

# The Effect of physical training on the Psychological Adjustment of stage fright of basketball athletes

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## Abstract

Every basketball player must possess exceptional psychological qualities to perform well. This study aims to determine the impact of physical training on the psychological development of basketball players. Twenty national first-class basketball players were chosen at random to participate in this study, which collects quantitative data. Partial least square-structural equation modeling (PLS-SEM) is employed for data analysis. Based on empirical findings, the study demonstrated that physical exercise significantly affects the muscle control of athletes and enhances psychological quality indicators from multiple perspectives. This study concluded that basketball players should be strongly encouraged to engage in physical activity. When athletes in the experimental group increased their physical training, their psychological qualities improved, and they became more stable in significant competitions. This study has contributed considerable findings to both theory and practice for improving the basketball performance of athletes.

**Keywords:** Physical ability; Basketball athletes; Psychological adjustment; Physical training

## 1. Introduction

As a result of the evolution of society, basketball events are no longer a pure competition between athletes but rather a contest of psychological quality. Consequently, psychological quality training has received unprecedented attention. Especially for juvenile basketball athletes, the lack of experience and immaturity of the game prevents them from taking the appropriate measures to deal with the game's complexities and from correctly assessing the success or failure of the game (Saulius & Malinauskas, 2023). The psychological pressure exerted upon athletes by the competitiveness and success of the game. Basketball players who lack psychological maturity cannot perform at their highest level during competitions. It has a negative effect on the outcome of the game and is not conducive to the overall development of basketball. To effectively eliminate the psychological barriers of basketball athletes, particularly young basketball athletes, and to enhance the overall level of basketball games, it is crucial to develop psychological training and adjustment plans for basketball athletes (Lu & Li, 2022).

There are numerous factors why basketball games psychologically impact athletes (Huang & Wang, 2021). Initially, the opponent's power will affect the athlete's disposition. Team members will likely experience tremendous psychological pressure if the opponent is mighty. Some may even experience a negative mood of discouragement, which is not conducive to their normal performance. However, the team members may be confident if the opponent's strength is inferior. Second, the

referees' impartiality also influences the athletes' moods. Athletes who believe the referee's punishment is unjust will experience negative emotions. Thirdly, the teammate's cooperation may result in errors and loss of points due to the teammate's unique understanding of the situation and playing style.

The confidence level of athletes in the game plays a crucial role in the evolution of sports technology. Teenagers' physical and psychological characteristics continuously develop, particularly their psychological comprehension and pressure tolerance (Gould, Martin, & Walker, 2022). In addition, modern competitive sports frequently emphasize victory and defeat, and fierce competition increases the strain on athletes. Athletes will experience stage anxiety and possibly fail the competition if subjected to this pressure. Therefore, instructors, athletes, and sports psychologists are increasingly concerned with athletes' sports self-confidence and its origins (Ohji et al., 2021). Basketball is a sport that requires athletes to actively cooperate with their peers on a predetermined playing field by coordinating various technical movements and strategies within the constraints of the rules of competition. In a basketball game featuring intense physical confrontation, frequent changes are needed in at, defenses, and complex situations. Athletes must also have a conviction in victory, a tenacious will, and the capacity to adapt to change (Leguizamo et al., 2021), in addition to their superior physical attributes, comprehensive skills, and reasonable tactical arrangements. Interference from the external environment, including the opposing team, the referee, and the audience, is

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inevitable during the competition (Wang, Lei, & Wu, 2023). The key to winning the competition is learning how to adjust their mindset, control their emotions, maintain a good state, perform at their optimal competitive level, and promptly eliminate anxiety, impatience, and other negative emotions. This study seeks to examine the impact of physical training on the psychological development of basketball players. The Effect of physical training on the psychological characteristics of basketball players was investigated. The findings of this investigation have significant theoretical and practical implications. The theoretical ramifications of this study are supported by empirical evidence and are novel in the academic literature. Conversely, the practical implications of this study are essential for enhancing the psychological quality of basketball athletes through physical training. In addition, this research suggests some avenues for future analysis and critical expansion of the corpus of knowledge.

## 2. Literature Review

Psychological training is an integral component of the contemporary basketball training system. By exerting influence on the athletes' psychological state and personality psychological traits, scientific methods and means are systematically used to effectively adjust and control their own emotions, thinking, behavior, and other psychological states to ensure the athletes' normal or even extraordinary competitive level. Excellent physical quality and exhaustive and skilled technical movements are the premise and foundation for athletes to achieve outstanding results, and stable and good psychological quality is a crucial assurance that they will perform at their appropriate competitive level. Through psychological training, athletes can cultivate various psychological qualities and personality characteristics to adapt to the demands of modern basketball sports and continuously strengthen and improve their ability to solve psychological problems during competition and training. The findings of Lu and Li (2022) indicate that the athletic performance of professional athletes with predictive mental health can be predicted. The relationship between mental health and professional athletic performance was not statistically significant (Saulius & Malinauskas, 2023). According to Leguizamo et al. (2021), athlete mindfulness is associated with favorable outcomes. Ohji et al. (2021) assessed the Effect of mindfulness training on improved mental resilience (MR) and mental health (MH). Physical fitness training is a fundamental requirement for basketball athletics training. Without the assurance of physical fitness, technical and tactical training cannot produce optimal results; without scientific and effective physical training, it

is challenging to enhance their competitive ability. In physical training, continuous high-intensity, repeated large-scale exercise is guaranteed to cause athletes to experience boredom, boredom, rebelliousness, and other negative psychological emotions, significantly diminishing the training effect (Chien et al., 2022). Using the intervention of psychological training, identify the interior needs of athletes, implement several positive psychological factors into the training process, and stimulate training enthusiasm (Samuel, Tenenbaum, & Galily, 2020). In physical training, difficulties, and obstacles are introduced to create adverse conditions such as fatigue and adversity artificially and to cultivate the athletes' indomitable will and never-give-up attitude.

It is currently simple to protest. In addition, basketball requires the close cooperation of the team. Therefore, complaining is not conducive to game success. Fourthly, the difference in scores between the two teams will also affect the athletes' mental state. During basketball games, if one team falls behind the other, particularly in the second half, team members may experience anxiety or negative emotions.

On the other hand, if one team has a higher score than the other, team members may be in high spirits and have the mindset of emotional adversaries. Fifthly, if the basketball court is unfamiliar to the athletes, this will also result in psychological fluctuations. Sixthly, if the athlete's skills are insufficiently professional, he or she is likely to experience negative emotions and psychological pressure during the competition; if the athlete's skill level is high, they may also have a mentality of belittling the opponent and individualism during the competition (Ellis et al., 2022).

Athletes' environmental, physiological, training level, and psychological factors all influence athletic performance. As a competitive sport, basketball is highly competitive, high-achieving, and high-pressure (Henriksen et al., 2020). In addition, athletes' self-definition and self-confidence are significant factors that influence their performance in the game. Under the influence of scientific and advanced training methods, athletes' own physical quality and tactical level, and the same level of the athlete's performance, sports competition is becoming increasingly competitive with the accelerated development of modern competitive sports. Thus, the psychological quality training level of the athlete will have a direct effect on the outcome of the event. Therefore, it is vitally essential for athletes to consciously and deliberately develop and improve their various psychological qualities, as well as to undergo scientific, exhaustive, and systematic personality and psychological training.

Without physical endurance, it is impossible to ensure basketball athletes' technical and tactical ability (Bastik &

Gümüşdağ, 2022). For athletes of equally technical and tactical knowledge, the difference in their physical characteristics can nearly determine the game's outcome. Therefore, basketball players' physical fitness training intensity must correspond to their technical and tactical skill levels. Their physical fitness meets expectations only when athletes attain a specific technical and tactical proficiency level (Zartaloudi et al., 2023). Players cannot achieve the desired results without relying solely on excessive physical training and disregarding the combination of physical training and technical tactics. In this regard, trainers should further develop and improve the technical and tactical level of basketball players while enhancing their physical endurance to enhance the applicability of the technical level of basketball athletes during actual combat.

In recent years, the theoretical and practical level of basketball coaches' physical fitness training has been significantly enhanced through various competitions and exchange learning (Goisbault et al., 2022). They can promptly comprehend the new technologies and concepts of physical fitness training of the world's basketball powers and progressively implement advanced physical training technology into basketball training. However, advanced physical training learning theories and methodologies cannot be copied verbatim (Conti et al., 2019). It is necessary to combine the characteristics of basketball athletes to innovate the means and methods of physical training, and coaches and scientific researchers should coordinate and collaborate. Based on basketball athletes' different factors and playing techniques, other physical training methods are formulated to adjust the players' physical fitness, laying a solid foundation for athletes to achieve good results (Nyland & Pyle, 2022).

Every basketball player's self-confidence must come first, as self-assurance accounts for fifty percent of achievement. In a basketball game, if each player is confident, they will perform at their highest level, which is conducive to the team's victory (Sánchez-Sánchez et al., 2023). If athletes lack confidence in themselves and their team, utilizing their skills to their maximum potential during competition is difficult. In the game, if the athletes have strong self-confidence, they will not give up, even if their team's score is lower than their opponent's in the final minute (Karipidis & Steinfeldt, 2020).

Inseparable from the encouragement of coaches at commonplace times is the development of athletes' self-confidence; therefore, coaches should encourage and praise athletes more; for instance, coaches can tell athletes before a competition, "I believe you will win this competition." In training, trainers may state, "You can dunk this ball," etc.

The words espoused by the coaches are conducive to maintaining a positive atmosphere in the stadium. After a victory, the confidence of the team members will naturally increase, creating a virtuous circle (Gentile et al., 2021). The development of self-assurance is inextricable from regular fundamental training. Athletes have mastered superior abilities through routine training, which can boost their confidence. If the free throw hit rate is low, the coaches should increase the overall training volume, which will place psychological pressure on the players. Typically, when players shoot under psychological pressure, their hit rate decreases, and through continuous training, this trend can be reversed.

Moreover, it is advantageous for athletes to overcome psychological pressure, trust themselves in the game, perform their shooting skills entirely and consistently, and win (Piñar et al., 2022). Inseparable from competition training is the cultivation of self-confidence; only by combining it with competition training can we accomplish good results, adapt to the competition, and maximize our level in competition (Park & Jeon, 2023). Often in the final minute or two of a game, the athletes' mood will fluctuate significantly; however, highly self-confident athletes can typically better comprehend the overall situation and seize the opportunity (Kvist, Bengtsson, & Lundqvist, 2023). Therefore, in training, coaches can train for the last two minutes of the game, arrange the same score for the two pairs, and make tactical arrangements to observe the movement of the players; they can keep the mentality of the athletes and then guide them; through long-term training, athletes can also control their emotions at the last critical moment, increase their self-confidence, and not panic in the last crucial moment of the actual game. In basketball games, if each athlete has strong self-confidence and self-control, it is conducive to seizing the opportunity, giving full play to the strength of the entire team, and winning (Gutiérrez-Capote et al., 2023). On the other hand, suppose athletes have only self-confidence, no self-control ability, and compete independently on the field. In that case, the entire team will be dispersed, and the team's overall strength will not be utilized, resulting in many points and errors (Gould et al., 2022).

Moreover, the modern basketball game emphasizes defense and athlete positions are ambiguous, necessitating the participation of all five players (Wang et al., 2023). Excellent basketball athletes must therefore possess specific self-control skills.

Therefore, in basketball training, instructors should prioritize not only the development of athletes' self-confidence but also the development of athletes' self-control ability. Furthermore, during daily training, the coach should allow each team member to increase their understanding and comprehension

of collective honor. Furthermore, when learning to use their abilities, they should consider the overall situation on the field and maintain confidence in themselves and their teammates. Based on these findings, we develop the following hypothesis:  
**Hypothesis 1:** *There is an effect of physical training on the psychological adjustment of stage fright of basketball athletes.*

### 3. Methodology

This investigation uses a questionnaire to collect quantitative data to verify the Effect of physical training on improving basketball players' psychological qualities. The scale elements used in this investigation were adapted from previously conducted research. Twenty national first-tier basketball players were randomly chosen to participate in the experiment. During the compilation of data, the athletes were in excellent health. In addition, twenty athletes adapted their physical training methods and content based on their daily fundamental training. During the three-month trial period, athletes were monitored and instructed to train correctly. The data obtained pertains to the athletes' performance, training status, and competitive status. In addition, this investigation has analyzed the data collected from respondents. Nonetheless, this study uses partial least square–structural equation modeling (PLS-SEM) for data acquisition and analysis. For the ultimate results, the findings of the measurement model and structural model are utilized.

**Table 1**

*Convergent Validity*

Constructs	Cronbach Alpha	Composite Reliability	Average Variance Extracted
Physical Training	0.88	0.78	0.68
Psychological Adjustment	0.85	0.81	0.72

In addition, this research has determined the findings regarding discriminant validity, which are essential for determining the data analysis. The discriminant validity results corroborate that the measurements used to collect data are unrelated. This study employed the Heteritrait-Monotrait

**Table 2**

*Discriminant Validity*

Constructs	Physical Training	Psychological Adjustment
Physical Training	0.67	
Psychological Adjustment	0.51	0.49

Finally, the research data is used to test the hypothesis after confirming the discriminant and convergent validity. For it, the t-statistics are taken by using PLS-SEM. The t-statistics for the two-tailed hypothesis are significant when the findings achieved 1.96 (Hair Jr, Howard, & Nitzl, 2020).

### 4. Results and Findings

This research examines the analyzed data's normality by determining the skewness and kurtosis values (Royston, 1992). The skewness and kurtosis are significant when their values are between +1 and -1. This study's findings were determined by entering data into SPSS 24. The results demonstrated that the skewness and kurtosis values for the data acquired for this study fell between +1 and -1. Therefore, the data used in this study are normal. In addition, this study examined missing values, but the reported results indicate no missing values in this study's findings. Thus, the data for this study have sufficient normality and can be utilized for further analysis.

On the other hand, this research's convergent validity is examined. This validity test is based on factor loadings, Cronbach's alpha, composite reliability, and extracted average variance. Shevlin and Miles (1998) recommend that the factor loadings of any study data should be greater than 0.60 for significant validity. Thus, the data analysis revealed that this study had loadings greater than 0.60, indicating that the items used for data measurement have individual validity. In addition, Cronbach alpha values greater than 0.70, composite reliability values greater than 0.70, and average variance extracted values greater than 0.50 are acknowledged for significant convergent validity. Consequently, Table 1's analyzed statistics indicate that the study's findings have significant convergent validity.

(HTMT) method for testing discriminant validity. The HTMT results must be less than 0.90 (Gold, Malhotra, & Segars, 2001) for discriminant validity to be significant. The results presented in Table 2 demonstrate that the discriminant validity of the research data is substantial.

The results of the hypothesis ( $\beta = 0.77$ ,  $t = 5.227$ , and  $p = 0.000$ ) reported that the Effect of psychological training is significant in the psychological adjustment of stage fright of basketball athletes. The data for this relationship is reported in Table 3.

Table 3

Hypothesis Testing

Relationship	$\beta$	t	P
Physical training -> Psychological Adjustment	0.77	5.227	0.000

## 5. Discussion

Based on this research's empirical and statistical findings, the results have been determined to be novel in the literature. According to the study, physical training affects basketball players' psychological adjustment to stage anxiety. These findings supplement the theory of basketball players' psychological imprudence. However, these findings are novel to the literature but are supported by prior research. With the approach of significant competitions in modern competitive sports, athletes' technical and tactical levels and physical function will stabilize, and there will be no significant changes before the match. However, [Saulius and Malinauskas \(2023\)](#) reported that the psychological changes of athletes at this juncture might cause fluctuations in the competitive state and directly impact the competition's outcome. The practice has demonstrated, according to [Wang et al. \(2023\)](#), that the higher the level of competition and the more intense the competition, the greater the psychological pressure on athletes; consequently, modern competitive sports pay increasing attention to the periodic adjustment and active response to psychological pressure on athletes.

Psychological stress is dynamic in that it produces an emotional response of perception and experience when an individual confronts what has happened or will happen ([Gould et al., 2022](#)). Excessive psychological stress will activate the body's sympathetic nervous system, keeping the body tense and vigilant. The body stores the energy released by the suppressed body, causing the viscera to overreact and negatively impacting the body's health. For example, basketball players are a socially pressurized group ([Ohji et al., 2021](#)). Typically, they are under excessive psychological pressure to dedicate themselves to the game. As a result, they are susceptible to performance anxiety, shortness of breath, rapid pulse, emotional instability, memory loss, inability to concentrate, and fear of failure.

Numerous factors, such as high social expectations, excessive media attention, and strong championship indicators, contribute to psychological pressure on basketball players, causing them to bear a specific psychological burden ([Leguizamo et al., 2021](#)). Some potent athletes cannot respond decisively to competition gains and losses under excessive psychological pressure ([Huang & Wang, 2021](#)). This will harm their normal performance. In addition, the internal

competition among athletes is ferocious, and they have high expectations for the outcome, placing them under tremendous psychological pressure.

Every basketball player is eager to succeed, but it isn't easy. Athletes encounter numerous adverse conditions during training and competition, including formidable opponents, fierce competition, continuous competition fatigue and pain, and accidents ([Bastık & Gümüřdađ, 2022](#)). Therefore, first, let athletes comprehend that accidents and adversity are expected, and then let them actively learn and master specific psychological adjustment techniques to deal with various adverse situations. In addition, you can seek the assistance of coaches and psychological counselors to adjust your psychological state and achieve the highest level of psychological performance in competition ([Zartaloudi et al., 2023](#)).

Modern neuropsychological research has demonstrated that music can directly influence the human nervous system, particularly the cerebral cortex, including heart rate, blood pressure, skin potential, muscle potential, endocrine and biochemical substances, and brain waves ([Karipidis & Steinfeldt, 2020](#)). The rhythm of music substantially affects an individual's respiration rate, pulse rate, etc. Music can alleviate and eliminate psychological tension ([Kvist et al., 2023](#)). Consequently, basketball players can choose music based on their psychological state and requirements and actively manage their psychological pressure while listening to music.

Due to the various physiological thresholds that each individual can perceive, it can be difficult for athletes to detect and control the changes resulting from their internal psychological pressure and tension ([Piñar et al., 2022](#)). However, with the continuous advancement of science and technology, it is now possible to monitor the physiological threshold of the body using sophisticated instruments and equipment, allowing athletes to modify their psychological pressure promptly ([Conti et al., 2019](#)). As a result, biofeedback adjustments make up most of the adjustment methods domestic and international athletes use.

The biofeedback mediation method amplifies physiological signals that are difficult to perceive within the human body, using modern biofeedback instruments to facilitate psychological adjustment training ([Sánchez-Sánchez et al., 2023](#)). Athletes can consciously use "ideas" to regulate their psychology following training. Biofeedback regulation can capture the exciting points and best performance ability of

athletes during training and competition, as well as the ability to competition stress response, correct bad behavior habits and pre-competition anxiety of athletes, and play a role in relieving psychological stress and fatigue and shaping the good emotional state and behavior mode of athletes (Nyland & Pyle, 2022). Presently, biofeedback instruments suitable for athletes include simple biofeedback instruments such as skin electricity and heart rate variability and equipment operated by professional psychological personnel that can conduct biofeedback psychological adjustment training more comprehensively and accurately (Gutiérrez-Capote et al., 2023).

In an unpredictable basketball game, fast and timely responses are crucial conditions for players to maximize their speed quality, and surprise is the key strategy for them to achieve victory (Chien et al., 2022). Excellent speed quality can help athletes not only obtain advantages in time and space during competition but also directly avoid the threat posed by others and improve the effectiveness and timeliness of defense and counterattack (Goisbault et al., 2022). Therefore, for both offensive and defensive strategies, the quickness of athletes is crucial. In a nutshell, when training the speed quality of basketball athletes, they should try to fit the game as much as possible, make meeting the game's needs the primary premise, and improve the athletes' reaction speed, displacement speed, and movement speed in all aspects (Park & Jeon, 2023). For athletes to enhance their displacement speed or movement speed, it is necessary to adhere to the principle of repeated practice with the utmost force they can withstand and force them to improve their displacement speed and movement speed to increase their reaction speed.

Foreign basketball players will emphasize quickness and strength training, particularly the "speed" component of strength training (Ellis et al., 2022). When performing strength training, it is essential to consider the coordination between the nervous system and musculature of the athlete, as well as the relationship between strength and speed. In basketball, athletes' ability to execute all technical movements is contingent on their quickness. However, when muscle contraction speed reaches it is optimum, they are able to complete the activity rapidly and produce increasing amounts of force. However, there is no necessary connection between the genesis of this phenomenon and the muscle's absolute strength (Samuel et al., 2020).

It is difficult to arrange the intensity of exercise burden during muscle strength training, particularly in special strength training, the combination of load and power, the number of repetitions, and groups (Henriksen et al., 2020). Therefore, the training content differs when performing

strength training. In tandem with the development of muscle strength training, athletes' muscle mass will also increase (Bastık & Gümüşdağ, 2022). Athletes' strength and explosive force will increase proportionally with increased muscle mass. The participants should be aware. Therefore, strength training that can enhance the sport's load and speed should strengthen the athletes' body monitoring during the training process to prevent sports injury.

## 6. Conclusion

Physical training enables basketball players to better control their muscles, exert reasonable effort, and effectively enhance the psychological quality of athletes, as demonstrated by the empirical findings. The increase in self-confidence, the speed of adjusting the psychological state, the quality of the athletes' will, and their physical fitness demonstrate the efficacy of physical training in enhancing the psychological quality of athletes. Athletes are subjected to intense psychological pressure; therefore, they must have a solid psychological makeup. Therefore, daily training should include psychological quality training in addition to fundamental training such as technology, tactics, and physical fitness. In addition to the development of technical ability, the improvement of psychological quality plays a crucial role in the enhancement of athletes' performance.

Physical training has a significant impact on the muscular control of athletes and the enhancement of psychological quality indicators from all perspectives; therefore, physical training should be aggressively promoted. Before a basketball contest, young athletes must conduct an in-depth analysis and comprehension of their opponents and the environment. Choose the most effective method for overcoming stage fright to demonstrate the highest level of training in your field and prevent being caught off guard by unforeseen phenomena. At the same time, juvenile athletes should be accustomed to dealing with competition emergencies and be able to solve them flexibly on the field to enhance their adaptability.

## 7. Theoretical Implications, Practical Implications, and Future Directions

This study has contributed new information to the literature regarding basketball athletes and their performance. In this manner, the research revealed that basketball players must enhance their performance efficaciously. Studies on player performance are already available in the literature. Still, this study adds to the body

of knowledge by asserting that basketball players should be highly motivated for their product performance. Basketball players who have access to improved training can advance their strategies for enhancing their mental health. Modern players must possess strategic skills to achieve effective implementation, and basketball players are highly motivated to take actions that will advance their performance. This advancement in the literature has significantly expanded the corpus of knowledge, and these findings were not highlighted in earlier research works. The significance of this study's findings cannot be overstated, as they advance the theory of basketball athletes. In the interim, scholars can comprehend these relationships to construct a framework for future research.

This study's findings also have practical implications that basketball players and team administrators must consider. First, the instructors must provide athletes with monitored training to ensure that their performance improves over time. Athletes' access to pertinent information regarding their training is the key to advancing their work. Basketball athletes should be provided with training organizations designed to maximize their participation and performance within the team. The psychological well-being of the athletes can be enhanced when the instructors are serious and routinely monitor the athletes' performance. The path forward that can empower athletes for team performance is a significant team performance, but they must have psychological control over it. Thus, fruitful athletic performance is possible when teams are managed reasonably to improve their performance. Many athletes

are motivated to improve their practices for teamwork, but by enhancing their psychological state, they can perform better in the team setting. Therefore, basketball players must engage in appropriately devised physical exercises to improve their psychological well-being and facilitate productive performance. This issue should receive the attention of team management, instructors, and athletes.

Based on its empirical evaluations and findings, this study concluded that basketball players should be strongly encouraged to engage in physical activity. Moreover, this study revealed that the psychological quality of the athletes in the experimental group who increased their physical training improved, and they became more stable during significant competitions. In addition, this research has contributed essential findings to theory and practice to enhance athletes' basketball performance. However, future researchers must take into account the limitations of this investigation. Scholars are obligated to determine the Effect of mental health literacy on the performance of athletes during physical exercise, as this phenomenon has not been exhaustively explored in the available research. In addition, the researchers are motivated to ascertain the direct Effect of basketball players' health behaviors on their physical activity. In addition, future research should examine the moderating Effect of health behavior between physical exercise and psychological well-being among basketball players. To contribute to the body of knowledge through academic works based on empirical evidence, these findings must be substantially considered.

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