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THE RELATIONSHIP BETWEEN MOTIVATION AND FLOW IN SPORT: one revision narrative and systematic

A RELAÇÃO ENTRE MOTIVAÇÃO E O ESTADO DE FLOW NO ESPORTE: uma revisão narrativa e sistemática

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ABSTRACT

The present study aimed to understand the development and facilitation of flow states and motivation founded in three theories: Motivation-to-action, Achievement Goal Theory (AGT) and Self-Determination Theory (SDT). A systematic-narrative search was conducted in PubMed, Scholar Google and Scielo databases and retrieved 200,660 texts. After the inclusion and exclusion criteria, 15 articles remained. Results showed that 9 of the 15 articles based their findings on the SDT framework. One article considered both SDT and AGT; whereas, four of the 15 articles focused their effort to explain the relationship between motivation and flow states using AGT. The theory Motivation-to-action, mainly the effort-to-task dimension, was adopted as theoretical approach in 3 of the 15 results retrieved. This study highlights the need for the understanding of the multidimensional, complex and dynamic process of motivation towards flow states. There is lack of studies that integrate and relate motivational theoretical approaches and flow states.

Keywords: Motivation; Flow; Sport; Athletes; Review.

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RESUMO

O presente trabalho objetivou destacar, a partir dos pressupostos teóricos das teorias da Motivação e Ação, da Meta de Realização (AGT) e da Autodeterminação (SDT), a relação de cada uma com o desenvolvimento e facilitação de estados de fluidez através de revisão sistemática-narrativa. Buscas foram feitas nas bases PubMed, Scielo e Google Acadêmico e extraíram 200.660 estudos que, após passarem pelos critérios de inclusão e exclusão adotados passaram para 15. Os resultados mostraram uma predominância da SDT como teoria pesquisada em relação ao flow, foram 9 dos 15 manuscritos. Um artigo considerou tanto a SDT quanto a AGT como perspectivas teóricas. A AGT contou com 4 publicações. A teoria da Motivação e Ação foi considerada, a partir da sua dimensão do esforço para realizar a tarefa, em 3 dos 15 artigos. Esse estudo aponta para a necessidade da compreensão do aspecto multidimensional, complexo e dinâmico da motivação na sua relação com o flow. Existe uma escassez de estudos que integram e inter-relacionam as perspectivas teóricas acerca da motivação com os estados de flow.

Palavras-chave: Motivação; Flow; Esporte; Atletas; Revisão.

1 INTRODUCTION

Motivation in the sports context has been studied in light of sports sciences, especially Psychology and Physical Education. The study of behavior related to motivation is of great interest as it investigates its etiology and its unfolding. Understanding motivation requires recognizing it as a complex and multidimensional phenomenon that relates to the quality of athletic performance and the athlete's well-being (Keegan; Middleton; Henderson; Girling, 2016).

Some theories of motivation aim to study the training environment and its cognitive, affective, and behavioral implications for participants. When an individual consciously understands their motivation, they can more clearly identify certain motivational factors over others, depending on personal abilities, time, and the resources of coaches and teachers (Bandura, 1971; Feliu, 1997; Weinberg; Gould, 2014). The psychological and mental condition of athletes and their associated behaviors in achieving the so-called optimal performance state, which has recently been the subject of study by researchers in the field, appear to be associated with their motivational levels (Turksoy; Altinci; Uster, 2015). One of the elements that seems to be related to motivation is a psychological dimension known as the state of flow (Murcia; Gimeno; Coll, 2008).

The concept of optimal performance state was coined by Csikszentmihalyi (1974) to define a specific zone within the performance spectrum corresponding to an individual's best possible performance. As a result of his studies, the author outlined another concept: *flow*

(or state of fluidity, in a free translation from English). Characterized by intense engagement in a specific task, generating feelings of pleasure, and which can be experienced in different activities such as sports and arts (Turksoy; Altinci; Uster, 2015). However, as we will see later, there is a lack of consensus regarding the definition of the concept of *flow*, its characteristics, and ways of identifying it.

Motivation, like the state of *flow*, is a complex and dynamic phenomenon. This makes it impossible to identify all its determinants or to predict with certainty the actions and reactions of athletes or other practitioners of sports activities (Keegan; Spray; Harwood; Lavalley, 2010). It is necessary to analyze individual differences in varied situations; that is, one should not understand the subject's behavior under rigid concepts, as it varies according to life history and environmental contingencies (Figueiredo, 2000; Winterstein, 2002; Weinberg; Gould, 2014; Keegan; Harwood; Spray; Lavalley, 2009).

Despite the vast literature on these topics, studies focus specifically on one or another construct, and the relationship between them is still poorly consolidated (Stavrou; Psychoutaki; Georgiadis; Kasteroliotis; Zervas, 2015). Given that the understanding of motivation has a multidimensional, complex, and dynamic configuration (Keegan *et al.*, 2010), there is a gap regarding the adequate assessment of its level and its relationship with the state of flow, such as... defined by Samulski: "a feeling of joy during the activity, total and absolute identification and concentration on the activity being performed, forgetting about oneself" (Samulski, p.139, 2002).

To date, few bibliographic surveys have been conducted with the aim of correlating the constructs; what is found are review studies focused on only one of the constructs, which ends up overlapping with and citing the other (*e.g.*, Norsworthy; Gorczynski; Jackson, 2017; Harwood; Keegan; Smith; Raine, 2015).

With the aim of filling this gap in the field, especially in Sports Psychology, this work sought to present, based on theoretical and scientific foundations from a critical perspective, studies involving this theme, pointing to the various theories about motivation and the lack of consensus regarding the definition of the *flow state*. The objective of this systematic and narrative review was to highlight the relationship between the constructs of motivation and *flow*. present in the sports environment.

2 MOTIVATION

There are several definitions for motivation, one of the most studied topics in modern psychology (Lacerda, 2010). Common sense generates explanations such as *internal personality characteristic*, *external influence*, or *consequence of a behavior*; which are open to interpretations that vary according to the context, the individual's convictions, and the experience of those interested in the subject. The discussion about the topic of motivation, both among laypeople and for science, arouses great interest in view of the various research projects that aim to understand the construct. Researchers disagree on its definition; Ryan and Deci (2017) summarized it with the question: "why do we do what we do?". For Maehr (1984), understanding the concept of motivation involves the study of behavior.

Nevertheless, to date the best indicators for understanding motivation are behavioral, according to Keegan *et al.* (2011). The researchers listed seven dimensions in subjects' behaviors that allow the inference of distinct motivational levels: (i) attention, (ii) effort, (iii) choices, (iv) probability/consistency of behaviors, (v) persistence followed by error/difficulty, (vi) facial expression, and (vii) achievement.

Among the general approaches to the study of motivation, two stand out in the literature: the traditionalist and the casuistic. The traditionalist approach assumes that individuals are predisposed to perform certain tasks and that this motivates them to engage in these activities. The casuistic approach, on the other hand, focuses more on how and why individuals are motivated, on interindividual differences (Roberts *et al.*, 1986; Pisani *et al.*, 1990; Weinberg; Gould, 2014).

Recent research on motivation, across various branches of Psychology, conceives of it as a combination of processes that lead to the persistence of a set of behaviors with significant duration (Boyd *et al.*, 2014), or, more objectively, as the direction and intensity of an effort in carrying out this activity. Samulski (2009) understands motivation as an active, intentional, and goal-directed process; it depends on the interaction of personal and environmental factors to occur fully. Additionally, motivation presents factors that contribute to determining the direction of motivated behaviors: intentions, interests, motives, and goals. Note that, although authors such as Davidoff (1983) understand the terms *motivation* and *motive* as synonyms, a difference is established here: the motive would be a directional determinant of behavior, one of the factors of motivation.

Finally, motivation can be classified as intrinsic and extrinsic. Intrinsic motivations are those that satisfy the individual through participation in the activity itself. It is divided into ego

motivation (personal achievement) and task enjoyment. Intrinsically motivated people aim for competence, task mastery, competition, action, enjoyment, and skill acquisition, and their level of expectation tends to rise regularly (Engeser, 2014; Massarella; Winterstein, 2009; Zanchetti; Buseti, 2014). Extrinsic motivations are rewards or punishments from other people. Examples of rewards include praise, applause, prizes, trophies, medals, money, trips, grades, and scholarships. Examples of punishments include the deprivation of privileges, criticism, ridicule, booing, extra exercises and work, and salary deductions. In terms of classification, extrinsic motivation is divided into rewards and social evaluation (Feliu, 1997; Franco, 2000).

2.1 Motivation in the sports context

In the sports context, particularly in Sports Psychology, the study of motivation plays a substantial role in attempting to explain certain behaviors. As mentioned earlier, among the various approaches, there is an effort to identify the reasons for engagement, its maintenance, and the abandonment of sports practice by practitioners (Turksoy; Altinci; Uster, 2015).

Between 1963 and 1980, researcher Heinz Heckhausen developed the Motivation and Action theory, which hypothesizes the central role of an individual's effort to overcome challenges, whether through individual reference norms (self-improvement) or social norms of competitiveness (Heckhausen; Heckhausen, 2018; Samulski, 2009; Wintersterin, 2002). Motivation for athletic performance, that is, the desire to improve, refine, or maintain high-level performance, is essentially characterized by two tendencies, according to Heckhausen and Heckhausen (2018): seeking success (the profile of a winning athlete) and avoiding failure (the profile of a losing athlete).

Heckhausen's theory proved to be limited to individual aspects, neglecting the interactional and environmental dimensions of motivation. One of the objects not studied in the Motivation and Action theory is the athlete-coach dyad. Regarding coaches' attempts to influence the motivation of their athletes, Smith *et al.* (2015) point to the existence of two socio-cognitive theories: the *Achievement Goal Theory*. *Goal Nicholls' (1984) AGT Theory and Self-Determination Theory*. *Theory - SDT* by Ryan and Deci (2017).

The AGT (Assessment-Based Guidance) theory is based on the premise that individuals desire to demonstrate competence in achievement contexts (Pensgaard; Roberts, 2000), characterized by the presence of evaluative elements, including school,

sports, and sometimes exercise/health (Roberts, 2001). In the educational and sports fields, it has been the dominant theory regarding the investigation of how success/failure is defined in these contexts (Keegan *et al.*, 2014).

In contrast, the other socio-cognitive theory of motivation, SDT (Deci; Ryan, 2000, 2002; Ryan; Deci, 2017), posits that the social environment created by the authority figure (e.g., boss, coach, manager, parent) has the power to influence an individual's motivational regulation in participating in a given activity through the satisfaction or frustration of basic psychological needs (Keegan; Spray; Harwood; Lavallee, 2011; Keegan *et al.*, 2014; Smith *et al.*, 2015). For SDT, autonomy (*i.e.*, acting according to one's interests, needs, and preferences), competence (*i.e.*, feeling effective when interacting with the social or physical environment), and belonging (*i.e.*, belonging to and feeling connected to the group) are conceptualized as essential psychological needs (Smith *et al.*, 2015; Standage; Treasure, 2002).

Both theories are used in studies on understanding the motivational conditions that participants experience in an adaptive or maladaptive way. In general, scholars tend to adopt one of the two perspectives (e.g., Norsworthy; Gorczynski; Jackson, 2017; Harwood; Keegan; Smith; Raine, 2015), however, it is also possible to envision the integrated use of AGT and SDT to explain empirically observed motivational phenomena (e.g., Keegan *et al.*, 2014; Smith *et al.*, 2015). In this sense, the present study adopted as its main theoretical frameworks the Motivation and Action theory (Heckhausen; Heckhausen, 2018), AGT (Nicholls, 1984), and SDT (Ryan; Deci, 2017).

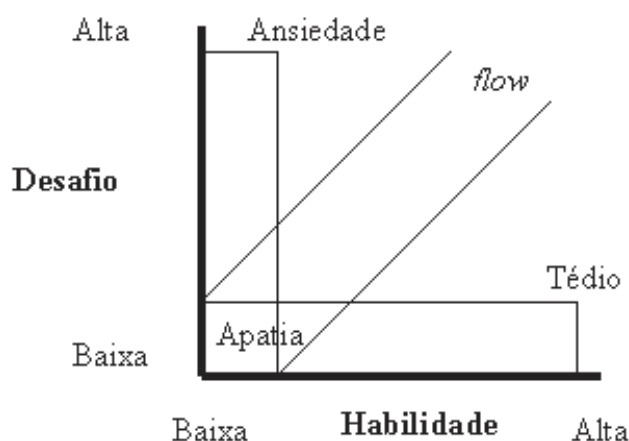
2.2 Flow State in Sport

Early studies on *flow theory* They were developed by a Hungarian psychologist, Mihaly Csikszentmihalyi, in the United States, in the 1970s (Csikszentmihalyi, 1974; Miranda; Russo; Coimbra; Miranda, 2012). His research included athletes, musicians, artists, surgeons, among others. In the feeling of flow, *the athlete's* consciousness is totally absorbed by the action. However, there is no consensus on a common definition of this phenomenon (Weinberg; Gould, 2014). Translated as feeling of fluidity or perception of fluidity, it is also known as flow, flux, optimal experience and peak experience, however the expression *flow-feeling* or simply *flow* It became established thanks to the studies of Csikszentmihalyi (1974, 1992, 1997) and Csikszentmihalyi and Csikszentmihalyi (1988). Some aspects common to all definitions can be highlighted, such as high level of

concentration, satisfaction, fulfillment in experiencing such a sensation, and the relationship with optimal performance.

For Csikszentmihalyi (1974, 1992, 1997) and Csikszentmihalyi and Csikszentmihalyi (1988), the *flow* state Flow appears when there is total focus on the activity being performed without any obvious external reward. Feelings, desires, and thoughts become aligned and are absorbed without any cognitive interference. Reports of loss of the sense of time and space are identified in the literature by athletes who have experienced *flow*. During peak performance, as illustrated in Figure 1, there is a balance between the challenge of the activity in which the subject is involved and their ability to respond (skill).

Figure 1 - Relationship between level of challenge/ability and *flow* (adapted from Csikszentmihalyi, 1992, p. 113)



Source: prepared by the authors, 2026

Regarding the components of the state of flow in sport, Samulski (2002) highlights seven of them as being the most reported and experienced by athletes in the scientific literature: (i) balance between skill and challenge, (ii) total absorption of the activity, (iii) total concentration, (iv) loss of self-awareness, (v) feeling of total control, (vi) intrinsic motivation, and (vii) loose and fluid movements. The first factor, the balance between skill and challenge, refers to the balance between the skill recognized by the individual and the determined challenge to be overcome; it must be positive. However, it is essential that the skill and the challenge are individually at high levels. The second dimension, total absorption of the activity, refers to the moment when the athlete interrupts their self-awareness, being

unable to visualize themselves as distinct from their action, in a fusion with the activity in a natural and spontaneous way.

The third dimension of *flow* is total concentration, defined as the situation where the focus of attention is on the task and the present moment without wasting energy. In this sense, one can observe the fourth aspect, which is the loss of self-consciousness, defined as the absence of space for concern regarding one's own opinion or the acceptance of others. The perception of a *self* separate from the world ceases to exist. The fifth valence of the construct is the feeling of total control, in which there is a sense of control over the situation, even unintentionally, provoking satisfaction in exercising such control over oneself and over difficult situations. The sixth factor of *flow* ... Intrinsic motivation can be defined as the feeling of pleasure, of movements flowing naturally; the activity becomes an end in itself, promoting intense pleasure and satisfaction. And the seventh and final dimension is the loose and fluid movements that appear when they happen easily and smoothly.

Other studies point to the composition of eight elements present in the *flow state*. In addition to those cited by Samulski (1992), according to Massarella and Winterstein (2009), effective performance indicators in a task and the feeling of a state of flow are also formed by the construction of clear goals during the task and their constant updating given the results of the actions (*feedback*). In another model, the goals established during execution should be separated from their updating based on *feedback*, which would be immediate and therefore would not serve to adjust the goals, but only to modify behaviors towards achieving the previous objective; thus, there is no question of a single dimension, constituting the ninth factor of *flow* (Oliveira; Fora, 2009).

The most prevalent aspect that links *flow* with motivation is the sixth dimension, intrinsic motivation, which concerns the pleasure and subjective fulfillment associated with the well-being of engaging in a task or competing (Samulski, 2002). In this sense, authors have been seeking to understand the role of each of the motivation theories applied to sport: the Motivation and Action theory (Heckhausen; Heckhausen, 2018), AGT (Nicholls, 1984) and SDT (Ryan; Deci, 2017), in the development and facilitation of flow states (Norsworthy; Gorczynski; Jackson, 2017; Harwood; Keegan; Smith; Raine, 2015; Turksoy; Altinci; Uster, 2015). With the aim of better understanding this interrelationship, this article seeks to review what the scientific literature presents on these topics based on the theoretical assumptions presented here.

3 METHOD

To address the above question, a narrative systematic review was used. A search for articles was conducted in the following databases: PubMed, SciELO, and Google Scholar. The following descriptors were considered in the searches: "motivation", "sport", "athletes", "*flow*" and "*flow state*". The logical operator "+" was used to combine the descriptors and terms used to track publications as follows: "sport" OR "motivation" + "athletes" OR "motivation" + "*flow*". The searches were conducted using the descriptors in English (PubMed and Google Scholar) and Portuguese (SciELO and Google Scholar).

The inclusion criteria adopted were articles published in peer-reviewed journals in English and Portuguese. In accordance with the objectives of this article, empirical articles, as well as case studies and literature review articles, were included. Articles from all dates were included, without restriction regarding indexing, origin, or journal periodicity.

The exclusion criteria were unpublished materials, patents, citations, or products without blind peer review, such as monographs, theses, and dissertations. Opinion articles or editorials, because they did not undergo blind review, were also excluded. Articles that did not have sport or exercise as their object of study were excluded, as well as duplicate articles found in more than one database. Materials that discussed *flow* without considering the seven theoretical dimensions suggested by Samulski (2002), the eight addressed by Massarella and Winterstein (2009), or the nine factors of Oliveira and Fora (2009) were also discarded. Finally, articles that did not address the topic from the perspective of Motivation and Action theory (Heckhausen; Heckhausen, 2018), AGT (Nicholls, 1984), and SDT (Ryan; Deci, 2017) were excluded.

Since this is a narrative review, literary works in the form of books considered very important for the discussion of the topic and which did not appear in the searches were included (e.g., Ryan; Deci, 2017). Similarly, articles of low quality evaluated by the first and last authors of this study, those that did not present a control group, whose statistical analysis was limited or did not present justification for being conducted, those that did not present clear methods, that made use of other theoretical perspectives in addition to those adopted as a basis in this text to justify their results, that presented dubious results, or that made speculative claims based on their findings were not considered.

4 RESULTS

A total of 200,660 articles were found in the three databases. After removing duplicates, the number of texts reached 25,075. Reviewing the titles based on exclusion criteria reduced the results to 4,850 articles. Among these, careful review of the abstracts brought the number of included articles to 818, of which 803 were excluded after reading the full text, reaching a final number of 15 articles. The numbers of results excluded and included in the final study are presented in Table 1.

Table 1 - Quantitative results of the articles that were returned, separated by search database

Number of articles	PubMed	SciELO	Google Scholar
Total	29	1	200.630
Duplicates	0	0	175,555
Adoption of exclusion criteria			
Removed by title	12	0	20.213
Removed from the summary	4	0	4.062
Removed from the full text	2	0	797
Included in the final result	11	1	3

Source: prepared by the authors, 2026

The results showed a predominance of SDT as the researched theory in relation to *flow*, with 9 (60%) of the 15 included articles addressing motivation from the SDT perspective. It's worth noting that one article (Gomes; Miranda; Bara Filho; Brandão, 2012) considered both SDT and AGT as theoretical perspectives. AGT had 4 articles, sharing one with SDT, while Motivation and Action theory was considered, based on its dimension of effort to perform the task, in 3 (20%) of the 15 articles. The main results showed that *flow* correlates with intrinsic motivation from the SDT perspective, but also correlates with extrinsic motivation. Within the AGT perspective, *flow* This is associated with task-oriented motivation, but not ego-oriented motivation. Finally, the perceived level of effort and the intensity demanded in the tasks, dimensions of the Motivation and Action theory, correlated with *flow*. Table 2 shows the authors, year, sample type and size, motivational theory adopted in the study, and the main results of the articles included in the review.

Table 2 - Articles returned and included from the systematic search and exclusion systems according to the established criteria. The table shows the authors, year of publication, sample type and size, the theory on motivation used to correlate with *flow*, and the main results of each article

Authors	Year	Sample	Theory	Key results
Ashford; Biddle; Goudas	1993	336 people practicing exercise	Motivation and Action	The effort to engage in exercise and physical activity in community centers is correlated with states of <i>flow</i> , more precisely the feeling of pleasure in performing the activity.
Çağlar; Aşçi; Uygurtaş	2017	220 professional athletes	AGT	The state of <i>flow</i> achieved by athletes, as assessed by a <i>flow scale</i> , was moderately associated with the motivational climate generated by coaches and training partners, with both being more effective when task-oriented than when ego-oriented.
Cervello; Villodre; Moreno; Churches	2006	1103 high school students	AGT	High school students' engagement in Physical Education classes is associated with feelings of pleasure generated by the <i>flow state</i> , while task orientation facilitates reaching these states. The motivational climate generated by the subject teacher and ego orientation did not correlate with <i>flow states</i> .
Ersöz; Eklund	2017	257 student athletes	SDT	Motivation, assessed holistically using self-determination theory, correlates with <i>flow states</i> in university student-athletes.
Gomes; Miranda; Bara Filho; Brandão	2012	30 professional volleyball athletes	SDT and AGT	The <i>flow</i> perceived by the athletes correlated positively with intrinsic motivation and negatively with extrinsic motivation, within the SDT. Regarding the AGT, the perception of the state of flow had a significant correlation with task orientation, but not with ego orientation.

Kowal; Fortier	2000	104 professional swimming athletes	SDT	The state of <i>flow</i> progressively correlates from intrinsic motivation to extrinsic motivation, being more associated with aspects of pleasure and less correlated with impersonal aspects such as external punishments.
Moreno; Gimeno; Gonzales - Cutre	2006	413 student athletes	SDT	The willingness to enter a state of <i>flow</i> among young student-athletes correlated with both intrinsic motivation and more central levels of extrinsic motivation, primarily within the athlete-coach dyad. However, there was no correlation with more external aspects of extrinsic motivation such as punishments, rewards, and the impersonal dimension.
Oh; Kim; Yang	2011	235 student athletes	Motivation and Action	The <i>flow of esports</i> players correlated with personal performance expectations and subjective level of perceived effort. Levels of enjoyment in the game also correlated with <i>flow</i> , but there was no significant relationship with social support or social encouragement for engagement in the sporting activity.
Schüler; Nakamura	2013	40 professional kayak athletes	SDT	The self-efficacy dimension of SDT correlates positively with <i>flow state</i> , but risky behaviors that can lead to injuries also correlated positively with self-efficacy.
Sierra-Díaz; González-Víllora; Pastor-Vicedo; López-Sánchez	2019	14 empirical articles	SDT	The systematic review combined with meta-analysis revealed that intrinsic motivation among children and adolescents to participate in sports is related to the level of enjoyment derived from the activity, and this level of enjoyment is closely associated with the frequency with which participants enter the <i>flow zone</i> .

Sklett; Lorås; Sigmunds-son	2018	40 professional ski athletes	AGT	The motivational climate created by the athlete-coach dyad and the relationship with training partners increased the <i>flow</i> . This was perceived, but only when motivation was task-oriented. Ego orientation did not correlate with measures of fluidity.
Sugiyama; Inomata	2005	29 professional judo athletes	SDT	Qualitative assessments of the subjective perception of <i>flow states</i> in both training and competitions among Japanese judo athletes appear to be significantly influenced by intrinsic motivation in the pursuit of feelings of pleasure and enjoyment.
Swann; Crust; Jackman; Vella; Allen; Keegan	2017	16 Olympic athletes	Motivation and Action	The perception of effort among Olympic athletes is associated with reports of <i>flow states</i> during competitions. Two other psychological dimensions also appear alongside <i>flow</i> : training intensity and perceived concentration levels.
Szemes; Harsanyi; Tóth	2016	115 professional athletes	SDT	Scores on the seven-factor <i>flow scale</i> correlated with intrinsic motivation within the SDT perspective; while there was no correlation with any dimension of extrinsic motivation.
Vlachopoulos; Karageorghis; Terry	2000	1231 people practicing aerobic sports	SDT	<i>Flow</i> scores were positively correlated with intrinsic motivation according to the SDT, with higher correlations for the dimensions of goal, <i>feedback</i> , concentration, and pleasure motivation from the perspective of the nine dimensions of <i>flow</i> .

Source: prepared by the authors, 2026

5 DISCUSSION

The main results of this study corroborate the literature, highlighting that authors have emphasized the search for understanding the relationship between motivation and *flow state* (Norsworthy; Gorczynski; Jackson, 2017; Harwood; Keegan; Smith; Raine, 2015; Turksoy; Altinci; Uster, 2015) in the sports context, based mainly on the Motivation and Action Theory (Heckhausen; Heckhausen, 2018), the AGT (Nicholls; 1984), and the SDT (Ryan; Deci, 2017). Research correlating these constructs is scarce. Therefore, this narrative systematic review is the first to synthesize existing knowledge base data with the aim of highlighting this interrelationship. Due to the limited number of publications in this area, this review adopted a broad and inclusive approach to analyze the results found.

As previously pointed out, it was found that, in general, studies on motivation in sport and its relationship with *flow* are based on one theory or another, whether it be the Motivation and Action theory (Heckhausen; Heckhausen, 2018), or the AGT theory (Nicholls, 1984) or the SDT theory (Ryan; Deci, 2017), and only one study correlated AGT and SDT. It is understood that this fact impoverishes the discussion of the interrelational nature between them in the development and even the promotion of the *flow state* in athletes. Despite this limitation, some considerations were drawn from the data synthesis.

According to Csikszentmihalyi (1974, 1992, 1997) and Csikszentmihalyi and Csikszentmihalyi (1988), the concept of *flow* It was derived from the study of intrinsically motivating activities, such as those of mountaineers, surgeons, composers, chess players, among others. According to Ryan and Deci (2017), intrinsic motivation is the most independent type of motivation that occurs when an individual engages in an activity that sparks interest or feels pleasure in performing it.

The most widely used socio-cognitive theory in correlating motivation with the state of *flow*. This is the SDT (Ryan; Deci, 2017). Studies have shown that, in university student athletes, there is a relationship between motivation and *flow states* (Ersöz; Eklund, 2017). In professional swimming athletes, the *flow state* is more associated with aspects of pleasure and less correlated with impersonal aspects such as external punishments, that is, more linked to intrinsic motivation (Kowal; Fortier, 2000).

Perhaps a central finding of the study was the identification of the coach as an important figure in understanding the motivational aspects in this environment, which corroborates the literature (Keegan *et al.*, 2009). When considering the athlete-coach relationship in young student athletes, there was a correlation with both intrinsic motivation

and more central levels of extrinsic motivation in the willingness to enter the flow state (Moreno; Gimeno; Gonzales-Cutre, 2006). Although not the focus of the study, it was also clear, in kayak athletes, in the case of risky behaviors that can lead to injuries, that the self-efficacy dimension of the SDT correlates positively with the *flow state* (Schüler; Nakamura, 2013).

A systematic review combined with meta-analysis revealed that intrinsic motivation among children and adolescents to participate in sports is related to the level of enjoyment in the activity, and this level of enjoyment is closely associated with the frequency with which participants enter the *flow zone* (Sierra-Díaz; González-Víllora; Pastor-Vicedo; López-Sánchez, 2019). Since this is a systematic review with meta-analysis, causality can be inferred in the correlation between the constructs of motivation, more specifically intrinsic motivation and *flow*.

flow scale, both in professional athletes and in practitioners of aerobic sports, correlated with intrinsic motivation (Szemes; Harsanyi; Tóth, 2016; Vlachopoulos; Karageorghis; Terry, 2000). It is from this approach, based on the classification of internal motivation, that the conclusion of the existence of a correlation between intrinsic motivation and *flow theory* resides. The hypothesis of interrelation of these authors seems to be supported by the results found here. Complementarily, in the study by Sugiyama and Inomata (2005) in judo athletes, the qualitative assessment of the subjective perception of *flow states* was used. It appears to emerge significantly in the presence of intrinsic motivation in the pursuit of feelings of pleasure and enjoyment.

Highlighting the second most used theory in the study of this correlation, AGT (Nicholls, 1984), the results showed that, in sports, the *flow* state achieved by professional athletes was moderately associated with the motivational climate generated by coaches and training partners, both being more effective when task-oriented than when ego-oriented (Çağlar; Aşçi; Uygurtaş, 2017).

In the academic context, the engagement of high school students in Physical Education classes is associated with feelings of pleasure generated by the *flow state*, while task orientation facilitates reaching these states. There was no correlation between the motivational climate generated by the subject teacher and ego orientation with *flow states* (Cervello; Villodre; Moreno; Iglesias, 2006). In contrast, in the context of sports, the motivational climate caused by the athlete-coach dyad and the relationship with training partners, among professional ski athletes, increased *flow*. perceived, but only when motivation was task-oriented and not ego-oriented (Sklett, Lorås; Sigmundsson, 2017).

Although not the focus of the present study, the athlete-parent relationship was not addressed in the context of motivational climate and the influences of social agents (Keegan *et al.*, 2009).

For the only article found that considered both theoretical perspectives, in the SDT reference the perceived *flow* among professional volleyball athletes correlated positively with intrinsic motivation and negatively with extrinsic motivation. Regarding AGT, the perception of the state of flow had a significant correlation with task orientation, but not with ego orientation (Gomes; Miranda; Bara Filho; Brandão, 2012).

Finally, based on the Motivation and Action theory (Heckhausen; Heckhausen, 2018) of the 3 articles found, engagement in exercise and physical activities in community centers is correlated with states of *flow*, more precisely the sensation of pleasure (Ashford; Biddle; Goudas, 1993). IN *eSports* players, *flow* correlated with personal performance expectations and the subjective level of perceived effort; levels of enjoyment in the game also correlated with *flow*, but there was no significant relationship with social support or social encouragement for engagement in the sporting activity (Oh; Kim; Yang, 2011). Among Olympic athletes, the perception of effort is associated with reports of *flow states* during competitions (Swann *et al.*, 2017).

Based on the foregoing, and in accordance with what the literature indicates, the hypothesis of causality between the variables motivation and *flow has become evident*. These findings appear to be supported by the research findings presented here. Extending this conclusion, 6 out of the 15 articles reviewed presented research data, either from individuals who practice physical exercise or professional athletes, that corroborate this study's hypothesis that intrinsic motivation and the state of *flow are key factors*. They are associated.

6 CONCLUSION

Researchers in the field of sports have increasingly studied the psychological and mental state of athletes and their behaviors associated with achieving the so-called optimal performance state, especially the relationship with their motivational levels (Turksoy; Altinci; Uster, 2015). As highlighted, the state of flow is one of the elements that seems to be related to motivation (Murcia; Gimeno; Coll, 2008). The present study shows that the complexity and dynamism of both phenomena seem to make it impossible to identify all their determinants or to reliably predict the actions and reactions of athletes.

Although the studies found start from one or another theory of motivation as a basis for establishing the relationship between motivational aspects and the state of *flow*, the discussion of the interrelation between them still lacks further research. A possible explanation for this limitation may lie in the lack of consensus on the very definition of *flow*. The main conclusions are the apparent relationship of motivation, especially intrinsic motivation, in the promotion and development of states of flow in athletes and practitioners.

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