

Can Music Improve Sports Performance

--Literature Review

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Abstract

Background: music is an indispensable part of modern life, and also one of the fashion trends. So listening to music for sports has become a new way of sports. However, different dimensions such as music type, music rhythm, music intensity, music preference and so on may make the sports participants have different physical or psychological performance. In a word, whether listening to music during exercise can improve sports performance has gradually become the research direction of many related researchers. Due to the lack of literature in this field in China, this paper only makes a systematic review of foreign literature on the impact of music and sports, so as to provide a theoretical support and reference for the future research on whether similar music can improve sports performance. **Objective:** to analyze the different music rhythm (fast and slow), different music intensity (volume), different music preference and different music types, which are equal to different physical or psychological sports performance in sports, and to summarize, classify and sort out, so as to demonstrate systematically and quantitatively whether music can improve sports performance. **Methods:** relevant books or materials were searched in the library of Jiangxi Normal University, and the key words such as "music, tempo, exercise, performance" were input into the website of foreign language periodicals such as "music, tempo, exercise, performance" on the official website of Jiangxi Normal University Library at the same time This paper discusses whether music can affect sports performance. **Results:** music can improve the exercise performance, which is reflected in the following aspects: 1. Fast rhythm music can motivate participants to adhere to the exercise more than slow rhythm music; 2. Different types of music produce different sports performance, and incentive music can improve the tolerance of high-intensity exercise more than non incentive music; 3. Compared with non music, preference music can significantly improve the relative output power 4. Different music intensity: compared with athletes, leisure people prefer strong music.

Keywords

Music; Tempo; Sport; Exercise; Performance.

1. Introduction

With the diversified development of society and the improvement of people's material living standard, the concept of "health first" has been deeply rooted in the hearts of the people. The reason why more and more people jump into physical exercise is that physical exercise can not only strengthen the body, but also make people feel comfortable. For people who participate in sports, it is very important to accurately evaluate their sports performance. Through effective evaluation of sports performance, on the one hand, well-trained athletes can clearly develop sports programs to improve sports performance; on the other hand, leisure sports enthusiasts can selectively carry out physical exercise according to their own needs.

Some external factors, such as music, can affect sports performance, and the effect is obvious. For a long time, listening to music while exercising is considered to be a healthy lifestyle that can increase emotional experience and bring benefits to people's body and mind. It is shown in some physiological and psychological aspects, such as tolerance, heart rate (HR), ventilation threshold (VT), blood lactate, perceived exertion (RPE), attention, perception, subjective emotion, subjective exertion and moodwait. In addition, listening to music can focus on music, which distracts the feeling of exercise fatigue and physical discomfort. Then, the shift of attention can make the participants devote more efforts to exercise, such as longer exercise duration, lower RPE, and improved mood state. However, due to the different characteristics and types of participants, the results are not the same, which may be highly related to gender, age, physical function and exercise level. This paper will classify and sort out the related literature on the influence of music on sports performance, and provide theoretical reference for the future research on the impact of music on sports.

2. Research method

This paper refers to the relevant books or materials in the library of Jiangxi Normal University. At the same time, the computer is used on the website of foreign periodicals such as web of science and EBSCO of the library of Jiangxi Normal University. The keywords such as "music, tempo, exercise, performance" are input respectively to search for relevant literature, and a total of 13 representative literatures are screened. This paper discusses whether music can affect sports performance.

3. Research results

Music can wake up our sports motivation more than no music. In the process of listening to music, different music (type, rhythm, volume, preference) and other factors will lead to different sports performance of sports participants. The following is a classified review of the impact of these factors on sports.

3.1. The influence of different music rhythms on Sports

This paper discusses the effects of slow rhythm (90bpm) and fast-paced (120bpm) music on effort related thinking, perceived exertion score (RPE), emotion and heart rate in isometric muscle strength training. Participants were randomly assigned to one of three states (no music control group, fast-paced music and slow tempo music) and had two isometric strength exercises (wall style and plank). The results show that: in wall sitting, fast-paced and slow-paced music stay separated longer than no music, but there is no such effect in treadmill. On the one hand, a baseline experiment is added in this paper, which emphasizes the steps, postures and methods of the experiment, which makes full preparation for the formal experiment and reduces the experimental error to a certain extent. At the same time, the research on long muscle strength training is relatively new, and the selected action posture is also representative; on the other hand, the results are different from the previous research results: 1. Music can improve muscle endurance and the duration of equal weight bearing; 2. Music does not affect pleasure and arousal; 3. Compared with no music, music with music or different rhythm does not increase the time of willpower failure. 16 people from the university community were selected to test whether listening to fast-paced music (130bpm / min) could prolong the exercise time of participants during high-intensity cycling exercise. The experiment proved that music increased exercise time, respiratory rate and heart rate, but did not affect RPE and other ventilation dynamics. Twenty eight adult women aged 29-51 were selected to study the effects of music rhythm on physiological, emotional, perceptual variables and walking speed performance under three conditions (no music, 90 BPM / min pop music and 140 BPM / min

pop music) to analyze the values obtained at 10, 15, 20, 25 and 30 min. Experiments show that fast music (140bpm per minute) can improve the level of self perceived fatigue and exercise performance of optional walking speed, but it does not significantly change physiology and emotion. Some studies have proved that slow rhythm music can stimulate autistic children's movement more than fast-paced music; some studies have proved that fast / loud pre task music can improve the emotional value and wake-up effect of preparing simple exercise tasks; some studies have proved that the ability of high-intensity music to induce rapid and powerful changes in emotion and arousal level can reduce the ability and trigger of negative emotional state. Some studies have proved that listening to fast-paced music can improve the overall exercise endurance and neuromuscular threshold, that is to say, it can delay the occurrence of neuromuscular fatigue; some studies have proved that the beneficial effect of music rhythm is more obvious in endurance sports, so music can be considered as an important tool to stimulate people to carry out low-intensity physical exercise.^{[1][2][3][4][5][6][7][8]}

Robyn Feiss et al. Designed ingeniously and reasonably considered cardiopulmonary measurements, such as inhaled oxygen, exhaled carbon dioxide, tidal volume and minute ventilation, and added a preliminary test to create necessary conditions for the whole experimental process. FL á via ang é Lica Martins Almeida et al. Made a systematic analysis from the perspective of music rhythm, and considered many factors, such as physiology and emotion, which made the article more comprehensive and systematic. At the same time, the speed of rhythm stimulated people's auditory nerve center in different degrees, and the performance of production was also different.

3.2. The influence of different music types on Sports

The results were as follows: 1. Subjects accumulated more blood lactic acid (blac) under m condition than in nm and con conditions, but did not increase their RPE peak score ($P < 0.05$); 2. M intervention can improve the performance of high-intensity exercise, and M intervention can improve the tolerance of high-intensity exercise. In this paper, an experiment was designed to prove whether stimulating music and video can improve the performance of high-intensity sports. In the experiment, irrelevant variables were controlled to the greatest extent and the error was reduced. At the same time, during the experiment, the distance, heart rate, RPE and heart rate of the subjects were recorded, and the experimental results consistent with the hypothesis were obtained, that is, stimulating music and video can improve the performance of high-intensity exercise.^[9]

3.3. The influence of different music intensity (volume) on Sports

Participants controlled the volume and adjusted the maximum treadmill graded exercise test (Jasmin C. Hutchinson, 2013) The results show that: 1. Women think that before the end of GXT, the volume plays a more and more important role; 2. Compared with athletes, leisure sports prefer music with strong music intensity. The results of this paper may be related to sports background. Leisure sports people prefer music with strong music intensity, which may be due to the fact that well-trained athletes tend to pay less attention to sports than leisure sportsmen, which shows that they are more focused on sports, while the impact of music on them is smaller, which needs further proof. On the other hand, the influence of volume on sports performance is also related to sexIt's not about it.

3.4. The influence of music preference and non preference on Sports

Twelve physically active men and women were selected to warm up their maximum heart rate (rowing for 5min) under three conditions (no music, music preference and non music preference). After warming up, they stopped any music and immediately completed the 2000 meter rowing test. The relative power output, time, heart rate, RPE and motivation were recorded. The experimental results show that: 1. Compared with no music, the relative output

power is increased, the time is significantly shortened, and the heart rate is also significantly increased; 2. The non preferred music does not change the RPE and has no benefit; 3. Compared with the non music and non preferred music, the participants' motivation under the music preference is higher. The research angle of this article is novel and the intention is very good. Nowadays, the music styles are quite different, including pop music, light music, rap, etc., and everyone's favorite music type will be different, which is closely related to personal personality, growth background and aesthetic appreciation. Then the author makes a deep analysis of the participants' sports performance from the perspective of music preference and non preference, which fills the gap of previous studies to a certain extent. In addition, other studies have demonstrated the relationship between exercise intensity and preference for music intensity. Women believe that music plays a more and more important role before the end of GXT, and it also proves that leisure people prefer music with higher music intensity than athletes.^{[10][11]}

3.5. The influence of synchronous music on Sports

Compared with no music, the fatigue time was prolonged by 66.59%, and the perceived fatigue score (RPE) was significantly reduced. In different cases, slight differences in heart rate were detected, and there were no significant differences in urine specific gravity, weight loss rate, thermal comfort and blood lactic acid. This paper makes a comparative study from the perspective of music synchronicity. The measurement indicators are diversified, which greatly improves the innovation. The beauty of this paper is that if the independent variable has asynchronous music comparative study, it can more intuitively see the intervention effect comparison of synchronization, asynchrony and no music in sports.^[12]

3.6. Other factors

The combination of music and video significantly reduced RPE, but the effect increased with the increase of time; the combination of music and video produced more obvious dissociative attention. This paper makes up for the deficiency of Martin J. Barwood et al. And classifies the intervention materials into four conditions: only music, only video, the combination of music and video and control group. The logic is clear and the design is meticulous. It is proved in the experiment that the combination of music and video can reduce RPE and promote sports performance.^[13]

4. Discuss

4.1. Subjects

It is not clear whether the results of the experiment are also applicable to the well-trained athletes. As we all know, different levels, different ages and different genders will have a certain impact on the experiment, but in many studies, these problems are not taken into account, so most of the research results are only applicable to specific groups of people, not the majority of the population.

4.2. Material selection

Music video is diversified. In the selection of music video, the type, rhythm, motivation quality, preference and synchronization should be considered, and the role of each feature is not the same; if there is music, the movement time is prolonged, whether the music and video play a role or whether the individual sports of the participants play a role. Some studies only compare the preference of music. There is no systematic comparative study on the two conditions of no music and no music, so the influence of non music and no music on sports is not clear; whether music is suitable for rowing, whether it is also suitable for other sports needs to be demonstrated.

4.3. Experimental design

The experimental design only includes fast-paced music group and control group, and there is no slow-paced group to conduct a comparative study, so it is difficult to explain that fast-paced prolongs high-intensity exercise time, and it is likely that rhythmic elements affect exercise time. Whether the fast rhythm prolonged the exercise time, or whether the participants' self-persistence prolonged the exercise time, we need to further study; the experimental time should be strictly controlled, conducted at the same time, controlling unrelated variables. The intensity of exercise exceeded RPE. The range of suggestions should also be taken into account in order to adapt to the crowd; if music and video are experimented in the same group, whether music or video or music video combination improves sports performance, there is no specific argument, so the three groups of conditions should be statistically analyzed separately with the control group; some studies only use music once in the warm-up, in fact, it is continuous repetitive exercise. Considering the duration of use, the effect of long duration and short duration needs in-depth study; only assuming that motivational music intervention improves the individual's self-efficacy, but how to improve the self-efficacy and thus improve the sports performance of sports participants has not been further proved, considering the mechanism of psychological production should be explored.

5. Limitations

Sample: the sample size of literature retrieval in this paper is too small, only 13 articles. However, predecessors have basically devoted themselves to the research on the influence of music rhythm on sports, resulting in the lack of research samples in music intensity, music type, preference degree and other aspects, which will have an impact on this study.

Literature: the references of this paper are all from abroad, and there is hardly any research on how music affects the performance of sports in China. After systematic analysis, the research on how to cultivate the sense of music rhythm in sports is generally conducted in China, rather than using music.

Inclusion criteria: there is no accurate inclusion criteria for the selected literatures in this paper, only high-level keywords are searched. After preliminary screening, they are more in line with the research content of this paper and are selected. Many representative literatures may be missed or missed, which is also questionable.

Results: according to the selected 13 literatures, the classification index is the result summarized by ourselves, but it can not guarantee that there is no deviation or omission. More systematic and perfect classification index needs to be further improved in future research.

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