Training, lifestyle and physiological conditions and performance in esports: a review

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Abstract

Esports practices are fast-growing worldwide with the increasing interest of numerous spectators. Given the competitiveness inherent to this activity, performance optimization is crucial to a large number of professional gamers and staff. However, scientific data, regarding critical factors that could favor such optimization, are still scant. This narrative review aims to provide a brief overview of studies that have examined the impact of lifestyle and psychophysiological parameters on esports players' performance. It has been shown that these factors are significant in a competitive context. The results describe the essential role of, sleep patterns, cognitive abilities, nutrition, and psychological functioning for optimal performance

in esports. In addition, the following technics including social cohesion, setting up clear life goals, internal discourse, and mental toughness technics positively affected esports players' performance. Our review also suggests that a multimodal coaching program for esports players, that considers all the aforementioned psychophysiological parameters, would account for the most benefits on performance.

Keywords: Esports, performance optimization, multimodal training, mental training, coaching, emotion management

Introduction

The International Esports Federation defines esports as a competitive activity in which players use their physical and mental abilities to compete against each other in virtual and electronic environments (IESF, 2022). In France, the Economic Affairs Committee defines esports as follows: "Esports refers to the practice of video games in a competitive context, at an amateur or professional level" (Masséglia, 2019). In some countries, the development of esports has reached a stage where professional practice is rigorously regulated. South Korea and the United States can be cited as examples of countries where esports is regarded as a genuine cultural phenomenon (for review see Pedraza et al., 2020). Moreover, the majority of professional gaming teams operating in these regions are overseen by official organizations and participate in various competitive events (for reviews see Cranmer et al., 2020; Pedraza et al., 2020). In Europe, certain countries have garnered attention for their organization of prominent professional events (LEC, European League of Legends championship in Berlin), the development of esports in France is still ongoing. In 2021, the "France Esports Association" revealed that there are 9.4 million people implicated with esports in France (players audience…). Regarding amateurs esports players (engaged in ranked and competitive play), 1.56 million individuals would be concerned, essentially between 15 and 34 years old (94%) and with a large majority of men (93% men, 7% women). Overall, one could acknowledge that esports is a rapidly expanding industry.

If considering esports as a traditional sport is still a matter of debate, this practice is arousing growing interest throughout the world. As the competitive dimension is common to both traditional sports and esports, it is reasonable to assume that the issue of performance optimization is equally relevant as well. Additionally, considering the complexity of the tasks involved in both disciplines, variables such as psychological preparation, lifestyle, and physiological conditions can exert an influence on athletes' performance. While in the field of

traditional sports, numerous research works have highlighted the psychophysiological data associated with performance, one cannot say the same for esports. However, some authors have turned their attention to psychophysiological data on the performance of esports players, by focusing in particular on nutrition (Thomas et al., 2019; Ribeiro et al., 2021), emotional management (Behnke and Kaczmarek, 2020), sleep habits (Lee et al., 2020) or cognitive capacities (Charland et al., 2012; Zhuang et al., 2020). Such research works are crucial in providing intel for the benefit of esports players in performance optimization.

The optimization of performance to enhance competitiveness represents a critical factor in any sport. Elite athletes frequently avail themselves of comprehensive support programs designed to support in their pursuit of superior performance. Indeed, coaching athletes in traditional sports entails a broad range of professions. From nutritionists to physical and mental trainers, many professions are dealing with lifestyle and psychophysiological conditions that have a critical importance to many top athletes. The introduction of this level of requirement in the field of esports would also allow the players to surpass their limits in competition. However, it is crucial to be aware of all the factors that have the potential to affect performance, including those related to lifestyle and psychophysiological parameters, to develop a suitable coaching program.

The objective of this review article is principally descriptive. Firstly, we will introduce the literature exploring the effects of psychophysiological conditions and lifestyle on esports players' performance. Then we will examine the coaching approaches currently employed to optimize performance in esports

Methodology

Protocol. The studies included in this review were identified following the recommendations of PRISMA (Moher, Liberati, Tetzlaff, Attman, & PRISMA GROUP, 2009). The process is detailed in Figure 1. The search was limited to studies published before January 2023.

We used the most important keyword "esports" with the following keywords and their combinations: "Nutrition", "Physical activity", "Sleep", "Mindfulness meditation", "Cohesion task", "Self-efficacy", "Performance goal", "Mental practice", "Pressure training", "Team cohesion", "Neurofeedback", "Psychosocial intervention", "Perfectionism", "Self-confidence", "Mental toughness", "Anxiety" "Stress", "Mastery goal approach", "Performance goal approach", "Goal setting", "Emotional intelligence", "Emotional competence", "Music", "Task goals", "Task-oriented coping", "Mood", "Emotion", "Mastery avoidance goals", "Ego goals", "Task climate", "Quiet-eye" as well as their associated terms and synonyms in the following electronic databases: PubMed, Cochrane Library, PsycArticles, ScienceDirect. Documents that were not initially located in the full text were requested directly from the lead authors.

Eligibility criteria. Full-text articles were eligible for inclusion in this narrative review under the following conditions: (a) published in peer-reviewed scientific journals; (b) written in English or French; (c) examining the factors of interest in this review (nutrition, sleep, physical activity, emotion, stress, coaching, motivation, and preparation); and (d) testing a population that included esports players.

For each article included in the analysis, the following elements were extracted and analyzed: authors and year of publication, main objective, characteristics of the population esports players, theoretical framework, tools used, and games concerned, and main findings.

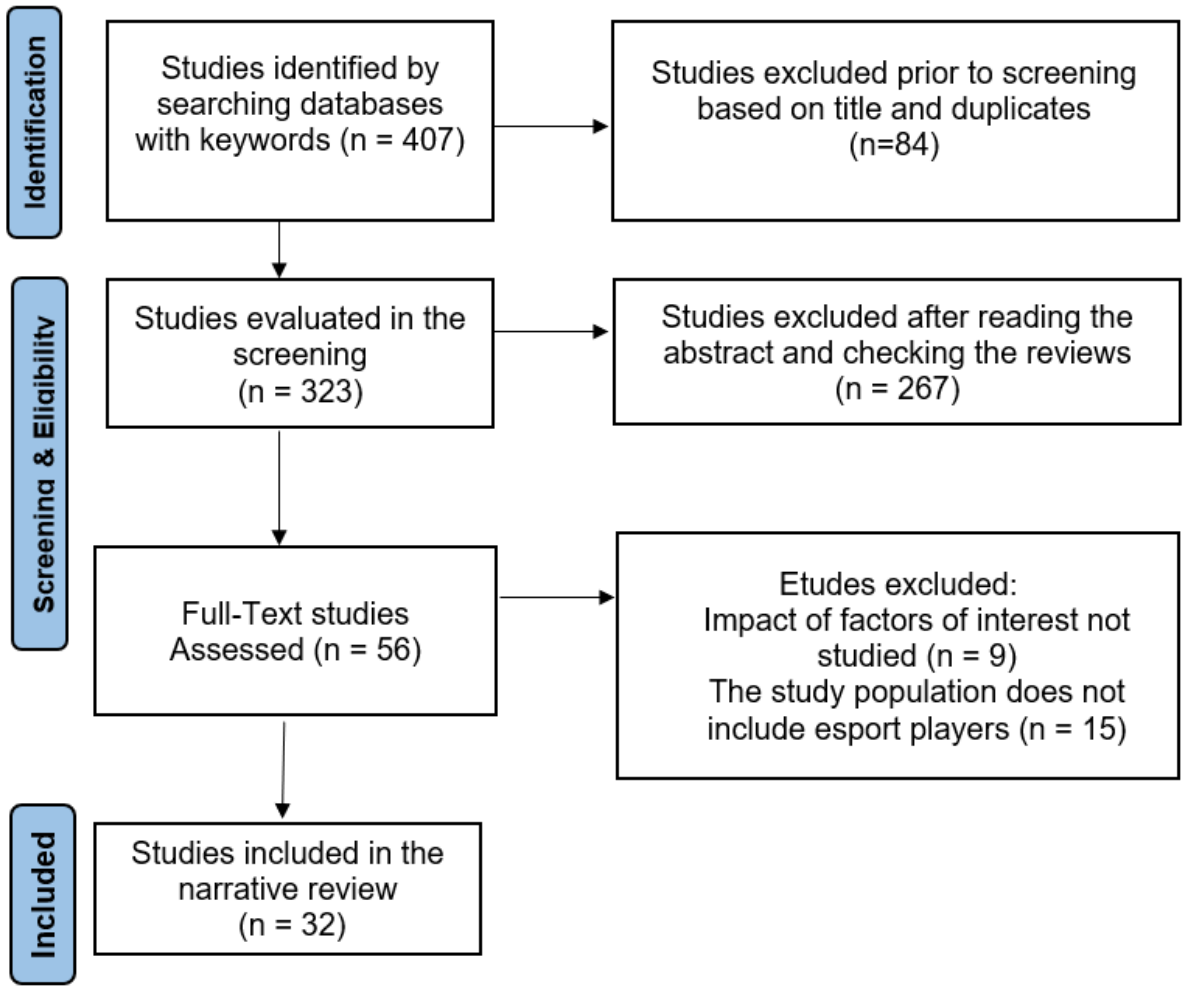

Figure 1. Flowchart of study selection

Results

It is important to acknowledge that some of the outcomes from the studies reviewed here may be inferred from research conducted in traditional sports or other competitive arenas in daily personal or professional life. The various factors investigated in relation to esports performance can be categorized into two groups: i) lifestyle and physiological conditions, and ii) psychological functioning.

1- Lifestyle, physiological conditions, and performance of esports players

Sleep

Sleep is a necessary physiological need for every human being, either for their well-being or for the better use of their intrinsic capacities (Vitale et al., 2019).

About high-performance sports athletes, in general, there is increasing evidence that poor sleep quality is associated with degraded performance (Vitale et al., 2019). It can be intuitive that if recovery from fatigue, which is supposed to take place during sleep, is not performed optimally, performance can be limited. However, unlike in traditional sports, very few studies have looked at sleep in esports players.

A recent review of the literature drew on pre-existing findings in sleep studies and established an indirect link between sleep deprivation and performance in esports players (Lee et al., 2020). This link stems from the overall physical and psychological damage that sleep deprivation can have on the human body. Moreover, other authors, thanks to actimetric data and based on responses to questionnaires, reveal that esports players present numerous markers of poor sleep quality, namely late bedtimes or increased wakefulness during the night (Lee et al., 2021; Gomes et al., 2021; Moen et al., 2022). These studies also identified the elements that would be responsible for this poor sleep quality in esports players: training hours, the atmosphere of the sleeping rooms (luminosity, temperature, surrounding noise), pre-competition tension, and the stress associated with competitive matches (Lee et al., 2021). The study by Baumann and colleagues (2022) added some elements: games that increase heart rate, arousal and blue light before sleep. These poor sleep markers have been associated with bad performance (Moen et al., 2022). However, the effect of an intervention to improve sleep quality, on the performance of esports players has never been addressed to our knowledge, and this is an important aspect that should be evaluated in future work. It is also important to note that there is currently no sleep education program and guidelines specifically designed for the esports field to prevent any adverse effects of inefficient sleep on performance. Furthermore, such a program should be adapted to the lifestyle of the athlete to minimize interference with important parameters such as training times.

Nutrition and supplement/psychostimulant

Research in esports nutrition is still in its infancy. Most of the findings are based on data from sports nutrition. Some recommendations have been proposed for esports players based on sports nutrition data (Migliore et al., 2021, Ribeiro et al., 2021). These recommendations include enriching the diet with pro-cognitive nutrients such as precursors to neurotransmitters, adding unsaturated fats to the diet to promote synaptic support of glial cells, maintaining regular hydration to avoid the detrimental effects of dehydration on cognition, and ensuring that sufficient polyphenols are incorporated for their antioxidant and neuroprotective properties. There is little research to date on the effect of nutrition on performance in the esports population. A recent study on a population of 20 Norwegian esports players indicated a link between adapted nutrition and athletic performance (Baumann et al., 2022). However, this study is qualitative and based on self-reporting data by the players via a video conference interview. This study also reports the impression that the players have a better performance after drinking energy drinks. This finding is not verified by the study of Thomas and colleagues (2019), which shows that the consumption of so-called "energy drinks", including caffeine, does not affect mental or physical performance in League of Legends® (LOL) players. Conversely, Tatar and colleagues (2019) demonstrated an improvement in executive functions, which are essential for sports performance, following the consumption of a food supplement (nooLVL®; Nutrition 21 Purchase, NY, USA).

Physical Activity

Like balanced nutrition and quality sleep, physical activity (PA) contributes to optimal brain function. This makes physical activity a crucial factor in optimizing performance in esports disciplines. A recent study among Norwegian esports players found that regular PA was associated with optimal performance (Bauman et al., 2022).

Furthermore, the effect of PA on performance in esports players is most often shown indirectly by studying the impact of PA on cognitive functions. Indeed, given the importance of the mental component in the discipline, the positive effect of PA practice on cognitive abilities (Etnier et al., 2016), can be transferred to performance. In addition, the effect of PA on performance in esports can also be mediated through another aspect: injury prevention. Indeed, esports players are subject to a variety of injuries on almost every joint and limb of the body and significant neuromuscular fatigue (Migliore et al., 2021). In the chapter on the prevention of esports injuries, Migliore (Migliore et al., 2021) stated that there are effective injury prevention models in esports such as the Van Mechelen protocol (1992) and TRIPP (translating research into the injury prevention practice; Finch, 2006). These protocols encourage specific physical training, precise stretching, and targeted muscle strengthening to avoid injury or relapse. An interesting result of a recent study by Trotter and colleagues (2020) shows that esports players in the top 10% of competitive games engage in more physical activity than others. These are generally the players who are the most identified and trained by structures that are putting more and more resources into having a framework (especially sports) to accompany the players. It is also important to emphasize that the different types of physical activity that would have the greatest effect on the performance of esports players are still unknown and fresh investigations on this matter are imperative.

Neurofeedback

It is worth mentioning that the practice of esports or video games in a broad sense leads to beneficial effects on cognitive abilities but the underlying mechanisms of action are still poorly elucidated (Campbell et al., 2018). The exploration of these mechanisms of action could be done through the application of the neurofeedback technique, the principle of which we will present together with the works that have suggested its interest in the field of esports.

The principle of neurofeedback can be defined by the fact of having real-time feedback on the brain activity associated with cognition during the performance of a task (Papo et al., 2019). About esport, for the few studies that have focused on the topic, and which we have included in this review, electroencephalography (EEG) headsets have been used to measure players' brain activity (Charland et al., 2012; Coulton et al., 2011). Based on the frequency of brain waves in different regions, a mental state was continuously assigned to the player. An increase in Beta wave activity is associated with a state of alertness and high attention to a given task, whereas an increase in Alpha wave activity reflects a state of relaxation and thus a kind of passivity (Charland et al., 2012). In this study by Charland and colleagues (2012), the B-Alert headset (Advanced Brain Monitoring, Inc) was used to measure the brain activity of 24 young players during a ten-minute session of the game Mecanika, a game with high spatial valence. Parietal, frontal, and central level activities were assessed. The notion of engagement discussed in this article corresponds to a state of alertness about the execution of a task. The higher the engagement, the higher the attention. An engagement index can be calculated using EEG data to reflect the player's cognitive investment in the task being performed. The results of this work show that the higher the difficulty of the game, the higher the engagement index calculated from the EEG data. The authors conclude that the use of neurofeedback in educational video games is of interest, but also encourage its application in the gaming industry. Furthermore, according to Coulton and colleagues (2011), the mental states of the players are well represented using the EEG feedback provided by the Neurosky® headset.

2 – Psychological functioning

Understanding and management of emotions

In esport, the exploration of emotional stimuli surrounding the players (environment, staff, personnel, ...) will be fundamental in many aspects: bring an important motivation, limit escape behaviors, and manage the attentional focus. Behnke and colleagues' (2020) study on

the role of emotions in esports shows that a pleasant emotion will lead to approach tendencies (action toward the pleasant stimuli) during the game.

This approach tendency has been defined as the main process through which emotions would impact esports performance. To promote positive emotions and approach behaviors that lead to better performance in athletes, Behnke and colleagues (2020) showed highlights (video montage or best of) of themselves or inspiring players in a competitive context. Furthermore, several studies have focused on how this process of emotion management could be potentiated. Behnke and Kaczmarek (2020) proposed in their study regular feedback on performance. In this study, the authors identified the link between emotions, approach/avoidance behavior, and challenge/threat status in 241 recreational and professional esports players. Providing regular feedback would improve evaluations of challenge/threat states and thus encourage the installation of emotions that favor approach behavior.

For LeNorgent (2019), a method of preferring positive internal discourse has been identified. This author explores the difference between sportsmen (56) and esports players (33) in the propensity for anxiety and internal discourse. He did not observe any difference in anxiety, but a significant difference in internal discourse in favor of the sportsmen was found. It has been argued that this result would be the consequence of much more developed coaching in traditional sports in which the internal discourse method is often used. The development of the ability to interoceptive perception and emotional awareness has also been highlighted (Lobel et al., 2014). Exploring these two abilities, Lobel and colleagues tested the links between emotional interoceptive awareness and emotion regulation in 26 students playing Starcraft®. They were able to show the link between the importance of emotional interoceptive awareness and the positive use of problem-solving strategies. Adinolf and Türkay (2018) reported in their study of six popular games, including League of Legends® (LOL), that toxicity was of critical interest. For esports players, a lack of awareness and support of tilt and toxicity was noted as

impacting performance which implies the need for future research regarding this topic. Kou and Gui (2020) show that players use Ochsner and Gross' (2014) modalities of emotion regulation in a competitive context. Whether by selecting behaviors before the triggering situation (i.e. walking, taking a break,...), modifying the situation to be more comfortable (i.e. using a blanket to be warm and being relaxed to manage anxiety), deploying attention differently (i. e.g. creating micro goals to avoid the overall pressure of the games), modifying thoughts (e.g. breathing calmly and telling yourself it's just a game) or modulating the response (e.g. writing an aggressive message in the chat room but deleting it before sending it). The integration of these different methods into a tailored coaching program adapted to each esports player would be a significant step forward in their performance optimization.

Stress and its coping

Given the importance of stress-related changes in competitive esports (Abad-Tortosa et al., 2017), this is a crucial point to be aware of and master to move towards optimal performance. In esport, Leis et al. (2022) and then Smith and his team (2019) have done work around specific triggers by identifying broad themes to group the types of stressors. The most comprehensive study is that of Smith et colleagues (2019) with 51 stressors grouped into 4 main categories (personal, team, event issues, and criticism/observations) and 13 secondaries (the role of social networks, opponents, the public, competition organization, interviews, logistics...).

In their review, Leis and Lautenbach (2020) show that during matches, sports athletes have physiological reactions related to an increase in stress: acceleration of the heart rate, modification of the ratio of the low and high frequency of the cardiac variability, and an increase in blood pressure. Similar data about the biological markers of stress and emotions have been highlighted by Schmidt et colleagues (2020) in esport. They found that Local Area Network (LAN) games increased the state of alertness. They also deduced from their results

that the group of athletes with a moderate cortisol level performed better than the group with a high level. To further investigate the link between cortisol, stress, and performance, Mendoza et colleagues (2021) showed that experts had high pre-competition cortisol levels which correlated with self-confidence and the perceived importance of the meet. The following behaviors have been described in esports players concerning their stress level: they anticipate and recognize events in advance (small drop in heart rate variability so less stress than low-levels), they are less stressed when playing with regular teammates, and when they are older, they are more effective in controlling their emotions, sociability skills and are less immersed in the game (Lee, 2021).

To cope with different types of adverse stress, esports players use coping strategies (stress management) naturally in several well-documented forms: emotion-based, problem-based, approach-based, avoidance-based, and appraisal-based strategies (Smith et al., 2019). For example, in the work of Poulus and colleagues (2021) involving 316 esports players, they offer support around coping mechanisms of the acceptance type which would allow them to face events more easily and to confront them more effectively. In this context, the presence or the search for staff, who can help the player to become aware of his or her emotions, understand emotional mechanisms, and implement stress management methods, seems to be one of the important axes (Lobel et al., 2014; LeNorgent, 2019; Poulus et al., 2020).

Problem-solving coping strategies are also favored by some esports professionals (Poulus et al., 2020). The vision of the seven esports players that Smith and colleagues (2019) revealed is the following approach strategy: taking a step back, evaluating the situation differently, threats, gains/losses, positive aspects of the situation, ...). Too often, esports players use coping strategies such as avoidance (suppression of emotions, drug/food use, ...) or aggression (verbal aggression, criticism, ...) which are associated with poorer performance (Smith et al., 2019). The use of approach strategies could reverse this trend. A study exploring the modalities of

stress in 119 LOL players find out that many factors can be considered to improve stress management strategies: the level of the player, the team, the level of communication, the age, the events specific to the game, the endgames and the final result (Lee, 2021). This provides a baseline model for future studies to explore the effectiveness of stress-coping strategies.

Motivation, passion, and flow

Motivation is one of the major points to keeping performance at its maximum. The following elements will have a huge impact on motivation in a competition context: personality characteristics, satisfaction, well-being, performance, chances of winning, perception of one's efficiency, their degree of pleasure (Gardia-Lanzo & Chamarro, 2018).

Regarding esport, both types of passion can have impacts on performance and spillover. Indeed, Bertran and Chamarro (2016) described that harmonic passion for LOL players helped protect them from the negative consequences of the game. Conversely, people with obsessive passion had negative consequences by aggravating negative behaviors (disproportionate playing time) and physical disorders (sleep disorders). Another approach was proposed by Hulaj and colleagues (2020) by exploring motivation through the prism of basic psychological need satisfaction. In their study of 329 esports players, they were able to show that the completion of skill and autonomy needs are predictors of ranking. However, internal or external motivational factors did not pass the significant threshold for impact on performance.

When passion is evoked, it is obvious that the state of flow must be summoned. It was the work of Csikszentmihalyi (1975) that made it possible to discover this cerebral and behavioral state. In the sporting dimension, it represents 4 elements in the game experience (Ohrankämmen et al., 2021): teamwork, team size and composition, player dedication, and shared game time. Flow is explored in the literature as a factor contributing to improved performance in traditional sports, particularly through improved attentional focus (Harris et al., 2021). The precise mechanisms concerning the links between performance and flow nevertheless need to be

investigated further. As far as the data concerning esports players, this is a field that has not been explored to our knowledge.

Internal discourse

Internal discourse is a widespread practice in traditional sports (Hatzigeorgiadiset al., 2011). It turns out that this practice has demonstrated its effectiveness in a competitive context. By studying a cohort of 89 esports players, Le Norgant (2019) found that internal discourse technique use is significantly less than in traditional sports. One explanation would be the difference in coaching. Traditional sportsmen and women have coaches who are more often better trained than in esport, and have easier access to this technique. In this context, it would be important to develop a structured practice of internal discourse in esports through scientific studies.

Social cohesion

In competitive team games like LOL, the social dimension involving group work to achieve optimal performance is crucial. This was studied by Freeman and Wohn (2017, 2019) using a semi-structured interview with 22 esports players. They were able to highlight several social dynamics: instrumental support serves as a support for emotional/esteem support, an acceleration of the construction of high-level support functions through interactions, a significant association between physical proximity and social bonding capital, weak social bonds but a contribution of strong emotional support between players, a more decentralized functioning in esports compared to traditional sports, a multiplicity of means of communication and finally a preference for visual/voice communication. Swettenham and Whitehead (2022) proposed workshops to improve awareness and co-presence in an esports team (2 managers, 1 coach, 1 analyst, and 5 esports players). Following the protocol, the players reported the following observations: improvement of the feeling of playing together, (self-) empathy, and getting together outside the game session to deal with problems. In addition, the staff noted an

improved understanding of self and others, team building, improved awareness of strengths/weaknesses, a better understanding of others, and positive teambuilding elements.

Goals

In our research, the only article on the subject that has been conducted with esports players is that of Martoncik (2015). In this study, personality traits were linked to life goals in esports people. This study showed that working on life goals (distraction and affiliation) is more important for esports players than for casual gamblers. As far as personality traits are concerned, the only significant result is in the power-related traits for esports players with leadership positions. Both in terms of goals and personality traits, further research would be interesting from the perspective of recruitment and teambuilding elements.

Quiet eye

From the perspective of psychological preparation, a little-known concept has been put forward as a vector of performance: the Quiet Eye. As a reminder, the Quiet Eye is a visual fixation behavior that allows us to study the relationship between perceptual behavior and skill mastery in tasks related to precision sports (pistol/rifle shooting, golf putting, free throws basketball, etc.). It starts when the person fixes the target object and initiates the motor response and ends when the fixation deviates from the object by more than 3 degrees (Dahl et al., 2021). Dahl and colleagues (2021) were able to replicate in their work regarding esports, the results found in the sports field, namely that the longer the Quiet eye time, the better the performance. In the future, this tool could be useful in the evaluation of perceptual-motor performance in athletes.

Psychosocial intervention

To support athletes in their careers, one element will be important: psychosocial support. Trotter and colleagues (2021), have highlighted some crucial elements.

It seems that esports players have less social support, less self-regulation, and lower levels of psychological competence than sports athletes. This generality is strengthened by the fact that 10% of the best esports players are better endowed with these 3 elements (the higher the score on these 3 variables, the greater the performance). Furthermore, esports players also have lower scores in self-regulation (evaluation, research, planning, implementation, and evaluation factors). One of the only areas in which esports people have higher scores is emotional control. In this study by Trotter and colleagues (2021), we find results similar to previous observations, namely that esports players use less of the fundamental bases for performance such as internal speech, goal setting, mental imagery, activation, relaxation, and negative thoughts.

Mental toughness

Regarding mental toughness, Gonzalez Caino (2022) proposed a study with 426 esports players who were given need satisfaction and mental toughness scales to try to relate these two variables. The results indicate that esports players have similar scores to sports athletes for need satisfaction and mental toughness. Regarding the specifics of esports, players of Multiplayer Online Battle Arena (MOBA) type games have higher scores in mental toughness and need more satisfaction than other types of games. An overall link could be made between these two elements: the higher the satisfaction of basic needs, the higher the mental toughness. It would therefore be interesting to determine precisely which basic needs are most relevant for athletes and for staff/structures/athletes in order to try to satisfy them as much as possible to strengthen mental toughness.

Discussion

The studies described in this review show that the performance of esports players can be modulated by several psychophysiological factors. Enhanced comprehension of these elements would be crucial to obtain or preserving optimal performance.

First of all, given the domination of cognitive and psychological dimensions in esports disciplines, we felt it was important to explore the factors impacting them. For example sleep, nutrition, and PA would impact some cognitive functions that are essential in esports: information processing which is necessary and must be associated with a fine and adapted motor response, sustained attention to follow the game mechanics over a long period, selective attention to annihilate all that is not necessary to integrate at a given moment in the game, or the executive functions for an adapted response to any new situation (Lee et al., 2020). We explored the basics of factors impacting capacity: sleep, nutrition, and physical activity. We were able to highlight that physical activity, good sleep quality, and adequate nutrition are among the physiological factors that can have a positive impact on athletic performance. In the future, research should focus more on the cognitive processes of athletes before, during, and after playing games to identify the link between the effect of physiological factors on performance on the one hand and the improvement of cognitive abilities on the other.

This monitoring of these cognitive abilities can also be carried out using information obtained by the neurofeedback technique. In the first instance, this information gives direct access to the brain areas that are active during the game mechanics and allows one to focus on the associated cognitive functions. This would lead to a better understanding of the cognitive functions involved in the game process and the interactions that may occur between these functions. Furthermore, it is true that esports practice already improves cognitive abilities, but data on the different types of functions involved and their degree of solicitation in the game can allow the development of training focused on these different functions to further optimize esports performance. Interestingly, this technique of training cognitive functions with the help of the Neurofeedback principle has already been successfully used in traditional sports (For a review see Mirifar et al., 2017). In addition, a better knowledge of the brain areas activated during

games can help to refine neurostimulation techniques which have also shown beneficial effects on performance (Zhuang et al., 2020).

Regarding the psychological aspect, the studies selected in this review were based on the review by Lochbaum and colleagues (2022) which determined the most effective psychological support practices for sports athletes. It appeared that certain practices are not yet used in the literature for esports players, such as mindfulness meditation, self-efficacy, visualization, pressure training, adaptation to perfectionism, self-confidence, task climate, and the use of music. These are all avenues for future research in the field of esport. However, in some categories, the works described in our review have produced convincing results. Concerning social cohesion, it turns out that esports players function differently, with, for example, faster and greater than average support through interactions, a decentralization of organizations, or a multiplicity of means of communication (Freeman and Wohn, 2017; 2019). It is even possible to set up workshops to improve, according to the athletes and their staff, group feeling, (self-)empathy, discussion possibilities, and consciousness of strengths/weaknesses (Swettenham and Whitehead, 2022). Building clear life goals (distraction and affiliation) seems to be important for esports players (Martoncik, 2015). The use of Quiet eye is also of interest according to Dahl (2021) who shows that this can be a useful process in esports. Support for esports players is very important as they have less social, emotional, and tangible support, less self-regulation, and lower levels of psychological competence than athletes (Trotter et al., 2021). Concerning internal discourse, esports players use it significantly less than sports athletes, despite its effectiveness in terms of performance for the latter (Le Norgant, 2019). Moreover, Gonzalez Caino et al. (2022), showed that mental toughness scores are equivalent between athletes and esports players and that the higher the satisfaction of basic needs, the more mental toughness was present.

Future recommendations

As far as esports coaching programs are concerned, we can see that the current methods are mainly focused on the psychological side. This component is crucial in the performance of esports players. In a recent review, Predraza-Ramirez and colleagues (2020) put forward recommendations concerning the psychological support of esports players concerning performance and professionalization. For them, the presence of psychologists is necessary for five aspects: the development of cognitive skills with targeted training, the optimization of programs according to games, the optimization of training routines according to brain capacities, learning and responding to players' needs, and the understanding and management of social, cognitive and emotional behavior. Nagorsky & Wiemeyer (2020) advocate coaching based mainly on education around performance structure and player training. These researchers specify that, as far as performance is concerned, team cohesion, communication, non-verbal communication, and team dynamics are of prime importance. Cognitive and sensorimotor aspects of esports such as memory, hand-eye coordination, mental rotation, action speed, game sense, and technique/skill were analyzed. Tregel et al. (2021) proposed a training method focusing on player control related to micro- and macro-management skills. Micromanagement is situated around the skills of ideomotor speed, hand-eye coordination, and visual perception with simple game actions. Micromanagement refers to a higher level of game control involving strategy, resource management, and knowledge of the game or map. One of the features of this method is that it categorizes the skill development needs of players according to the type of game.

Because of the data presented above and the number of factors that can impact performance, it seems crucial to consider all the physiological parameters that can have an impact, on the coaching programs. Indeed, such a program that would target several modalities could allow the beneficial effects of the interventions to be potentiated and thus boost performance even

more. Moreover, in the consideration of certain physiological parameters, there is a dimension of preservation of the health of the esports players. Indeed, programs aimed at improving sleep quality or practicing physical activity will not only boost the performance of the players but are also known interventions that maintain good general health. This holistic approach to performance training is beginning to prove its worth in the context of traditional sports. It is only logical that esports should follow suit. Future research should lay the scientific foundation for this method.

Conclusion

Esports, a new phenomenon that is experiencing rapid expansion in the world, is still in its developmental stage in France. Despite being in its preliminary stages, it is worth mentioning that a considerable body of research has already been conducted in this domain, providing intriguing groundwork, particularly regarding the diverse psychophysiological parameters that may influence the performance of esports athletes. These studies warrant further exploration. Thanks to the results of these studies, it is appropriate to underline the urgency of the elaboration of a reference coaching program for esports players, as in traditional sports, to optimize performance, solidifying the scientific bases in the field but also stimulating the interest of spectators. It is imperative to specify that this coaching program could derive advantages from multimodality, by taking into account all the factors that have an impact on performance.

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