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RESEARCH ARTICLE

The mediating effect of dispositional flow in the relationship between individual factors and satisfaction of performance: A comparison of competitive and recreational athletes

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ABSTRACT

Coaches and sportsmen and women have long paid more attention to individual factors that predispose to sports practice and how they are able to affect performance, both in training and during competitive performance. Despite this, to date, very little research has analyzed the relationship between individual variables such as sense of self-efficacy, personality factors and flow status and investigated their possible implications. The aim of the present work is to verify through the comparison of two different samples (competitive athletes and practitioners) the possible relationship and difference between these variables. The research participants were 425 (male 162, female 263) The research participants practice various types of sports (volleyball, football, tennis, swimming, dance, etc.), among them 43.5% practice sports at competitive. Participants were recruited in specific sports centers. The results confirm the indirect effect of the Flow state between antecedents and outcomes, and they confirm that there are differences between those who engage in competitive sports and those at the amateur level. The study reveals significant practical implications regarding the effect produced by the flow state during performance, and this effect is enhanced when the motivations of those seeking to achieve the goal are stronger.

Keywords: personality traits; self-efficacy; state flow; multigroup analysis; competitive and recreational athletes

1. Introduction

One of the most used approaches to study behaviour in sport is certainly the five personality traits model, developed by McCrae and Costa[1].

However, the validity of this theory, there are uncertainties regarding the idea that there are specific personality traits that lead to the production of the same behaviour, also because the sporting environment consists of moments of tension, anxieties, and fears, which influences the emotional stability of everyone.

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Exactly because of the complexity of sport from a psychological point of view to date, there are no certain and predictive models of sporting behaviour that can be correlated with a specific personality trait[2]. In consideration of the results obtained with these models, it has become indispensable to combine information about personality traits with information about the sports context, including competition, expectations and interpersonal relationships and other individual factors. According to the interactionist approach, the performance of a sports subject depends on the relationship between the individual and the situation in which he or she finds himself or herself[2].

Another fundamental variable for the analysis of behaviour in sport is self-efficacy, referred to in the literature as 'one of the individual capacities that, if correctly mobilised by the individual, foster his or her ability to solve problems'[3]. Bandura uses the term self-efficacy to refer to the set of beliefs one has about one's abilities and the ability to succeed in achieving specific results based on actions performed[4]. This concept applied in the sports context shows that the subject who performs a sporting performance and demonstrates a high degree of self-efficacy is convinced that he or she can perform difficult tasks and still achieve the desired result. From these considerations, it has been shown that self-efficacy has a positive influence on the motivation and the path the individual takes in sport. On the contrary, if the degree of self-efficacy is not high, the individual does not feel capable of achieving the desired result[3]. These considerations apply not only to competitive performance but also to non-competitive sporting practice in adults[2]. Successively, a model called the Sport Commitment Model (SCM) was developed by Scanlan and colleagues, this model focuses on what are the main factors that favour continuous engagement in physical activity[5, 6].

In the context of sporting practice, the state of flow, also called “optimal experience”, resides an important place[7]. When an athlete perceives the flow condition both during the competition and during training, he loses track of everything around him and cancels out any distracting factors in favour of maximum mental concentration[7].

From different research conducted on this condition, it is possible to point out nine different factors that lead the sportsman to perceive a flow condition: the challenge-skill balance, the union between action and consciousness, clear goals, immediate feedback, concentration on the task, sense of control, loss of self-awareness, deconstruction of time and autotelic experience[7]. Some authors have defined this last factor as an experience characterized by strong internal motivation, enjoyment, and fulfilment, leading the subject to repeat it even at the cost of great sacrifice[8]. The three individual variables addressed above suggest that studies and research should be undertaken that can provide more answers as to the strength of their link and the different effect they may have on what are two different situations: the competitive sportsperson and the practitioner. In this sense, the main objective is to identify the effect that sport in a general sense produces with respect to what is not only an inherent condition of those who practise sport at a competitive level, but on the benefits that it produces at an individual and psychological level, also on those who practise sport at an amateur level.

2. The relationship between personality factors, sense of self-efficacy and flow status

The three variables that are the subject of our study, personality factors, sense of self-efficacy and flow status, of which there is an extensive description in the literature, are sometimes placed in correlation with each other[9], but their role in sports and their influence on sports performance is rarely investigated. Swann and colleagues[10], give a definition of the flow state within sport psychology as a psychological state related to superior performance. Csikszentrnihalyi[11] (p. 75) states that “*it is not the abilities we actually possess*

that determine the ability we feel, but those we think we possess" laying the groundwork for hypothesizing that self-concept and perception of one's abilities may be a necessary precondition for entering and perceiving the state of flow. The flow state occurs when individuals perceive the task as challenging but consider their resources proportionate to the demands of the task, resulting in a psychological state characterized by intense concentration, automaticity and a sense of control[12]. The flow state is characterized by complete absorption in what one does[13] and a completely focused motivation[12].

Among the different antecedents of flow state, one of the earliest studies highlighting the correlation between self-efficacy and flow state in sports is that of Lee and colleagues[14]; they demonstrated the positive influence of a model to be inspired by for learning and how much this increases the subject's feeling of self-efficacy on a sample of middle and high school students. This correlation suggests how an improvement in self-efficacy can serve as a variable for inducing the state of flow in athletes, consequently improving their performance. Such studies, although focused on other areas of life, such as school learning in adolescents, hint at a similar result regarding the sports experience. According to Tandon[13], there is a direct correlation between self-efficacy and the state of flow therefore a high confidence in one's abilities makes the subject experience difficult tasks as challenges to be faced rather than threats. Subjects with higher self-efficacy increase and sustain their efforts in the face of failure by attributing failure to insufficient effort or deficient knowledge and skills.

Several researches also suggest that the experience of flow state is associated with personality traits and in particular with characteristics of "autotelic personality"[7] such personalities have typical traits and are able to handle circumstances unbearable for others; so-called "flow people"[15, 16] can convert very difficult situations into situations with an access to flow state by having a defined goal[17].

The study of Annalakshmi et al. (2020)[18] demonstrated a direct relationship between personality and flow state, where personality is revealed as a predictor of flow state. Personality factors such as extroversion, open-mindedness and conscientiousness have a predictive role on the flow state. Other research also identifies the presence of dependability, strong will, tenacity to achieve goals, control skills and emotional stability[17], which enable athletes to adapt their potential to challenges, set goals and assess their feasibility, focus and control their actions. In addition, according to Swann and colleagues[19], an innate general curiosity about life, tenacity, low self-centeredness and the ability to allow oneself to be motivated by intrinsic rewards are strongly correlated with the state of flow. At the same time, for Stamatelopoulou and colleagues the presence of confidence and anxiety as a personality traits can also influence flow state[20]. Jackson (1998) argues that flow state can be influenced by dispositional psychological factors such as intrinsic/extrinsic motivation, goal orientation, perceived sport skill, and competitive trait anxiety[21]. On the other hand, Kimiecik and Stein's Model[22] proposed that in addition to psychological factors interact situational factors that influence the athlete to "get in the zone": a positive relationship between flow state, confidence, use of imagery and control of action is assumed[23, 24]. For example, Jackson and Csikszentmihalyi (1999) stated that visualisation will help athletes to focus on crucial performance aspects, to focus on their goals, and to make their performance more effortless[25]. Morris, Spittle, and Watt advocated that "*imagery, which is specifically directed at the an-tecedents in a particular sport context, should enhance the experience of flow*"[26] (p. 327). In a sample of 261 athletes, Koehn and colleagues found confirmation that the balance between challenge and skill, clear goals, concentration on the task and a sense of control are key dimensions for the experience of flow in tennis competitions and that improving imagery skills can increase the state of flow[24].

Since among the prerequisites of the flow conditions there are the clear goals inherent in the activity for the individual to strive towards, the objectives play a strategic role in the activation of the flow state. In

relation to achievement goal theory[27], Jackson and Roberts reported that athletes high in mastery orientation experienced flow more frequently than athletes low in mastery, while flow was also found to be associated with high levels of perceived ability[28]. Goal-setting theory advocates for the use of specific, challenging goals to maximize performance[29], and considered best practice by applied practitioners aiming to facilitate performance in a range of settings[30]. In line with the theory, a study by Stavrou et al.[31] carried out on a sample of 268 athletes showed that athletes' task orientation may be an important factor for attracting flow in competitive sport, feeling more skillful and estimating the upcoming competition as challenging, while low ego and low task oriented athletes lack these elements, which are important for them to get into flow.

At same time, flow states have frequently been associated with elevations in well-being[32], self-concept[33], positive subjective experience[12-34] and objective performance[28]. This intersection of peak performance and peak experience is the crux of the flow experience and means that flow is extremely relevant in sport. Flow research was adopted into sport in the early 1990s, with the first empirical studies published in 1992 [28-35]. Since, then a body of sport-specific flow research has emerged, including a number of studies which are considered classics in the field[36, 37]. A recent systematic review and meta-analysis of the relationship between flow states and performance by Harris et al.[38] reports that in sport much research has focused on the relationship of flow with performance[33-39], antecedents of flow[19-40] and interventions to increase flow[41]. The core components of the flow experience do appear to be functional for task performance[42, 43] in the context of sport and include intrinsic motivation, high levels of con-centration, and focusing on the goal not the self, all of which are likely to provide performance benefits[44-46].

To date, there is no work to our knowledge that has combined the variables under study and investigated the correlation between personality traits, self-efficacy and the creation of the flow state in sports. This research aims to study these variables and how they can affect the sportsman in order to create excellent performance in line with his athletic possibilities. In particular, in light with the literature, we hypotizesed (see **Figure 1**):

H1: the perception of self-efficacy, personal traits, imaginative capability and goal setting have a positive and direct effect on subjective satisfaction of performance.

H2: the perception of self-efficacy, personal traits, imaginative capability and goal setting have a positive and direct effect on the state of flow.

H3: the perception of self-efficacy, personal traits, imaginative capability and goal setting have a positive and indirect effect subjective satisfaction of performance, via state of flow.

H4: There are no differences between competitive and recreational athletes.

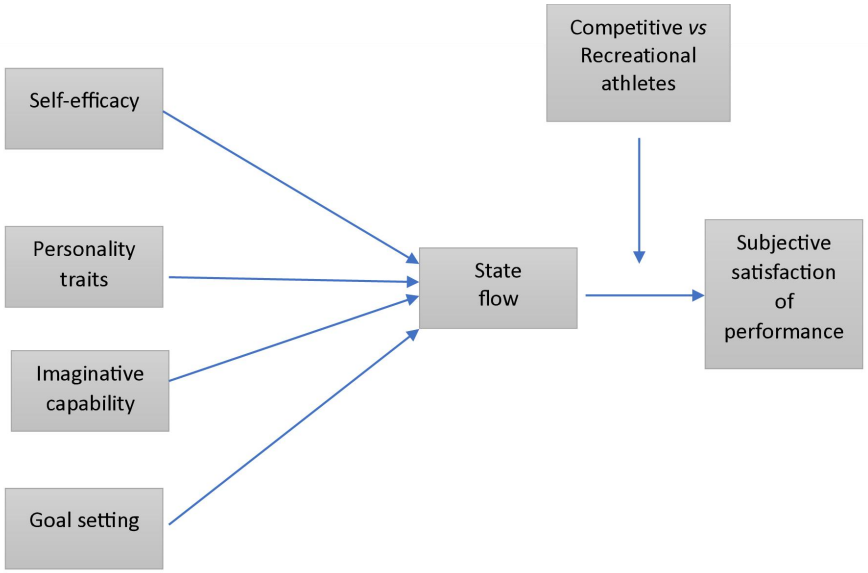


Figure 1. Theoretical model.

3. Method

3.1. Participants and procedure

The research participants were 425 (male 162, female 263) with an average age of 25.59 (SD=5.1). Regarding the level of education, most of them have a high school diploma, followed by a three-year degree. The research participants practice various types of sports (volleyball, football, tennis, swimming, dance, etc.) both individually and in teams (individual=63.1%, team=36.9%), among them 43.5% practice sports at competitive. Participants were recruited in specific sports centers (schools, clubs, gyms, race circuits, sports centers, etc.).

3.2. Measures

3.2.1. Generalized self-efficacy scale (GSES)

For evaluating the overall sense of perceived self-efficacy, the Generalised Self-efficacy Scale[47] (GSES: Jerusalem & Schwarzer, 1986) was used in the version proposed by Sibilia, Schwarzer, & Jerusalem[48]. The scale aims at measuring the ability to cope with everyday difficulties and the adaptation to stressful life experiences. The instrument consists of 10 items measured on a 4-point Likert scale from 1 (corresponding to not at all true) to 4 (corresponding to exactly true). The scale provides an overall score ranging from 10 to 40 points. Sample items are "I can solve most problems if I invest the necessary effort" and "If someone opposes me, I can find the means and ways to get what I want".

3.2.2. Flow state scale (FSS)

The measurement of the sample's flow state was instead carried out by the Flow State Scale (FSS) first developed by Rheinberg, Vollmeyer & Engeser[49]. The instrument presents a corpus of 13 items assessed on a scale of agreement from 1 to 5, divided into three factors: (1) Fluency (smooth pursuit of action), (2) Absorption and (3) the Worry component. The scale produce also a total score to evaluate high, medium and low flow levels. Sample items are "I feel that I have everything under control" and "I don't notice time passing".

3.2.3. Big five inventory- 10 (BFI-10)

The measurement of personality traits was carried out through the Big Five Inventory-10 (BFI-10) developed by Rammstedt[50] and validated in the Italian context by Guido and colleagues[51]. The structure of this scale, smaller in lenght than the famous extended version, has received considerable support over time and has become the most widely studied and adopted personality model, especially in sport contexts[52-53]. Even in its short version, it maintains adequate reliability and validity indices. The instrument is a self-report scale, consisting of 10 items for individuals to rate themselves on a 5-point Likert scale. Each dimension of the Big Five is investigated through two scale items, one of which is in reverse scoring mode. An example of an item is "I see myself as a person who ... in a reserved manner". Specifically, the factors investigated are extroversion, agreeableness, conscientiousness, emotional stability and openness. According to Musek[54], in our study, we utilized the Big Five as a single factor. This is possible because the Big Five model represents a comprehensive and well-established framework for describing personality, breaking down key traits into five fundamental dimensions: openness, conscientiousness, extraversion, agreeableness, and emotional stability. These dimensions provide a thorough overview of various facets of personality, allowing for a comprehensive assessment within a single context. Factor analyses conducted with various personality measures in three distinct samples have provided confirmation for the presence of a overarching personality factor (referred to as "The Big One") within the framework of the five-factor model.

3.2.4. QuAM-2

The Mental Skills Questionnaire (QuAM-2)[55], was used to measure specific aspects of a sportsman's abilities. The instrument actually examines eight different domains: self-esteem, competitive anxiety management, attention and concentration, imaginative ability, sports motivation, assertiveness, stress management and goal setting. Consisting of 48 items, measured on a 5-point Likert frequency scale (never to always), it allows for an overall score and one for each individual area.

The minimum score each subject can obtain in each subscale is 6 while the maximum score is 30. The result given by the sum of the individual subscales can instead range from a minimum of 48 to a maximum of 240. A result between 6 and 10 is a very low value, between 11 and 15 is low, between 16 and 20 is fair, between 21 and 25 is good, between 26 and 30 is very good. Example items are "Waiting for the race stresses me out" and "Thinking back on my past sporting successes is helpful for the race". Specifically, in our study we used the following two sub-dimensions as dependent variables (outcome): goal setting and imaginative capability.

3.2.5 Athlete's subjective performance scale (ASPS)

The Athlete's Subjective Performance Scale (ASPS)[56] contains six items that measure an athlete's subjective perception of his or her performance in sport. An additional item developed in 2012 by Nicholls, Polman and Levy on a large sample of athletes was also added to the scale. Athletes responded to the question "Please rate how satisfied you are with your sports performance by circling the appropriate number." Athlete respondents answered 6 items, two to assess general performance, two for team contribution, and two for personal ability. Respondents answered on a scale ranging from 1=not at all satisfied to 10= totally satisfied.

3.3. Data analysis

The data are analysed in three steps. In the first phase descriptive statistics to depict the sample's and variables characteristics are calculated. Pearson correlation (r) is used to assess the relationship between self-

efficacy, personality traits, imaginative capability, goal setting, dispositional flow and subjective satisfaction of performance. Subsequently, we evaluated the models' goodness of fit, through different fit indexes like Comparative Fit Index (CFI), Root Mean Square Error of Approximation (RMSEA), Standardized Root Mean Square Residual (SRMR). $\chi 2$ values and $\Delta\chi 2$ values are also used.

As second step, we performed a mediation analysis by SEM (structural equation model), testing the indirect effect of dispositional flow in the relationship between the predictors (self-efficacy, personality traits, imaginative capability, goal setting) and the outcome (subjective satisfaction of performance)[57, 58]. To verify the model, two different regression models are tested at the same time, hypothesizing that the total effect of the dependent variable on the independent variable is different from the direct effect of the variable. The mediating effect of the variable is tested using a bootstrap estimation approach on 2000 samples and a percentile method corrected for 95% bias[59, 60]. Finally as third step we carried out a multi-group analysis. Two groups (competitive and recreational athletes) are selected from the sample and used for this analysis. The multi-group analysis is used to assess measurement invariance, structural model invariance and structural-path-coefficient between the two groups, using chi-square difference tests for nested models.

All the analyses are run through SPSS 27.0, and AMOS 27.0. (for Windows; IBM Corp., Armonk, NY, USA).

4. Results

4.1. Descriptive statistic, correlation, and reliability (N=425)

The findings in **Table 1** show the total mean scores for each variable of the sample. Furthermore, to estimate the internal consistency of the model, the Cronbach's alpha coefficient was calculated for each of the variables examined. The reliability analysis confirmed that the final model had a good level of internal consistency, as the Cronbach's alpha value was above 0.73. **Table 1** also reports the results of the intercorrelations; specifically, self efficacy positive and significative correlates with all the predictors (except for personality traits) and with the performance (ASPS; r.=.32). Moreover, personality traits had positive correlations with imaginative capability (r=.10), goal setting (r=.15), flow state (r=.22) and performance (r=.25). Imaginative capability had postive correlation with goal setting (r=.18) and performance (r=.11), but a negative one with the flow state (r= -.16). Finally, Perfomance had positive correlations also with goal setting (r=.29) and perfomance (r=.32), and flow state positive correlates with goal setting (r=.31).

Table 1. Descriptive statistics, correlation and reliability.

	M	SD	α	1	2	3	4	5
1. Self-Efficacy	2.9	.41	.78	1				
2. Personality Traits	3.1	.45	.77	.08	1			
3. Imaginative Capability	2.7	.70	.80	.20**	.10*	1		
4. Goal Setting	2.7	.77	.82	.28**	.15**	.18**	1	
5. Flow State	4.9	.91	.82	.44**	.22**	-.16**	.31**	1
6. Performance (ASPS)	3.2	.46	.73	.32**	.25**	.11*	.29**	.32**

4.2. CFA to test the model

To confirm that our model fit the respondent sample, we conducted a comparison of three different possible models and checked which one showed better fit to the data. First, we compared our model (Model 1) with 6 first-order factors (Self-Efficacy, Personality Traits, Imaginative capability, Goal Setting, State Flow and Performance), with a one-factor model (with all items loaded on a single factor) (Model 2), the

CFA was performed using a robust maximum likelihood estimation to examine the structure of the constructs. The results reveal that the first model, provided a better fit for the data in all CFA fit measures. [χ 2 (139, n = 425) = 327.801, p<.001, χ 2/df = 2.36, RMSEA = .07 (C.I. = .061 -.075), CFI = .93, TLI = .91, SRMR = .05. In addition, the AIC and BIC values were 198.457 and 216.046, respectively.

The second CFA model included the same factors but considered all scales with a single factor structure, in which all indicators were loaded on a single factor. The results of this model provided a worse fit to the data (χ 2 [141, n = 425] = 514.524, p<.001, χ 2/df = 3.65, RMSEA = .14 (CI = .132-.149), CFI = .73, TLI = .71, SRMR = .08, AIC = 432.110; BIC = 523.574). Differences were significant when comparing chi square values and degrees of freedom of both models ($\Delta\chi$2 (2) = 186.723, p < .001).

In addition, we also compared our model (Model 1) with a third model (Model 3) in which we wanted to test the structure of the Big-five against our data. That is, we performed a CFA on our data by placing the five individual factors of the Big-Five (extroversion, agreeableness, conscientiousness, emotional stability and openness) in place of the one-factor model. The results show that although the CFA of model 3 is sufficient as a goodness of fit to the data, model 1 has a better fit [χ 2 (140, n=425) = 463. 216, p<.001, χ 2/df = 3.31, RMSEA = .08 (C.I. = .076 -.091), CFI = .89, TLI = .90, SRMR = .05, AIC = 302.982; BIC = 389.158)], ($\Delta\chi$2 (1) = 135.415, p < .001), (see **Table 2**).

Table 2. Confirmatory factor analysis results for the study model and alternative models for comparison.

Model	Cmin/df	χ2	Df	TLI	CFI	SRMR	RMSEA (C.I.)	AIC	BIC	$\Delta\chi$2
Model 1 **6-first order factors**	2.36	327.801	139	.91	.93	.05	.071 (.061–.075)	198.457	216.046	-
Model 2 **1-factor model with all items loading on a unique factor**	3.65	514.524	141	.71	.73	.08	.142 (.132–.149)	432.110	523.574	186.72
Model 3 **5-first order factors and five factors of the Big-Five**	3.31	463.216	140	.90	.89	.05	.079 (.076-.091)	302.982	389.158	135.415

4.3. Structural model

To verify the mediation effect whose analysis model was first tested with the CFA, we followed the recommendations of James, Mulaik and Brett[61] and the logic of Shrout and Bolger regarding the expected proximal and distal effects[62].

The indirect effect in turn was tested using a bootstrap estimation approach with 2000 samples and the 95% bias-corrected percentile method with confidence interval[60].

4.4. Directed effect

Figure 2 shows the results of the direct effects tested on our model. The results show that there is a positive direct effect of self-efficacy (β = .24; p < .001) of personality factors (β = .22; p < .001) and goal setting (β = .23; p < .001) on subjective performance satisfaction, whereas there is no direct effect of imaginative capability (β = .07; ns).

In addition, there is a positive direct effect of Self efficacy (β = .31; p < .001) of Personality traits (β = .21; p < .001) and Goal setting (β = .26; p < .001) on Dispositional flow and a negative effect of Imaginative capability (β =-.12; p < .001). Finally, Dispositional flow had a direct positive effect on

subjective performance satisfaction (β = .28; p < .001). The direct effects are almost all confirmed with respect to our starting hypothesis.

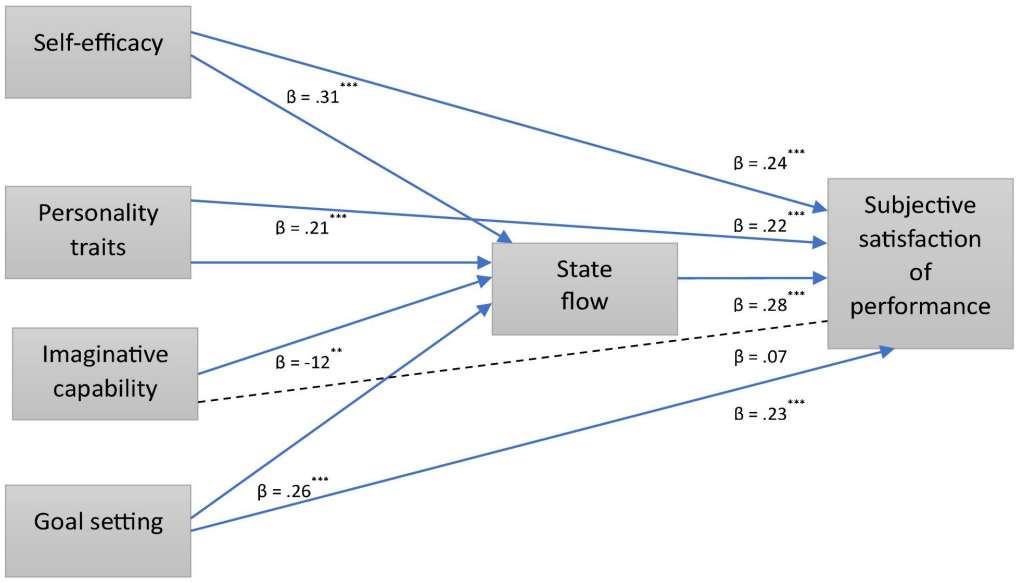


Figure 2. Structural model model *** p < .001, ** p < .05; the dotted line shows a nonsignificant link.

4.5. Indirected effect of state flow

The mediation effect was tested by means of indirect effect testing, the procedure used being that of Hayes and Scharkow[60]. Bootstrapping was used to construct 95% CIs corrected for two-sided bias to assess indirect effects. As presented in **Table 3**, the bootstrap CIs do not cross zero.

The results show that the mediating effect of the State flow between the independent variables and the dependent variable (subjective satisfaction with performance) is verified on all significant relationships found in the direct effect. Specifically, State flow mediates the effect of self efficacy (β = .05, p < .01, 95% CI [.211, .502]), personality traits (β = .06, p < .001, 95% CI [.315, .801]) and goal setting (β = .04, p < .01, 95% CI [.179, .368]).

Table 3. Standardized indirect effects of State flow between antecedents (self efficacy, inaginative capability, personality traits and goal setting) and Subjective satisfaction of performance (ASPS).

Predictor	**Mediator**	**Outcome**	**β**	**SE**	**BC 95% CI**	
					LL	UL
Self Efficacy →	State Flow →	ASPS*	.05**	.04	.211	.502
Perosnality traits →	State Flow →	ASPS*	.06***	.05	.315	.801
Goal setting →	State Flow →	ASPS*	.04**	.03	.179	.368

*** *p < .001,* ** *p < .01, ASPS= Subjective satisfaction of performance*

4.6. The multigroup analysis between competitive and recreational athletes

The moderating effect was tested by comparing two groups: competitive and recreational athletes. The first step in testing these differences was to determine whether they existed and whether these differences resulted from structural differences in path coefficients between the groups. Specifically, before evaluating any evidence regarding the structural equality of the paths (structural invariance test), it is important to test whether the measurement parameters work the same for both groups (measurement invariance test)[63-64].

Multigroup analysis was used to assess measurement invariance between the groups of competitive and amateur athletes, using chi-square difference tests for a series of nested models.

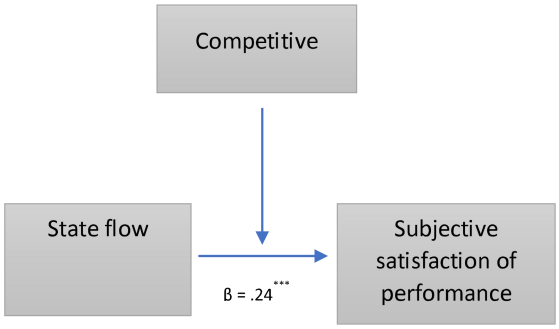
The results indicated that the measurement model had adequate fit indices in the multigroup [$\Delta\chi2$ (Δdf = 38) = 65.53, p < .005] and that the structural relationships among the three latent factors varied according to impact (competitive vs recreational athletes) (**Table 4**).

Table 4. Multigroup analysis: Testing for measurement invariance across competitive and recreational athletes.

Measurement model	χ2	df	Δχ²	Δdf	NFI	CFI	RMSEA
Multigroup model for the total sample	169.05	188	-	-	.91	.94	.063
Unconstrained model	186.24	192	17.19	4	.90	.93	.058
Measurement model	211.75	218	42.70	30	.90	.93	.058
Structural model	234.58	226*	65.53***	38	.90	.93	.060

****p<05 ª NFI=Normed fit index; CFI= Comparative fit index; RMSE= Root mean square error of approximation.*

a) Competitive N=185



b) Recreational athletes N=240

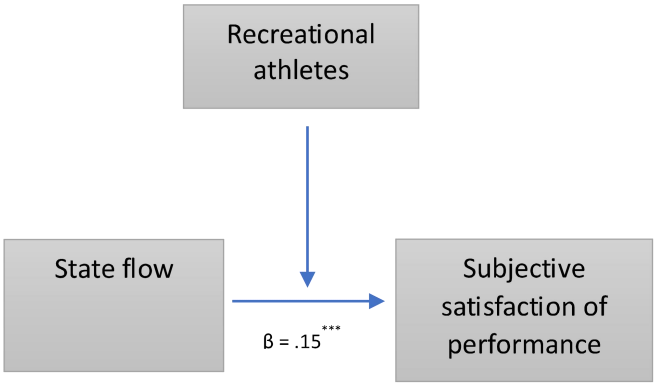


Figure 3. Standardized path coefficients of structural models for competitive and recreational athletes groups.***p < .001.

In **Figure 3** we show the results from the multi-group analysis separately for each group **Figure 3 (a,b)**. Once the group invariance of our measurement model was confirmed, we again performed the multi-group through a series of chi-square difference tests.

The results are shown in **Table 5** and indicate that there were significant differences in path estimates between competitive and recreational athletes, as evidenced by a significant chi-square difference ($\Delta\chi2$ [8] 16.09, p<.001) found between the baseline model (Model 1) and the restricted model (Model 2). An additional chi-square difference test was performed and subsequently identified which paths differed (model

3), the paths from State flow (SF) to Subjective satisfaction of performance (ASPS) was significantly higher in the competitive group than in the recreational athletes group ($\Delta\chi 2$ [5] = 6.95, $p < .001$).

Table 5. Multigroup analysis: Testing for path coefficients invariance across competitive and recreational athletes (N=425).

STRUCTURAL MODEL	X2	DF	ΔX^2	ΔDF
Model 1: baseline model	351.05	134	-	-
Model 2: Factor loadings and all path coefficients invariant	367.14	142	16.09	8
Model 3: Path coefficient SF→ ASPS	358.16	139	6.95	5

5. Discussion

The aim of the study was to investigate the role played by state of flow in the relationship between some personal characteristics, such as self-efficacy, personality traits, goal setting and imaginative capability on subjective satisfaction with performance and to verify any differences between professional athletes and amateurs. Results revealed the importance for professional and amateur athletes to achieve a state of flow that guarantees higher levels of performance. These findings produced valid insights both for future research and for practical development of specific training program to enhance state of flow and sport performance.

Specifically, results confirmed our hypotheses, in line with what was found by the literature. Direct effect of the model suggests that self-efficacy, personality trait and goal setting influence subjective satisfaction with performance, while the effect of imaginative capability on the dependent variable is not significant (H1). At the same time, self-efficacy, personality trait and goal setting have a positive effect on state of flow, while imaginative capability has a negative effect on state of flow (H2). Moreover, the relationship between efficacy, personality trait and goal setting and subjective satisfaction with performance is partially mediated by state of flow (H3) and there are no differences between competitive and recreational athletes but the relationship between flow state and performance is too hard for the competitive athletes.

The analysis of psychological factors that may influence the performance of athletes has been a subject of study in recent decades in numerous disciplines [39, 65, 66]. There is a growing understanding of how aspects such as competitive anxiety, motivation, moods, flow states, and self-efficacy relate to each other and with sport performance[67, 68].

In this regard, results regarding H1 confirmed what was found in the literature: sportsman with a high level of self-efficacy tend to have a positive concept of themselves and their abilities and therefore commit themselves more to their performance. Furthermore, following the Big Five trait conceptualization, research in athletic settings has provided evidence that these trait dimensions predict short-term athletic behaviors[69, 70], interpersonal relationships[71, 72], and long-term athletic success[73, 74]. This also applies to non-professional athletes because in non-athletic settings, there is evidence that neuroticism, extraversion and conscientiousness are important for physical activity levels[75, 76] and that physical activity contributes to stability and change in personality over long time frames[77, 78]. At same time, the result confirms the important role of goal setting to focus their efforts towards goal-related actions, to energizes individuals, allowing them to invest effort in goal pursuit, to increase persistence and to facilitates the discovery and development of task-relevant strategies, as confirmed by numerous previous review[79-82].

In a similar vein, results relating to H2 (the impact of self-efficacy, personality trait and goal setting on state of flow) confirmed the positive and direct relationship with this intrinsically enjoyable psychological state that is characterized by perceiving a balance between the challenge of a situation and the skills

necessary to meet that challenge, enhanced focus and concentration, and the absence of self-doubt[11-83], and it can often produce optimal sport performance[28-33]. As perceiving a balance between challenge and skill level is essential for flow, it seems plausible that self-efficacy i.e., a belief in one's skill level) could be an important precursor to flow states[84]. Many aspects of personality also have been researched regarding flow, including the desire to fulfill basic needs (need satisfaction)[85], need for achievement[86, 87], and the Big Five personality traits[88, 89]. In this regard, previous studies showed that all dimensions of the Big Five, such as openness to experience[88, 90-92], conscientiousness[89, 91-95], emotional stability[89, 91-94, 96], extraversion[89-95] and agreeableness[91-97] were a strong predictor of flow. Furthermore, for the flow state to be activated and generate its numerous benefits, there must be preconditions that Csikszentmihalyi (2000)[98] himself contributed to defining, including among the flow conditions the clear goals inherent in the activity for the individual to strive towards and unambiguous feedback to either inform the athlete that they are progressing towards these goals, or tells them how to adjust in order to do so.

Among the antecedents considered in our study, only imaginative capability showed controversial results. Specifically, imaginative capacity did not have a direct effect on performance, while it even had a negative effect on the state of flow. Although in the literature the role of imagery is closely linked to sporting performance in different types of sports[99-101], and to the activation of a state of flow[102-104] , this is a very complex ability to acquire, refine and use and requires specific training to develop. for this reason and due to the characteristics of our sample this dimension was not significant in the tested model.

Likewise, results showed that flow state mediated the relationship between self -efficacy, personality traits, goal setting and performance (H3). This result underlines that the state of flow, or that intrinsically rewarding, harmonious psychological state involving intense focus and absorption in a specific activity, with a sense of everything coming together or clicking into place, even in challenging situations[12], which is also activated thanks to the presence of some conditions demonstrated in our study, has a very important role in promoting the positive effect of personality traits, the sense of perceived self-efficacy and goal setting on sports performance. This evidence appears very interesting in terms of practical implications, as it suggests the importance of activating specific training programs, widely documented in the literature, which can help the athlete train to generate a state of flow to encourage more successful performances.

Finally, it was interesting to note how the results were absolutely the same between the two groups analyzed, that is, there were no differences between professional and amateur athletes, despite an obviously stronger relationship between flow state and performance in professional athletes (H4). This result demonstrates how although there are typical competitive conditions, some personal characteristics, such as those analyzed in the study, still have an impact on the activation of a positive state that generates successful performances. And if this applies to professional athletes who in their preparation pay particular attention to attention to physical and mental details, which would help them to improve, for amateurs the practice of sport itself probably generates a state of well-being such that, combined with some personal characteristics, improves satisfaction with the performance obtained[105].

Author Contributions

Conceptualization, G.V. and S.P.; methodology, S.P.; software, S.X.; investigation, M.M., C.M. and M.G.; resources, S.G.; data curation, S.P.; writing—original draft preparation, M.G., S.G. and C.M.; writing—review and editing, M.M. and C.M.; visualization, M.G.; supervision, S.P.

Informed Consent Statement

Informed consent was obtained from all subjects involved in the study.

Conflicts of Interest

The authors declare no conflict of interest.

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