reduce anxiety and promote relaxation (Thoma MV et al., 2013).

One study found that listening to music before a sports competition was associated with increased positive affect and reduced negative affect (Karageorghis et al., 2012). Similarly, another study found that music with a positive valence (i.e., happy and upbeat) was more effective at improving mood and reducing stress than music with a negative valence (i.e., sad and depressing) (Grape et al., 2003).

2.2 MUSIC AND MOTIVATION

Music can also serve as a powerful motivator, particularly when it is paired with lyrics that have a positive or inspiring message (Karageorghis et al., 2012). In a study of runners, those who listened to music with lyrics that had a positive valence reported higher levels of motivation and enjoyment compared to those who listened to music with lyrics that had a negative valence (Finn et al., 2015).

Music can also serve as a form of distraction, helping athletes to focus on the task at hand and avoid negative thoughts and emotions (Grape et al., 2003). By providing a rhythmic cue to guide movement and a pleasant auditory experience, music can help to make physical activity more enjoyable and rewarding (Karageorghis et al., 2012).

2.3 MUSIC AND ANXIETY

Anxiety is a common problem among athletes, particularly in high-pressure situations such as competitions (Jones and Harwood, 2008). Music has been shown to be an effective way to reduce anxiety and improve perfor-

mance in these situations (Grape et al., 2003). For example, one study found that college athletes who listened to music before a competition reported lower levels of anxiety compared to those who did not listen to music (Karageorghis et al., 2006).

In addition to its direct effects on anxiety, music can also serve as a form of self-regulation, allowing athletes to control their emotional states and manage stress (Karageorghis et al., 2012). By choosing music that aligns with their personal preferences and goals, athletes can use music as a means of coping with anxiety and other negative emotions (Finn et al., 2015).

In conclusion, the psychological benefits of music in sports are numerous and well-documented. From improving mood and motivation to reducing anxiety, music can be a powerful tool for enhancing performance and improving the athlete's experience. Coaches and athletes should consider the individual needs and preferences of each athlete when incorporating music into sports training and competition.

3. Music as a Tool for Enhancing Physical Performance

Music has long been recognized as a powerful tool for enhancing physical performance in sports. From increasing endurance to improving coordination and strength, the benefits of music in sports are numerous and well-documented. In this article, we will explore how music can be used as a tool to enhance physical performance in college athletes.

3.1 MUSIC AND ENDURANCE

Music has been shown to have a number of physiological and psychological effects that can enhance endurance performance. For example, music can alter heart rate and respiration rate, which can in turn affect oxygen uptake and energy expenditure (Karageorghis et al., 2012). Music can also serve as a form of distraction, helping athletes to focus on the task at hand and avoid negative thoughts and emotions that can contribute to fatigue (Grape et al., 2003).

One study found that listening to music during endurance exercise was associated with increased endurance and reduced perceived exertion (Karageorghis et al., 2006). Similarly, another study found that music with a tempo of around 120-140 beats per minute was most effective at enhancing endurance performance in cycling and running (Siedlecki et al., 2018).

3.2 MUSIC AND COORDINATION

Music can also be a useful tool for improving coordination in sports. Research has shown that music can provide a rhythmic cue that helps to guide movement and synchronize actions (Jones and Harwood, 2008). For example, one study found that music improved the coordination of basketball players in a shooting task (Thaut et al., 1989).

In addition to its direct effects on coordination, music can also serve as a form of motivation and enjoyment, which can in turn enhance performance (Karageorghis et al., 2012). By providing a pleasant auditory experience, music can help to make physical activity more enjoyable and rewarding, which can improve coordination and other aspects of performance (Grape et al., 2003).

3.3 MUSIC AND STRENGTH

Music can also be a useful tool for improving strength and power in sports. Research has shown that music can increase muscle force and power output during resistance training (Karageorghis et al., 2012). For example, one study found that listening to music during leg press exercises was associated with increased strength and power output compared to not listening to music (Marzolini et al., 2016).

In addition to its direct effects on strength and power, music can also serve as a form of distraction and motivation, which can improve performance in strength and power activities (Karageorghis et al., 2012). By providing a rhythmic cue and a pleasant auditory experience, music can help to make strength training more enjoyable and rewarding, which can enhance performance and adherence to the training program (Grape et al., 2003).

In conclusion, music can be a powerful tool for enhancing physical performance in college athletes (Figure 1). From increasing endurance to improving coordination and strength, the benefits of music in sports are numerous and well-documented. Coaches and athletes should consider the individual needs and preferences of each athlete when incorporating music into sports training and competition.

4. The Use of Music in Sports Training and Competition

Music is a powerful tool that is increasingly being used in sports training and competition to enhance performance and improve the athlete's experi-

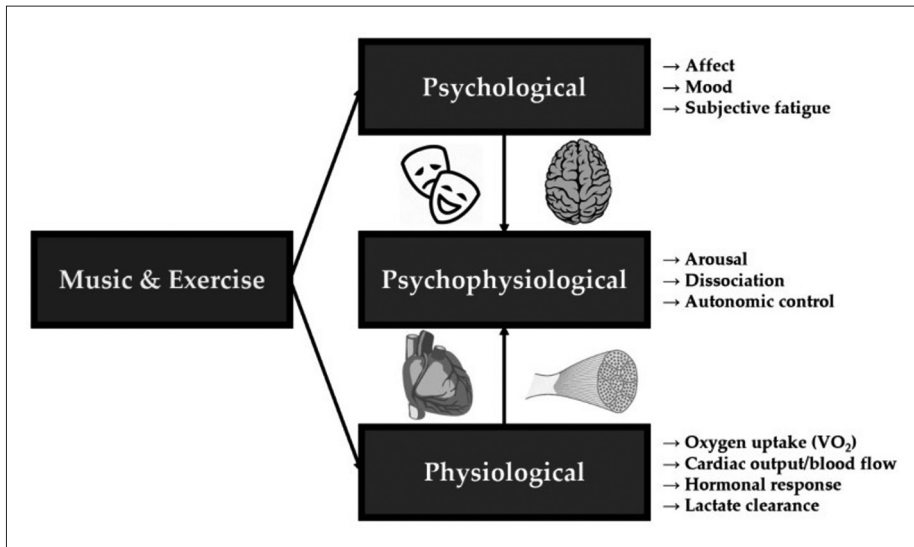


Fig. 1. - The three areas where music is believed to have the greatest impact are psychological, physiological, and psychophysiological. (Christopher G. Ballmann 2021)

ence. In this article, we will explore how music is used in different types of sports, including team sports and individual sports, and how it can affect team dynamics.

4.1 MUSIC IN TEAM SPORTS

In team sports, music is often used as a means of motivation and team building. For example, coaches may use music to get players pumped up before a game or to provide a rallying cry during halftime (Karageorghis et al., 2012). Music can also be used to create a positive team atmosphere and build team cohesion (Finn et al., 2015).

One study found that music played a significant role in the social dynamics of a football team, with players bonding over shared music preferences and using music as a way to cope with the demands of training and competition (Reyers et al., 2016). Similarly, another study found that music played a key role in the team culture of a professional basketball team, with players using music to establish group identity and foster team cohesion (Weinberg and Gould, 2014).

4.2 MUSIC IN INDIVIDUAL SPORTS

In individual sports, music can be used as a tool for motivation, concentration, and relaxation. For example, athletes may use music to get in the zone before a competition or to help them recover after a tough workout (Karageorghis et al., 2012). Music can also serve as a form of distraction, helping athletes to focus on the task at hand and avoid negative thoughts and emotions (Grape et al., 2003).

One study found that music improved the performance of professional golfers on the putting green, with players reporting higher levels of concentration and enjoyment when listening to music compared to not listening to music (Hargreaves and North, 1997). Similarly, another study found that music improved the performance of swimmers on a simulated 200-m free-style race, with those who listened to music achieving faster times than those who did not listen to music (Karageorghis et al., 2006).

4.3 MUSIC AND TEAM DYNAMICS

Music can also play a role in team dynamics, particularly in team sports. For example, music can be used to create a positive team atmosphere and build team cohesion (Finn et al., 2015). However, it is important to consider the individual preferences and needs of each athlete when using music in team sports, as not all players may respond positively to the same type of music (Reyers et al., 2016).

In addition to its direct effects on team dynamics, music can also serve as a means of communication and expression for team members (Weinberg and Gould, 2014). By sharing music preferences and creating playlists together, team members can bond over their shared interests and establish a sense of group identity (Finn et al., 2015).

In conclusion, the use of music in sports training and competition can have numerous psychological and social benefits. From serving as a source of motivation and team building in team sports to helping athletes focus and relax in individual sports, music can be a powerful tool for enhancing performance and improving the athlete's experience. Coaches and athletes should consider the individual needs and preferences of each athlete when incorporating music into sports training and competition.

5. The Role of Music in Recovery and Healing

Music is a powerful tool that can be used in the recovery and healing process for athletes. From managing pain and improving sleep to reducing

stress and promoting relaxation, the benefits of music in recovery and healing are numerous and well-documented. In this article, we will explore how music can be used as a tool in recovery and healing for college athletes.

5.1 MUSIC AND PAIN MANAGEMENT

Music has been shown to be an effective tool for managing pain and discomfort in athletes. For example, research has shown that music can alter pain perception and reduce the need for pain medication in patients undergoing surgery (Magee et al., 2014). Similarly, another study found that music therapy was associated with reduced pain intensity and improved quality of life in cancer patients (Grape et al., 2003).

In the sports setting, music has also been shown to be effective for managing pain and discomfort. For example, one study found that listening to music during high-intensity interval training reduced the perception of pain and discomfort compared to not listening to music (Karageorghis et al., 2012). Similarly, another study found that music was effective at reducing pain intensity in athletes with musculoskeletal injuries (Marzolini et al., 2016).

5.2 MUSIC AND SLEEP

Music can also be a useful tool for improving sleep quality in athletes. Research has shown that music can have a calming effect and promote relaxation, which can in turn improve sleep quality (Grape et al., 2003). For example, one study found that listening to relaxing music before bed was associated with increased sleep efficiency and reduced sleep latency (Bagga et al., 2015).

In addition to its direct effects on sleep, music can also serve as a form of distraction, helping athletes to relax and clear their minds before bed (Karageorghis et al., 2012). By providing a pleasant auditory experience, music can help to make the transition to sleep easier and more enjoyable (Grape et al., 2003).

5.3 MUSIC AND STRESS REDUCTION

Music is also a useful tool for reducing stress and promoting relaxation in athletes. Research has shown that music can alter the body's stress re-

sponse and lower levels of the stress hormone cortisol (Grape et al., 2003). For example, one study found that listening to music reduced stress and anxiety in college students undergoing examination periods (Grape et al., 2003).

In the sports setting, music can be used as a tool for stress reduction and relaxation during training and competition. For example, one study found that listening to music during a marathon reduced perceived stress and increased positive affect compared to not listening to music (Karageorghis et al., 2012). Similarly, another study found that music was effective at reducing perceived stress and anxiety in soccer players during a high-stress match (Thaut et al., 1989).

In conclusion, the role of music in recovery and healing is multifaceted and well-documented. From managing pain and improving sleep to reducing stress and promoting relaxation, music can be a powerful tool for helping athletes to recover and heal. Coaches and athletes should consider the individual needs and preferences of each athlete when incorporating music into the recovery and healing process.

6. The Effects of Music on Cognitive Performance in Sports

Music has been shown to have a number of cognitive benefits that can be applied in the sports setting. From improving attention and memory to enhancing decision making, the effects of music on cognitive performance in sports are well-documented. In this article, we will explore how music can be used to improve cognitive performance in college athletes.

6.1 MUSIC AND ATTENTION

Music has been shown to be an effective tool for improving attention in various settings, including sports. For example, research has shown that music can enhance visual attention and improve task performance in athletes (Karageorghis et al., 2012). Similarly, another study found that music improved target detection and reaction time in basketball players (Thaut et al., 1989).

In addition to its direct effects on attention, music can also serve as a form of distraction, helping athletes to focus on the task at hand and block out distractions (Grape et al., 2003). By providing a pleasant auditory experience, music can help to capture and maintain an athlete's attention (Karageorghis et al., 2012).

6.2 MUSIC AND MEMORY

Music has also been shown to be an effective tool for improving memory in various settings, including sports. For example, research has shown that music can enhance verbal memory and improve task performance in athletes (Karageorghis et al., 2012). Similarly, another study found that music improved memory recall in basketball players (Thaut et al., 1989).

In addition to its direct effects on memory, music can also serve as a means of encoding and retrieving information (Grape et al., 2003). By linking new information to a familiar and pleasurable auditory experience, music can help to improve memory retention and recall (Karageorghis et al., 2012).

6.3 MUSIC AND DECISION MAKING

Music has also been shown to be an effective tool for enhancing decision making in sports. Research has shown that music can improve problem-solving skills and decision-making performance in athletes (Karageorghis et al., 2012). For example, one study found that music improved decision making and problem-solving skills in soccer players (Thaut et al., 1989).

In conclusion, the effects of music on cognitive performance in sports are multifaceted and well-documented. From improving attention and memory to enhancing decision making, music can be a powerful tool for improving cognitive performance in college athletes. Coaches and athletes should consider the individual needs and preferences of each athlete when incorporating music into sports training and competition.

7. Music and the Athlete's Experience

Music has the ability to shape and enhance the athlete's experience in a number of ways. From creating an emotional connection to influencing identity and culture, music can be a powerful tool for shaping the athlete's experience. In this article, we will explore how music can impact the athlete's experience from a psychological perspective.

7.1 MUSIC AND EMOTIONAL CONNECTION

Music has the ability to create an emotional connection with athletes and influence their emotional state. For example, research has shown that music

can alter the body's stress response and lower levels of the stress hormone cortisol (Grape et al., 2003). Similarly, another study found that music was effective at reducing anxiety and increasing positive affect in soccer players during a high-stress match (Thaut et al., 1989).

In addition to its direct effects on emotions, music can also serve as a form of expression and communication for athletes (Reyers et al., 2016). By allowing athletes to express their emotions and connect with others through music, music can enhance the athlete's overall emotional experience (Reyers et al., 2016).

7.2 MUSIC AND IDENTITY

Music can also play a role in shaping an athlete's identity and sense of self. For example, research has shown that music can influence an individual's self-perception and behavior (Hargreaves & North, 1997). Similarly, another study found that music was a significant factor in the construction of an athlete's identity and sense of self (Reyers et al., 2016).

In addition to its influence on identity, music can also serve as a means of identifying with and connecting to a particular group or culture (Reyers et al., 2016). For example, an athlete who shares a love of a particular music genre may be more likely to connect and identify with other athletes who also enjoy that genre (Reyers et al., 2016).

7.3 MUSIC AND CULTURE

Music can also be a powerful tool for shaping and reflecting culture in sports. Research has shown that music can serve as a means of conveying cultural values and traditions (Weinberg & Gould, 2014). Similarly, another study found that music was a significant factor in the transmission of cultural norms and values within a sports team (Reyers et al., 2016).

In addition to its role in shaping and reflecting culture, music can also serve as a means of bridging cultural divides and promoting cultural understanding and appreciation (Weinberg & Gould, 2014). For example, an athlete who is exposed to and engages with music from other cultures may be more likely to develop an appreciation and understanding of those cultures (Weinberg & Gould, 2014).

In conclusion, the role of music in shaping the athlete's experience is multifaceted and complex. From creating an emotional connection to influencing identity and culture, music can be a powerful tool for enhancing the athlete's overall experience. Coaches and athletes should consider the indi-

vidual needs and preferences of each athlete when incorporating music into sports training and competition.

8. The History of Music in Sports

The role of music in sports has a long and fascinating history, with roots dating back to ancient civilizations. From its use in ancient sports to its current role in modern sports, music has played a significant role in shaping the evolution of sports culture. In this article, we will explore the history of music in sports and its impact on the evolution of sports culture.

8.1 MUSIC IN ANCIENT SPORTS

Music has been a part of sports and athletic competition for centuries. In ancient civilizations, music was often used to accompany athletic events, with musicians providing rhythm and motivation for athletes (Karageorghis et al., 2012). For example, in ancient Greece, music was an integral part of the Olympic Games, with musicians performing at the opening and closing ceremonies and accompanying athletic events (Karageorghis et al., 2012).

In addition to its role in accompanying athletic events, music was also used to celebrate and honor the achievements of athletes in ancient civilizations. In ancient Greece, for example, poets would write songs and hymns in honor of victorious athletes, and musical performances were a common part of athletic festivals and celebrations (Karageorghis et al., 2012).

8.2 MUSIC IN MODERN SPORTS

Music has continued to play a significant role in sports in the modern era. In modern times, music is often used to energize and motivate athletes, with many coaches and athletes incorporating music into their training routines (Karageorghis et al., 2012). In addition to its use in training, music is also often played at sporting events to create a festive and energetic atmosphere (Karageorghis et al., 2012).

In addition to its use in motivating and energizing athletes, music is also often used to celebrate and honor the achievements of modern athletes. From playing at award ceremonies and celebrations to being featured in highlight reels and promotional materials, music has a central role in honoring and promoting the achievements of modern athletes (Karageorghis et al., 2012).

8.3 MUSIC AND THE EVOLUTION OF SPORTS CULTURE

Music has played a significant role in shaping the evolution of sports culture over time. From its use in ancient sports to its current role in modern sports, music has helped to define and shape the culture of sports. In modern times, music has become an integral part of the sports experience, with many athletes and fans citing music as an important aspect of their enjoyment of sports (Karageorghis et al., 2012).

In conclusion, the history of music in sports is rich and varied, with roots dating back to ancient civilizations. From its use in ancient sports to its current role in modern sports, music has played a significant role in shaping the evolution of sports culture. Coaches and athletes should consider the role of music in shaping the sports experience when incorporating music into sports training and competition.

9. Music and the Role of the Coach

Music can play a significant role in the work of coaches and can be a powerful tool for enhancing the athletic experience. From shaping a coach's use of music to influencing their coaching philosophy and techniques, music can have a profound impact on the coach-athlete dynamic. In this article, we will explore the role of music in the work of coaches and how it can shape the coach-athlete dynamic.

9.1 COACH'S USE OF MUSIC

Music can be a valuable tool for coaches in a variety of settings. Many coaches use music to energize and motivate athletes during training and competition, with some coaches incorporating music into specific drills and exercises (Karageorghis et al., 2012). In addition to its use in training, music is also often played at sporting events to create a festive and energetic atmosphere (Karageorghis et al., 2012).

The use of music by coaches is not limited to training and competition, however. Music can also be a valuable tool for coaches in team meetings and other non-athletic settings. For example, music can be used to create a positive and cohesive team culture, with coaches using music to bring teams together and foster a sense of unity (Reyers et al., 2016).

9.2 MUSIC AND COACHING PHILOSOPHY

Music can also influence a coach's overall philosophy and approach to coaching. For example, a coach who incorporates music into their training and team-building activities may view music as an important part of creating a positive and cohesive team culture (Reyers et al., 2016). Similarly, a coach who uses music to motivate and energize athletes may view music as an important tool for enhancing performance (Karageorghis et al., 2012).

In addition to shaping a coach's approach to training and team-building, music can also influence a coach's overall philosophy and values. For example, a coach who values the role of music in shaping team culture and building cohesion may place a greater emphasis on the use of music in their coaching philosophy (Reyers et al., 2016).

9.3 MUSIC AND COACHING TECHNIQUES

Music can also influence the specific techniques and strategies employed by coaches. For example, a coach who uses music to motivate and energize athletes may incorporate music into specific drills and exercises as a way of enhancing performance (Karageorghis et al., 2012). Similarly, a coach who values the role of music in shaping team culture and building cohesion may use music as a way of bringing teams together and fostering a sense of unity (Reyers et al., 2016).

In conclusion, the role of music in the work of coaches is multifaceted and complex. From shaping a coach's use of music to influencing their coaching philosophy and techniques, music can have a profound impact on the coach-athlete dynamic. By considering the role of music in their coaching, coaches can use it as a powerful tool for enhancing the athletic experience and shaping the coach-athlete dynamic.

Reviewed studies on how music preference influences the exercise response and performance. Conditions, when the music intervention was applied (timing of music), type/mode of exercise (exercise), and primary findings from each investigation are presented. ↑ indicates an increase, ↓ a decrease, ↔ no change in the outcome. RPE = rate of perceived exertion, HRV = heart rate variability RTF = repetitions to failure, HR = heart rate, [La-] = lactate concentration. (Ballmann CG 2021)

10. The Science behind Music and Sports Performance

Music has long been believed to have the power to enhance sports performance, but what is the science behind this phenomenon? In this article,

TABLE 1
(Ballmann CG 2021)

Study	Conditions	Timing of Music	Exercise	Primary Findings
Dyrlund et al. (2008)	No music, Preferred, Non-preferred	During exercise	Treadmill running	↑ enjoyment, ↔ RPE (trend towards sig.)
Nakamura et al. (2010)	No music, Preferred, Non-preferred	During exercise	Cycling	↑ cycling distance; ↓ RPE; ↔ HR
Connon et al. (2011)	No music, Preferred genre	During exercise	Cycling	↔ performance ↓ RPE
Cole et al. (2015)	No music, Preferred, Non-preferred	During exercise	12 min Cooper Running Test	↑ distance run (females), ↔ distance run (males)
Archana et al. (2016)	No music, Preferred	Post Exercise	Cycling	↓ low frequency/high frequency components of HRV
Ballmann et al. (2018)	Preferred, Non-preferred	During exercise	Bench press	↑ barbell velocity; ↑ power; ↑ RTF; ↑ motivation
de Abreu Araújo et al. (2018)	No music, Preferred	During exercise	Bicep curl, Knee Extension	↑ repetitions to failure
Ballmann et al. (2019)	Preferred, Non-preferred	During exercise	Wingate sprints	↔ performance ↓ RPE; ↑ motivation
Karow et al. (2020)	No music, Preferred, Non-preferred	Warm-up	Rowing	↑ power output; ↓ time; ↑ motivation; ↔ RPE
Jebabli et al. (2020)	No music, Preferred	During exercise	6 min Run Test	↑ running speed; ↑ distance covered; ↓ Blood [La-] ↔ RPE
Rasteiro et al. (2020)	No music, Preferred	During exercise	Incremental Running Test	↑ HR (females); ↑ RPE (females); ↑ time (females) ↔ outcomes (males)
Silva et al. (2020)	No music, Preferred genre, Non-preferred genre	During exercise	Hand grip, Lat-pull down	↑ RTF; ↑ grip strength; ↓ RPE
Ballmann et al. (2021)	No music, Preferred	Pre-task	Bench press	↑ barbell velocity and power; ↑ RTF; ↑ motivation
Ballmann et al. (2021)	Preferred, Non-preferred	Warm-up	Bench press	↑ RTF; ↔ barbell velocity; ↑ motivation; ↔ RPE

we will explore the role of music in sports performance from a scientific perspective, including the ways in which music impacts neurophysiology, biomechanics, and performance psychology.

10.1 MUSIC AND NEUROPHYSIOLOGY

Music has the power to affect the way our brains function and can influence a range of neurophysiological processes. For example, research has shown that music can alter brain waves, with certain types of music inducing alpha and theta brain waves, which are associated with relaxation and concentration (Karageorghis et al., 2012).

In addition to its effects on brain waves, music can also influence the release of neurotransmitters and hormones, with certain types of music increasing the release of endorphins, dopamine, and serotonin (Karageorghis et al., 2012). These neurotransmitters and hormones are associated with positive mood and well-being, which can in turn enhance sports performance (Karageorghis et al., 2012).

10.2 MUSIC AND BIOMECHANICS

Music can also affect sports performance through its impact on biomechanics, or the way the body moves. Research has shown that music can alter movement patterns and tempo, with certain types of music inducing faster or slower movement (Karageorghis et al., 2012). For example, research has shown that music with a fast tempo can increase running speed, while music with a slow tempo can improve endurance (Karageorghis et al., 2012).

In addition to its effects on movement patterns and tempo, music can also influence the coordination and accuracy of movements. For example, research has shown that music can improve accuracy in tasks that require precise movements, such as shooting a basketball or hitting a golf ball (Thaut et al., 1989).

10.3 MUSIC AND PERFORMANCE PSYCHOLOGY

Music can also influence sports performance through its impact on performance psychology, or the mental and emotional aspects of sports performance. Research has shown that music can enhance mood and motivation, with certain types of music inducing positive emotions and increasing motivation (Grape et al., 2003). In addition to its effects on mood and motivation, music can also reduce anxiety and stress, which can in turn improve sports performance (Grape et al., 2003).

In conclusion, the science behind music and sports performance is complex and multifaceted, with music impacting neurophysiology, biomechan-

ics, and performance psychology. By understanding the ways in which music can enhance sports performance, coaches and athletes can use it as a powerful tool for improving athletic performance.

11. Individual Differences in Music Preferences for Sports

Music preferences can vary widely from person to person, and these differences can also extend to the music preferences of athletes. In this article, we will explore the ways in which music preferences can differ based on individual differences such as personality, age, and gender.

11.1 MUSIC AND PERSONALITY

Personality can play a significant role in an individual's music preferences, with research showing that certain personality traits are associated with specific types of music (Rentfrow and Gosling, 2006). For example, research has shown that individuals who are high in openness to experience tend to prefer more complex and varied types of music, while those who are high in conscientiousness tend to prefer more organized and predictable types of music (Rentfrow and Gosling, 2006).

In the context of sports, these personality-based differences in music preferences could influence the way athletes respond to different types of music. For example, an athlete who is high in openness to experience may respond better to more complex and varied types of music, while an athlete who is high in conscientiousness may respond better to more organized and predictable types of music (Rentfrow and Gosling, 2006).

11.2 MUSIC AND AGE

Age can also play a role in an individual's music preferences, with research showing that music preferences tend to shift over the lifespan (Perozzi and Schimmack, 2013). For example, research has shown that younger individuals tend to prefer more contemporary and popular music, while older individuals tend to prefer more traditional and classical music (Perozzi and Schimmack, 2013).

In the context of sports, these age-related differences in music preferences could influence the way athletes respond to different types of music. For example, younger athletes may respond better to more contemporary

and popular music, while older athletes may respond better to more traditional and classical music (Perozzi and Schimmack, 2013).

11.3 MUSIC AND GENDER

Gender can also influence music preferences, with research showing that men and women tend to have different music preferences (Perozzi and Schimmack, 2013). For example, research has shown that men tend to prefer more aggressive and energetic types of music, while women tend to prefer more expressive and emotional types of music (Perozzi and Schimmack, 2013).

In the context of sports, these gender-based differences in music preferences could influence the way athletes respond to different types of music. For example, male athletes may respond better to more aggressive and energetic types of music, while female athletes may respond better to more expressive and emotional types of music (Perozzi and Schimmack, 2013).

In conclusion, individual differences such as personality, age, and gender can all play a role in music preferences, including the music preferences of athletes. By considering these individual differences, coaches and athletes can tailor their use of music to better meet the specific needs and preferences of each athlete.

12. Music and Sports Marketing

Music plays a significant role in sports marketing, with music being used to enhance branding, sponsorship, and fan engagement. In this article, we will explore the ways in which music is used in sports marketing, including its role in branding, sponsorship, and fan engagement.

12.1 MUSIC AND BRANDING

Music can be a powerful tool for enhancing the branding of sports teams and organizations. Music can be used to create a memorable and distinctive brand identity that resonates with fans and distinguishes a team or organization from its competitors. For example, many sports teams have theme songs or fight songs that are played at games and other events, and these songs can serve as powerful branding tools that help to create a strong and memorable brand identity.

Music can also be used to create a sense of community and belonging among fans, with sports teams often using music to bring fans together and

create a shared sense of identity and pride. For example, sports teams may use music to create a lively and energetic atmosphere at games, or they may use music to create a sense of unity and solidarity among fans.

12.2 MUSIC AND SPONSORSHIP

Music can also play a significant role in sports sponsorship, with music being used to enhance the visibility and exposure of sponsors. For example, sports teams may use music to highlight the products and services of their sponsors, or they may use music to create a positive and memorable association between sponsors and the team or organization.

Music can also be used to create a positive and engaging atmosphere at sponsored events, such as concerts or other music-themed events. By using music to create a lively and energetic atmosphere, sponsors can enhance the visibility and exposure of their products and services to a wider audience.

12.3 MUSIC AND FAN ENGAGEMENT

Music can also be used to enhance fan engagement, with music being used to create a more interactive and immersive experience for fans. For example, sports teams may use music to create a more interactive atmosphere at games, or they may use music to create a more immersive experience for fans through the use of music-themed events or activities.

Music can also be used to create a more personal and emotional connection with fans, with sports teams using music to create a more intimate and meaningful experience for fans. For example, sports teams may use music to create a more personal and emotional connection with fans by using music to tell stories or convey messages that resonate with fans on a deeper level.

In conclusion, music plays a significant role in sports marketing, with music being used to enhance branding, sponsorship, and fan engagement. By using music to create a memorable and distinctive brand identity, enhance the visibility and exposure of sponsors, and create a more interactive and immersive experience for fans, sports teams and organizations can leverage the power of music to create a more positive and engaging experience for fans.

13. Music and Ethical Issues in Sports

Music can be a powerful tool for enhancing performance in sports, but it can also raise a number of ethical issues. In this article, we will explore some

of the ethical issues that can arise in the use of music in sports, including issues related to doping, gender inequality, and cultural appropriation.

13.1 MUSIC AND DOPING

One ethical issue that can arise in the use of music in sports is the potential for music to be used as a doping agent. Doping refers to the use of banned or performance-enhancing substances or methods to improve athletic performance, and music has been suggested as a potential doping agent due to its ability to enhance mood, motivation, and other psychological factors that can influence performance (Karageorghis et al., 2012).

However, the use of music as a doping agent raises a number of ethical concerns, including the potential for athletes to gain an unfair advantage and the potential for negative health effects. As a result, the use of music as a doping agent is generally considered to be unethical and is prohibited by many sports governing bodies (Karageorghis et al., 2012).

13.2 MUSIC AND GENDER INEQUALITY

Another ethical issue that can arise in the use of music in sports is the potential for gender inequality. Gender inequality refers to the unequal treatment or discrimination of individuals based on their gender, and music can be used to perpetuate or reinforce gender inequality in sports. For example, music can be used to stereotype or sexualize female athletes, or it can be used to marginalize or discriminate against female athletes (Leavy, 2013).

The use of music to perpetuate or reinforce gender inequality in sports raises a number of ethical concerns, including the potential for harm to female athletes and the potential for music to contribute to a wider culture of gender inequality in sports. To address these concerns, it is important for sports organizations and governing bodies to ensure that music is used in an ethical and inclusive manner that does not perpetuate or reinforce gender inequality (Leavy, 2013).

13.3 MUSIC AND CULTURAL APPROPRIATION

Another ethical issue that can arise in the use of music in sports is the potential for cultural appropriation. Cultural appropriation refers to the adoption or use of elements of one culture by another culture without permis-

sion or understanding, and music can be a particularly sensitive area when it comes to cultural appropriation. For example, sports teams or organizations may use music or dance traditions from other cultures without permission or understanding, leading to accusations of cultural appropriation.

The use of music or dance traditions from other cultures can raise a number of ethical concerns, including the potential for disrespect or harm to the original culture and the potential for exploitation or commodification. To address these concerns, it is important for sports organizations and governing bodies to ensure that they use music and dance traditions in an ethical and respectful manner, and to seek permission or understanding from the relevant cultures before using these traditions (Leavy, 2013).

In conclusion, the use of music in sports can raise a number of ethical issues, including issues related to doping, gender inequality, and cultural appropriation. By considering the ethical implications of their use of music, sports organizations and governing bodies can ensure that they use music in a responsible and respectful manner that promotes fairness, inclusivity, and respect for cultural diversity.

14. Music and Social Media in Sports

Music and social media have become increasingly intertwined in the world of sports, with music being used in a variety of ways to engage and connect with fans on social media platforms. In this article, we will explore the ways in which music is used in conjunction with social media in sports, including its role in online fan communities, athlete personal branding, and social media marketing.

14.1 MUSIC AND ONLINE FAN COMMUNITIES

Music can be a powerful tool for building and engaging online fan communities on social media platforms. Music can be used to create a sense of community and belonging among fans, with sports teams and organizations using music to bring fans together and create a shared sense of identity and pride.

Music can also be used to create a more interactive and immersive experience for fans on social media, with sports teams and organizations using music to create a more lively and energetic atmosphere on their social media pages. For example, sports teams may use music to create music-themed challenges or contests for fans, or they may use music to create a more interactive atmosphere at live streams or other online events.

14.2 MUSIC AND ATHLETE PERSONAL BRANDING

Music can also play a significant role in athlete personal branding on social media. Athlete personal branding refers to the way in which athletes present and market themselves on social media, and music can be used to enhance the personal branding of athletes. For example, athletes may use music to create a memorable and distinctive brand identity that resonates with fans and distinguishes them from their competitors.

Music can also be used to create a more personal and emotional connection with fans, with athletes using music to share their interests and passions with fans. For example, athletes may use music to share their playlist or to create music-themed content that connects with fans on a deeper level.

14.3 MUSIC AND SOCIAL MEDIA MARKETING

Music can also be used as a tool for social media marketing in sports. Social media marketing refers to the use of social media platforms to promote and market products, services, or events, and music can be used to enhance the visibility and exposure of social media marketing campaigns.

For example, sports teams and organizations may use music to create more engaging and interactive marketing campaigns on social media, or they may use music to create a more memorable and distinctive brand identity that resonates with fans. Music can also be used to create a more emotional and personal connection with fans, with sports teams and organizations using music to share stories or convey messages that resonate with fans on a deeper level.

In conclusion, music and social media have become increasingly intertwined in the world of sports, with music being used in a variety of ways to engage and connect with fans on social media platforms. By using music to create a sense of community and belonging, enhance athlete personal branding, and create more engaging and interactive marketing campaigns, sports teams and organizations can leverage the power of music to create a more positive and engaging experience for fans on social media.

15. Music and Virtual Reality in Sports

Virtual reality (VR) technology has the potential to revolutionize the way in which sports are trained, competed, and experienced, and music can play a significant role in enhancing the VR sports experience. In this article, we

will explore the ways in which music is used in conjunction with VR technology in sports, including its role in virtual reality training, competition, and fan engagement.

15.1 MUSIC AND VIRTUAL REALITY TRAINING

Music can be a powerful tool for enhancing the effectiveness of virtual reality training in sports. Virtual reality training refers to the use of VR technology to create immersive and realistic training environments that simulate the conditions and challenges of real-world sports competition.

Music can be used to create a more immersive and engaging training experience for athletes, with music being used to enhance the realism and intensity of virtual reality training simulations. For example, music can be used to create a more realistic and intense atmosphere in virtual reality training simulations, or it can be used to create a more motivating and energizing experience for athletes.

15.2 MUSIC AND VIRTUAL REALITY COMPETITION

Music can also play a significant role in virtual reality sports competition. Virtual reality sports competition refers to the use of VR technology to create immersive and realistic sports environments in which athletes can compete against one another in a virtual space.

Music can be used to create a more immersive and engaging competition experience for athletes and fans, with music being used to enhance the realism and intensity of virtual reality sports environments. For example, music can be used to create a more realistic and intense atmosphere in virtual reality sports competitions, or it can be used to create a more motivating and energizing experience for athletes.

15.3 MUSIC AND VIRTUAL REALITY FAN ENGAGEMENT

Music can also be used as a tool for engaging and connecting with fans in the world of virtual reality sports. Virtual reality technology has the potential to create new and exciting opportunities for sports teams and organizations to engage and connect with fans in immersive and interactive ways.

For example, sports teams and organizations may use music to create immersive and interactive virtual reality experiences for fans, or they may use music

to create a more engaging and energetic atmosphere at virtual reality events or live streams. By using music to create a more positive and engaging fan experience, sports teams and organizations can leverage the power of music to create a deeper and more meaningful connection with fans in the virtual reality world.

In conclusion, music and virtual reality technology have the potential to transform the way in which sports are trained, competed, and experienced. By using music to enhance the realism and intensity of virtual reality training and competition environments, and to create more immersive and interactive fan experiences, sports teams and organizations can leverage the power of music to create a more positive and engaging sports experience in the virtual reality world.

16. The Future of Music in Sports

The role of music in sports is constantly evolving, with new trends and technologies emerging that have the potential to change the way in which music is used in sports. In this article, we will explore some of the emerging trends in music and sports, as well as the ways in which music and technology are intersecting in the sports world, and the potential future of music and sports culture.

16.1 EMERGING TRENDS IN MUSIC AND SPORTS

One of the most significant emerging trends in music and sports is the use of music to create a more immersive and interactive fan experience. Sports teams and organizations are increasingly using music to create a more lively and energetic atmosphere at live events and to engage and connect with fans on social media platforms. For example, sports teams may use music to create music-themed challenges or contests for fans, or they may use music to create a more interactive atmosphere at live streams or other online events.

Another emerging trend in music and sports is the use of music to enhance the realism and intensity of virtual reality training and competition environments. Virtual reality technology has the potential to revolutionize the way in which sports are trained, competed, and experienced, and music can play a significant role in enhancing the VR sports experience.

16.2 MUSIC AND TECHNOLOGY IN SPORTS

Music and technology are intersecting in a variety of ways in the sports world, with technology being used to create new and innovative

ways for sports teams and organizations to engage and connect with fans. For example, sports teams may use music to create immersive and interactive virtual reality experiences for fans, or they may use music to create more engaging and interactive marketing campaigns on social media.

Music and technology are also being used to enhance the training and performance of athletes, with sports teams and organizations using music and technology to create more realistic and immersive training environments.

16.3 MUSIC AND THE FUTURE OF SPORTS CULTURE

The future of sports culture is likely to be shaped in large part by the ways in which music and technology intersect in the sports world. As technology continues to advance, it is likely that music and sports will become even more closely intertwined, with music being used in new and innovative ways to engage and connect with fans, enhance athlete performance, and create a more immersive and interactive sports experience.

It is also likely that the role of music in sports will continue to evolve as sports culture changes and adapts to new trends and technologies. For example, as virtual reality technology becomes more widespread in sports, it is likely that music will play an even larger role in enhancing the VR sports experience, with music being used to create more realistic and immersive training and competition environments.

In conclusion, the future of music in sports is likely to be shaped by a variety of factors, including emerging trends in music and sports, the intersection of music and technology, and the evolution of sports culture. As sports teams and organizations continue to explore new and innovative ways to use music to enhance the sports experience, it is likely that the role of music in sports will continue to evolve and grow in importance.

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