

The Impact of Color on Marathon Runners

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Abstract: Based on years of experience in marathon events, this study examines the impact of color on marathon runners from the perspectives of color science, sports physiology, and sports psychology. It aims to help coaches and athletes scientifically enhance the positive role of color in marathon sports, stimulate the athletes' potential, and improve their performance.

Keywords: Color; Marathon Athletes; Physiological and Psychological Impact

1. Introduction

Vision is the most important sense for humans and animals. Over 90% of the information humans acquire from the outside world is obtained through vision, where we perceive the size, brightness, color, and movement of external objects. Different wavelengths of light stimulate the human eye and brain, allowing us to experience a colorful world. Colors can evoke sensations of warmth or coolness, expansion or contraction, distance, weight, and excitement in different people under different conditions, leading to the classification of colors into positive and negative tendencies. In marathon competitions and training, colors directly affect the physiology and psychology of athletes, causing emotional changes that subsequently affect their performance and athletic achievements. Marathon sports are ultra-long distance competitive events that require both speed and endurance. Marathon running is a moderately intense sport, with aerobic and anaerobic metabolism accounting for 95% and 5% respectively, with aerobic metabolism being dominant. Due to the longer duration and distance compared to other long-distance running events, the monotonous running can easily lead to physical and mental fatigue in athletes. The health of a marathon runner's body and mind directly affects the quality of their competitive performance. In addition, an athlete's training habits, training and living environments, daily routines, competitive experience, seasonal changes, weather variations, and the athlete's physical condition and emotions on the day of the competition also indirectly affect their competitive performance. Among the many influencing factors, the impact of color on the physiology, psychology, and competitive performance of marathon athletes should be highly valued by coaches and athletes. In marathon competitions, if we choose the right colors to stimulate athletes, we can mobilize their enthusiasm, bring out their potential, and encourage them to achieve better results in the competition. Color directly transmits through the senses to the central nervous system, causing a brain response, and thus can instantly evoke an athlete's emotions. For example, seeing red can cause excitement in the athlete's cerebral cortex, increasing heart rate and blood pressure, as well as respiration; however, staring at red for too long may lead to a decrease in muscle strength, reduced physical coordination, increased physical consumption, and limited athletic ability. Whereas seeing green can calm the emotions, create a sense of relaxation, and speed up the recovery from fatigue. According to research by Fere, "under the illumination of colored lights, the elasticity of human muscles increases and blood circulation accelerates, with the degree of increase ordered from smallest to largest as blue, green, yellow, reddish-yellow, and red." Colors not only affect a person's physiology, psychology, and emotions but also their character and sentiments.

Because of color, people's lives have become increasingly rich. In marathon sports, if coaches and athletes can accurately use the positive effects of color, they will surely be able to help control emotions, overcome the irritability that occurs during long-distance running, eliminate fatigue in a timely manner, adjust and improve the athlete's physical function, and bring out the athlete's potential to achieve better

competitive results. Marathon sports are widely carried out in our country and are loved by many. However, there is still a gap between the performance of our country's marathon athletes and foreign athletes, making the study of the physiological and psychological impact of color on marathon athletes very important.

2. The Sources of Color in Marathon Competitions and Their Physiological and Psychological Impact on Athletes

2.1. Sources of Color in Marathon Competitions

In marathon competitions, the sources of color are divided into direct and indirect sources. In the sport of marathon running, direct sources of color refer to those that have a direct relationship with the athletes. These include the type of race course (highway or mountain trail), the dark blue color of the highway, the earthy yellow of the mountain trail, and the colors of the athletes' clothing. Indirect sources of color are those that have an indirect relationship with the athletes in the competition environment. For example, the various colors present in the competition setting, when racing in a city, athletes will see towering high-rise buildings with colorful billboards everywhere; when racing on mountain trails in the countryside, athletes will see green trees, colorful flowers, and various small plants; the clothing colors of referees, staff, spectators along the way, banners, and the colors of the team flags, etc.

2.2. The Physiological Impact of Color on Marathon Runners

The impact of color on the vision of marathon runners varies due to the different wavelengths of colors found in nature, which affect one's field of vision and visual acuity differently [2]. In order from the largest to the smallest impact, they are white, yellow, blue, red, and green. The larger the field of vision, the broader the range people can observe. At the same time, emotions also affect an athlete's visual field. When athletes are emotionally high or low, the flexibility of the eyeballs decreases, vision becomes sluggish, the field of vision narrows, and in severe cases, it can lead to parallax and illusions, directly affecting the athlete's ability to compete and, consequently, their competitive performance. In marathon races, if the colors of athletes' clothing are too complex and varied, it can distract their attention, which is not conducive to the competition. Especially during the stalemate phase with opponents, if there are too many and too complex colors entering the athletes' eyes, it will affect their field of vision, distract their attention, increase voluntary mistakes, disrupt the normal rhythm of running, and disrupt the continuity of the competition, directly affecting the athlete's final results. If athletes train and compete in an environment with chaotic colors over a long period, it is not conducive to the development of tactical awareness and tactical literacy.

2.3. Color Boosts Marathon Performance

In marathon races, if athletes wear bright and eye-catching clothing in fluorescent yellow, fluorescent green, light yellow, or orange, it can enhance their visibility during the competition, increase their level of excitement, strengthen their focus on the race, expand their field of vision, and greatly enhance their ability to fully utilize tactics and techniques. This, in turn, can effectively improve the competitive performance of marathon runners.

2.4. The impact of color on the physiological functions of marathon runners is significant.

In marathon races, color not only affects an athlete's field of vision but also their physiological functions [3]. For instance, color can influence the heart, blood pressure, endocrine system, and the central nervous system. These influences can be both positive and negative. When people see red, the nervous system becomes excited, the heart rate increases, adrenaline is heightened, and blood circulation quickens. However, staring at red for too long can affect vision, causing dizziness. When people see green, it can reduce ocular pressure, alleviate visual fatigue, and improve muscle function. But being in a green environment for a long time can make one feel cold and affect gastric juice secretion, leading to a decrease in appetite. Blue can inspire imagination, regulate nerves, treat insomnia, and lower blood pressure, but its negative effects include accelerating neurasthenia and potentially causing depression. Yellow can stabilize emotions and enhance appetite, but staring at it for too long can exacerbate negative emotions. Most marathon races take place on roads, and the asphalt of city roads is a dark blue-black color, which can easily

suppress an athlete's spirit. In trail marathon races, athletes face the earthy yellow of mountain paths, and staring at it for too long can make them feel powerless and tired. Marathon races are long in duration and cover a greater distance compared to other long-distance races. Athletes who are negatively affected by color for extended periods can easily feel bored and weak, affecting their fighting spirit and emotions, and in severe cases, can even lead to various diseases.

3. The Psychological Impact of Color on Marathon Runners

Color is ubiquitous in every aspect of people's lives. With the development and advancement of science and technology, more and more people have begun to pay attention to color and study its effects on physiology and psychology. Through research on the properties of color, it has also been found that color can affect people's knowledge level, cultural literacy, ethnic customs, aesthetic consciousness, values, and emotions. Over the years, as an official in marathon events, I have noticed in various competitions that the impact of different colors on marathon runners varies, directly affecting the athletes' emotions, psychology, and competitive performance.

3.1. The Impact of Color on Marathon Runners' Emotions

Many psychologists believe through research that various colors are transmitted through the senses to the central nervous system, causing the brain to react differently to colors, directly affecting people's emotions and behavior. In marathon competitions, emotions directly affect the performance of athletes and the final results of the competition. Emotions can play a positive role, promoting athletes to perform their potential in the competition and improve their performance; they can also have a negative effect, making athletes depressed, losing the passion and ability to compete, and ultimately affecting the competition results [4]. For example: Red is grand and warm, urging people to be actively enterprising; Blue is serious and solemn, gentle and relaxed, which can alleviate tense emotions; Green is a symbol of hope and life, making people feel comfortable and peaceful, and is helpful for post-race fatigue recovery; Orange is full of vitality, making people feel warm, energetic, and enhancing their fighting spirit; Purple is soft and peaceful, making people calm and contemplative; Black is prone to making people feel sad and sentimental. All kinds of warm colors make people full of vitality and vigor; all kinds of cold colors make people feel calm and oppressive. In various marathon competitions, it is often possible to see athletes wearing high-brightness, high-purity warm-colored clothing, because this can make athletes more excited and actively participate in the competition [5].

3.2. The Impact of Color on Marathon Runners' Attention

Attention refers to selective attention, which is the simultaneous direction and concentration of a person's senses and perception towards a certain object, and is a positive psychological activity. When people focus on colors, they are always perceiving, thinking, remembering, imagining, or experiencing. At different times, in different situations, and in different activities, people's psychological states also vary. The information people perceive about the world mainly comes from vision. In marathon competitions, if color can be used appropriately to adjust the athletes' attention, it will make the athletes more focused on the competition, playing a positive role in improving the competition results [6]. For example: Red, orange, light yellow, and light blue make athletes concentrate; fluorescent yellow and fluorescent green can affect athletes' behavioral abilities, increase excitement, and thus improve sports performance: White and black can enhance athletes' fighting spirit, but they can also have negative effects.

4. The Positive Impact of the Proper Use of Color on Athletes

4.1. Choose different colors according to the seasons.

Marathon runners compete in various seasons, and their psychological needs for color differ accordingly [7]. In the warm spring, with its peach blossoms and willow greens, and the suitable temperatures, athletes can wear brightly colored clothing or clothing with high color contrast. This helps athletes to shake off negative states and regain psychological confidence. In the scorching summer, with the hot sun and high temperatures, athletes should be given cold-colored clothing. Cold colors provide a feeling of coolness,

freshness, and comfort, which helps to stabilize athletes' emotions and make them happy to participate in the competition, psychologically freeing them from the feeling of heat and dryness. In the comfortable autumn, the season of harvest, with suitable temperatures, athletes can be given richly colored clothing, and some gradient colors can also be chosen for matching. In the cold winter, when the colors of nature are pale and bleak, athletes should be given warm-colored clothing. Warm colors make people feel bright and warm, and dark-colored clothes are easy to absorb heat, making athletes feel warm psychologically.

4.2. Select different colors based on different competition environments.

In various marathon competitions, selecting the appropriate colors to stimulate athletes can yield unexpected results [8]. When racing on urban roads, where high-rise buildings are ubiquitous and billboards are abundant, the long-distance running can easily cause visual fatigue for athletes. Therefore, athletes may opt for clothing in colors such as fluorescent yellow, fluorescent green, and orange. During races in the countryside or on winding mountain roads, surrounded by trees and filled with greenery, the fresh air makes long-distance running feel relaxed and pleasant for athletes. For these settings, athletes' attire might include light yellow, light pink, light green, and so on. For races along coastal roads where sunlight is abundant and can make it difficult for athletes to keep their eyes open, leading to visual fatigue, it is advisable to choose relatively soft colors, and when necessary, to wear sunglasses.

4.3. Choose colors based on the athletes' personal preferences and habits.

In marathon competitions, due to differences in living environments, levels of knowledge, and personal temperament, each athlete has their own preferences and habits regarding color. Generally, athletes prefer clothing in the colors of their national flag; for example, Chinese athletes like attire with a combination of red and yellow; African athletes prefer a combination of green and yellow. During competitions, this can remind athletes of their country, that they are striving for their homeland, thereby strengthening their determination to complete the race. Some athletes consider the color of the clothing they wore when they achieved good results in a competition to be their lucky color, and they repeatedly wear clothing of this color in subsequent competitions. For instance, Chinese team members believe that red symbolizes victory. Some teams also have the habit of all athletes wearing the same color of clothing for the competition, and in the heat of the contest, just seeing the color of their own team allows everyone to tacitly cooperate in tactics and strategy.

5. Conclusion

This article explores the physiological and psychological impact of color on marathon runners and offers suggestions for the reasonable use of color to enhance athletes' performance. Research indicates that color can rapidly influence emotions and physiological states through vision, such as red enhancing excitement and green aiding in emotional stability and fatigue recovery. Marathon runners are directly affected by colors from the race course, clothing, and environment, which indirectly affect their competition performance by influencing their attention, emotions, and physiological functions. To improve the performance of marathon runners, it is recommended to choose appropriate colors based on seasonal changes, competition environments, and athletes' personal preferences. For instance, bright colors are selected for spring, cool colors for summer, richly colored attire for autumn, and warm colors for winter. Additionally, the color of an athlete's clothing should be coordinated with their national flag or personal lucky colors to inspire fighting spirit and teamwork. Through these methods, the positive effects of color can be harnessed to help athletes control their emotions, eliminate fatigue, and perform at their best during competitions.

6. References

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