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Relationships Among Personality, Perfectionism and Dispositional Flow in Athletes: A Partial Least Square Path Modeling Approach

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ABSTRACT

Understanding which psychological traits promote a flow state is crucial in the sport environment. This study aimed to examine whether personality and perfectionism among athletes were associated with the experience of dispositional flow. A sample of 216 athletes ($M_{age} = 25.30$; $SD = 8.67$; 129 men) completed self-report measures. Results of the partial least squares path modeling approach showed that extraversion was significantly positively associated with challenge skill balance, awareness, merging of action, clear goals, loss of self-consciousness, unambiguous feedback, and transformation of time. In addition, agreeableness was significantly negatively associated with sense of control. Besides, conscientiousness was significantly negatively associated with sense of control, clear goals, and autotelic experience. Finally, emotional stability was significantly positively associated with the transformation of time. In conclusion, it is important to highlight the influence of personality in the flow experience, which may hinder the performance of those athletes who have not developed certain personality traits. Also, it is noteworthy that extraversion is among the most salient personality variables in relation to flow. This has practical psychological implications for developing healthy environments and for identifying risk profiles that endanger well-being and performance among athletes.

1 | Introduction

The concept of flow (Csikszentmihalyi 1990) is a key term in the literature on sports psychology. Several studies have shown a relationship between the disposition to experience flow and factors such as perfectionism (Blachowska et al. 2023), satisfaction (Harnois 2022), and sports performance (Jackson and Eklund 2002; Norsworthy et al. 2017; Swann et al. 2023). Although there is extensive scientific literature on these variables, few studies have examined these three variables from an integrative perspective (Radulović and Petrović 2023). Most existing research relies on correlational designs, which limit the ability to capture the complexity of the underlying phenomena (Bassi et al. 2014; Danckert et al. 2018; Heller et al. 2015; Martínez and Scott 2016; Ross and Keiser 2014). According to these authors, employing

advanced statistical techniques, such as structural equation modeling, is essential for gaining a more nuanced understanding of the relationships between personality traits and sports performance, particularly when considering potential interactions and moderating variables. In light of this, the present study aims to examine which personality traits and dimensions of perfectionism enhance athletes' disposition to experience flow, using a partial least squares path modeling (PLS-PM) approach.

1.1 | Flow

Flow is key to sports performance, but the study of this variable is complex, as there is significant interindividual variability among athletes, and not all athletes experience it with

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Keypoints

- This study examines the nine dimensions of dispositional flow separately rather than as a single global construct, providing a more detailed understanding of the flow experience in athletes.
- Personality traits and perfectionism were analyzed simultaneously using a partial least squares path modeling approach to examine their associations with dispositional flow.
- Extraversion emerged as the most consistent personality predictor, showing positive associations with several dimensions of dispositional flow.
- Agreeableness and conscientiousness showed negative associations with specific flow dimensions, highlighting the complex role of personality in optimal sport experiences.
- Emotional stability was positively associated with the transformation of time dimension of flow.

the same frequency or intensity (Blachowska et al. 2023). Therefore, understanding the type of stable variables that can lead athletes to experience flow during competitions and how to increase their willingness to flow is vital for sports psychologists and coaches.

To study this variable, two different types of measurement have been used, which make extrapolation of the data difficult and require clarification. Flow state refers to a state of total absorption in the present activity, characterized by intense focus, concentration, and enjoyment, accompanied by a loss of reflective consciousness (Blachowska et al. 2023). In contrast, the disposition to flow, which is the type of measure on which this study focuses, assesses a person's stable tendency to feel flow (Csikszentmihalyi 1990).

Different studies in sports literature have shown that dispositional flow is related to sports performance (Garcia et al. 2019; Jackson and Eklund 2002; Kamushadze et al. 2021). However, although experiencing flow and its associated changes would lead to several performance benefits, the current evidence is not very clear (Harris et al. 2021). This may be because most research on flow, rather than utilizing the nine different factors included in Csikszentmihalyi's (1990) model, has employed a global measure of it, which limits a comprehensive understanding of this variable. In addition, flow disposition is related to other variables that may modulate the relationship between flow and sports performance, such as perfectionism (Arslan and Altan-Atalay 2022) and personality (Ross and Keiser 2014). Hence, in this study, the examination of flow will encompass the nine factors of this variable to provide a more comprehensive picture of the experience of dispositional flow in athletes.

1.2 | Perfectionism and Personality

Previous studies revealed that the perfectionism of athletes is influenced by personality factors (Smith et al. 2019; Stoeber et al. 2009). In fact, a few studies have analyzed whether the

effects of perfectionism are not reducible to well-established basic personality traits, such as the Big Five personality dimensions (Waleriańczyk and Stolarski 2021). The results highlighted the need to include both variables in studies related to flow, based on the premise that the Big Five can serve as a useful reference point from which to examine the unique contribution of perfectionism to performance. Thus, when establishing the importance of flow in sports performance, it is first necessary to understand the multidimensionality and complexity of the relationships established between perfectionism and personality in the context of sport and competition in measuring them as independent variables together.

1.2.1 | Perfectionism

Perfectionism was originally defined as an individual disposition characterized by setting excessively high personal standards of performance, accompanied by tendencies for overly critical evaluations and a sense of doubt about the quality of performance, which was traditionally seen as a negative form of perfectionism (Frost et al. 1990).

According to Stoeber and Otto (2006), in the sports context there is considerable agreement that perfectionism can be positive and that there is a large amount of evidence by which two basic forms of perfectionism can be distinguished: the orientation towards perfection, which includes self-imposed high standards and striving to achieve perfection (e.g., *perfectionistic strivings*) and negative reactions to imperfection, which refers to concerns about not being perfect, the fear of failing etc. (e.g., *perfectionistic concerns*). The results collected in the bibliography suggest that the orientation towards perfection, in the absence of high levels of concern for error, can favor adaptive responses (Stoeber et al. 2007).

For instance, Gotwals and Stoeber (2018) found that orientation towards perfection was positively related to key dimensions of flow, including the balance between challenge and skill, clarity of goals, and concentration. Similarly, Hill et al. (2020) confirmed that athletes with an adaptive perfectionism profile (high *strivings* and low *concerns*) reported significantly higher levels of flow during competition.

1.2.2 | Personality

The study of personality has become a central area in sport and exercise psychology. Throughout the development of this field, research has consistently shown that personality traits are associated with key variables such as performance, competitive adaptation, and emotional regulation (Allen et al. 2011; Allen and Laborde 2014). In particular, recent investigations with athletes across different competitive levels have identified low neuroticism as one of the traits most consistently associated with sporting success and elite performance (Piepiora 2021; Piepiora et al. 2025).

In a study of individual sports champions, athletes with higher international achievements displayed significantly lower levels of neuroticism and higher levels of extraversion and

conscientiousness compared to other competitors (Piepiora 2021). Similarly, recent analyses comparing amateur, competitive, and professional athletes have shown that the trait most consistently associated with progression to higher competitive levels is low neuroticism, whereas extraversion does not function as a universal linear predictor of competitive advancement (Piepiora et al. 2025). Although higher levels of extraversion and conscientiousness have also been observed among successful or elite athletes, evidence regarding the relative weight of these traits varies depending on the sport discipline and competitive level examined.

Taken together, these findings suggest that while different personality traits may contribute to sport performance, emotional stability appears to play a particularly important role in distinguishing among competitive levels. However, whereas the relationship between personality traits and performance has been widely examined, considerably less attention has been paid to the association between personality traits and optimal psychological states such as dispositional flow, which may represent a complementary pathway through which personality operates in sport contexts.

Several personality characteristics have been examined in relation to flow, including those based on the Big Five model of personality (Bassi et al. 2014; Danckert et al. 2018). Previous research has provided evidence of the relationship between most of the big five factors and flow as a general factor (Kennedy 2020). However, there is a scarcity of works that examine the relationship between these variables, separating the flow factors that may lose valuable information when intervening with athletes (Bassi et al. 2014; Danckert et al. 2018; Heller et al. 2015; Martínez and Scott 2016; Ross and Keiser 2014).

For instance, Danckert et al. (2018) found that conscientiousness, agreeableness, openness to experience, and extraversion were significantly positively correlated with the likelihood of experiencing a flow state, while Neuroticism was significantly negatively correlated. Likewise, the positive relationship between Responsibility and flow is the most consistent finding (Martínez and Scott 2016; Ross and Keiser 2014). On the other hand, Extraversion (Heller et al. 2015) and Openness to Experience (Bassi et al. 2014; Kennedy 2020) also show a positive relationship with flow, while Neuroticism is negatively related (Heller et al. 2015; Ross and Keiser 2014).

In contrast, findings regarding agreeableness remain inconsistent, with some studies reporting positive associations (Danckert et al. 2018) and others reporting negative ones (Ross and Keiser 2014). Only one study failed to identify significant relationships between the Big Five traits and flow (Kocjan and Avsec 2017).

Given the complexity of the relationships among perfectionism, personality, and flow, further investigation is warranted in order to better understand their combined role in optimizing athletes' functioning and performance.

Based on the abovementioned, the complexity of the relationships between perfectionism, personality, and the state of

flow becomes evident, underscoring the need to study them in order to optimize the improvement and performance of athletes. As such, the work aims to predict how the Big Five personality traits influence each of the nine dimensions of flow, as previous studies have not yet examined flow and its dimensions in isolation. This fact may lead to the loss of information in work within the applied field, as the flow variable is not decomposed into its factors (Danckert et al. 2018; Elbe et al. 2010; Kennedy 2020; Martínez and Scott 2016; Stavrou et al. 2007). Accordingly, the present study aimed to examine the associations between the Big Five personality traits, perfectionism dimensions, and each of the nine dimensions of dispositional flow. By analyzing flow at the dimensional level, this study seeks to provide a more nuanced understanding of these relationships, which may be obscured when flow is treated as a global construct.

The following hypotheses were established: (a) perfectionistic strivings are expected to be positively associated with dispositional flow, whereas perfectionistic concerns are expected to be negatively associated; (b) conscientiousness, agreeableness, openness to experience, and extraversion are expected to be positively associated with dispositional flow, whereas neuroticism is expected to be negatively associated.

2 | Method

2.1 | Participants

The study sample was made up of 216 athletes (Mage = 25.30; SD = 8.67; 129 were men). In particular, 13 athletes were not federated, 203 were federated athletes, and 37 were professional athletes. Regarding the competition level, 117 competed nationally, 154 competed regionally, 111 competed nationally, and 31 competed internationally. The sports modalities practiced by the athletes were: Athletics ($n = 11$), badminton ($n = 4$), basketball ($n = 26$), handball ($n = 16$), cycling ($n = 19$), football ($n = 58$), tennis ($n = 11$), triathlon ($n = 11$), volleyball ($n = 10$), water polo ($n = 11$), and others ($n = 28$).

2.2 | Measures

The Big Five Personality Trait Short Questionnaire in the Spanish version (BFPTSQ; Ortet et al. 2017) was utilized to measure personality traits in athletes. This questionnaire is a brief 50-item scale targeted to measure adults and adolescents (Morizot 2014), examining these factors: openness ($\alpha = 0.78$), extraversion ($\alpha = 0.78$), agreeableness ($\alpha = 0.87$), conscientiousness ($\alpha = 0.70$), and emotional stability (low neuroticism) ($\alpha = 0.74$). It is graded using a 5-point Likert scale (0 = Disagree strongly; 4 = Agree strongly).

The Multidimensional Inventory of Perfectionism in the Spanish version (MIPS; Atienza et al. 2020; Stoeber et al. 2007) in Sports was utilized to measure striving for perfection and negative reactions to imperfection. The scale comprises five questions that measure negative reactions to imperfection (NRI; $\alpha = 0.70$) and five items evaluating individual differences in striving for perfection (SP; $\alpha = 0.75$). Prior to presenting the questions, it was

stated the following statement when playing or practicing sports. The scale was rated ranging from 1 = “never” to 6 = “always”.

The Spanish version of the Dispositional Flow Scale (DFS; García-Calvo et al. 2008; Jackson et al. 1998). This scale consists of 36 items that try to measure the frequency with which athletes experience flow during the practice of their sport, using a Likert-type scale from 1 (never) to 5 (always). The questionnaire is divided into 4 items for each of the following dimensions: Challenge-skills balance ($\alpha=0.79$), Action-awareness merging ($\alpha=0.86$), Clear Goals ($\alpha=0.87$), Unambiguous feedback ($\alpha=0.88$), Total Concentration on the task at hand ($\alpha=0.91$), Sense of Control ($\alpha=0.88$), Loss of Self-consciousness or Self-Awareness ($\alpha=0.80$), Transformation of time ($\alpha=0.81$), and Autotelic Experience ($\alpha=0.88$).

2.3 | Procedure

The study complied with the ethical standards of the American Psychology Association (Knapp and VandeCreek 2012) and it was approved by the local ethics committee at Universidad Internacional de La Rioja (UNIR; PI:018_2019). First, researchers contacted athletes and coaches by phone or email to ask for their interest in participating in the research. Once they showed their interest in collaborating, the participants signed informed consent before the study was carried out. Participants were contacted online and in person, but in any case, they completed the survey through an online-based questionnaire. Thus, they received the link to answer the questions, which were recorded in an online database.

2.4 | Statistical Analyses

To conduct the analyses, the statistical software R (4.1.1) was utilized with the library PLS-PM (Sánchez 2013). In that case, Partial Least Squares Path Modeling (PLS-PM) was used to analyze the connection between personality traits, perfectionism, and dispositional flow. In particular, PLS-PM is a technique based on the variance of structural equation modeling, which is not constrained by normality distributions (Martinent et al. 2019). Thus, PLSPM is shown to be a reliable package that works with small sample sizes. To examine the significance of the confidence intervals, it was evaluated by building a 95% bias-corrected percentile following a bootstrap technique with 5000 repetitions (Sánchez 2013). Concerning the variables examined with PLS-PM (personality, perfectionism and dispositional flow), two or three parcels were created (Coffman and MacCallum 2005) in aleatory items combination.

First, the psychometric characteristics of the variables were examined to ensure that the model was of good quality. In particular, the following indexes were reported: composite reliability values (ρ), eigenvalue analysis of each manifest variable's correlation matrix, standardized factor loadings and average variance extracted (AVE) values. AVE scores higher or equivalent to 0.50 (Martinent et al. 2019), ρ scores higher than 0.70 (Fornell and Larcker 1981), standardized factor loadings greater than 0.40 (Raykov 2001), the second eigenvalue is less than 1 and the first is more than 1 (Sánchez 2013) provide enough reliability

of the examined variables. Second, the structural model was examined to explore the connection among the distinct latent variables of the study.

3 | Results

3.1 | Descriptive Statistics of the Examined Model

Table 1 shows the characteristics of the examined factors. The results revealed low scores in conscientiousness and emotional stability. On the other hand, medium scores were found in openness, extraversion, and agreeableness. Moreover, moderate to high scores were found in negative reactions to imperfection, striving for perfection, clear goals, challenge skill balance, merging of action and awareness, sense of control, concentration on the task, unambiguous feedback, transformation of time, autotelic experience, and loss of self-consciousness. Moreover, correlational studies did not reveal collinearity among the research factors, with correlations ranging from -0.46 to 0.81 and no confidence intervals near 1.0.

3.2 | Preliminary Analyses

Table 2 revealed the results of the inner PLS-PM model in the distinct reliability and validity markers of the model. In particular, the standardized factor loadings ranged from 0.60 to 0.94 ($M=0.83$; $SD=0.07$), the ρ scores ranged from 0.82 to 0.92 ($M=0.89$; $SD=0.03$), the AVE scores ranged from 0.60 to 0.79 ($M=0.70$; $SD=0.06$), whereas the first eigenvalues ranged from 1.54 to 3.00 ($M=2.44$; $SD=0.52$) and the second eigenvalues ranged from 0.34 to 0.84 ($M=0.56$; $SD=0.15$).

3.3 | Results of the Structural Model

Table 3 shows the results of the PLS-PM model (i.e., connection among latent factors). Results showed that extraversion was significantly positively associated with Challenge Skill Balance ($\beta=0.47$; $p<0.05$), Merging of action and awareness ($\beta=0.39$; $p<0.05$), Clear Goals ($\beta=0.43$; $p<0.05$), Unambiguous feedback ($\beta=0.42$; $p<0.05$), Loss of Self-consciousness ($\beta=0.33$; $p<0.05$) and Transformation of Time ($\beta=0.24$; $p<0.05$). Besides, Agreeableness was significantly negatively associated with Sense of Control ($\beta=-0.20$; $p<0.05$), Conscientiousness was significantly negatively associated with Clear Goals ($\beta=-0.25$; $p<0.05$) Sense of Control ($\beta=-0.19$; $p<0.05$) and Autotelic Experience ($\beta=-0.27$; $p<0.05$). Finally, Emotional Stability was significantly positively associated with Transformation of Time ($\beta=0.20$; $p<0.05$) (Figure 1).

4 | Discussion

This study aimed to examine whether personality and perfectionism in athletes were associated with dispositional flow. Overall, the results indicate that personality traits are both positively and negatively associated with athletes' tendency to experience flow during competition. First,

TABLE 1 | Descriptive statistics and correlations among the variables.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1. OP																
2. EXT	0.53															
3. AGRE	−0.22	−0.46														
4. CONSC	−0.29	−0.24	0.26													
5. EMO	−0.19	−0.32	0.17	0.34												
6. ST	−0.05	−0.12	0.48	0.16	0.06											
7. NREACT	−0.05	−0.12	0.42	0.07	−0.00	0.77										
8. BAL	0.22	0.46	−0.20	−0.21	−0.18	0.01	−0.00									
9. MERG	0.13	0.35	−0.15	−0.14	−0.05	0.14	0.09	0.76								
10. CLEARG	0.20	0.45	−0.23	−0.33	−0.23	0.01	0.01	0.75	0.64							
11. CLEARDF	0.18	0.46	−0.29	−0.22	−0.27	−0.10	−0.11	0.78	0.63	0.78						
12. CONT	0.18	0.30	−0.22	−0.24	−0.27	−0.10	−0.01	0.67	0.58	0.66	0.70					
13. SENSC	0.20	0.40	−0.31	−0.29	−0.19	−0.01	−0.01	0.75	0.71	0.73	0.78	0.81				
14. LOSS	0.10	0.32	−0.23	−0.15	−0.04	−0.07	−0.14	0.47	0.52	0.51	0.56	0.55	0.56			
15. DIS	0.13	0.23	−0.17	−0.08	0.09	−0.06	−0.19	0.30	0.41	0.25	0.25	0.32	0.43	0.51		
16. AUTOTE	0.10	0.24	−0.15	−0.31	−0.12	−0.19	−0.05	0.54	0.49	0.54	0.53	0.69	0.62	0.41	0.34	
Mean	2.74	2.74	1.75	0.88	1.12	3.32	3.57	4.07	3.93	4.18	3.98	4.21	3.97	3.55	3.30	4.36
Standard Deviation	0.65	0.75	0.70	0.48	0.60	0.82	0.71	0.65	0.77	0.73	0.75	0.71	0.74	0.94	0.98	0.69
Skewness	−0.26	−0.43	0.41	0.42	0.46	0.03	0.09	−0.68	−0.52	−1.01	−0.77	−0.86	−0.59	−0.20	−0.22	−1.07
Kurtosis	0.29	−0.48	−0.22	−0.56	−0.39	−0.52	−0.80	0.95	0.06	1.23	0.63	1.08	0.28	−0.57	−0.25	0.59

Abbreviations: AGRE, agreeableness; AUTOTE, autotelic experience; BAL, challenge skill balance; CLEARDF, unambiguous feedback; CLEARG, clear goals; CONSC, conscientiousness; CONT, concentration on the task; DIS, transformation of time; EMO, emotional stability; EXT, extraversion; LOSS, loss of self-consciousness; MERG, merging of action and awareness; NREACT, negative reactions to imperfection; OP, openness; SENSC, sense of control; ST, striving for perfection.

regarding the personality traits that were positively associated with dispositional flow, extraversion was significantly associated with seven of the nine flow dimensions described by Csikszentmihalyi (1990): challenge–skill balance, action–awareness merging, clear goals, unambiguous feedback, loss of self-consciousness, and transformation of time. These findings are consistent with previous research using global measures of flow (Danckert et al. 2018; Heller et al. 2015). Extraversion is characterized by sociability, assertiveness, activity, sensation-seeking, and positive emotionality. Individuals high in extraversion tend to experience and maintain positive affect, display higher levels of behavioral activation, and actively seek stimulating experiences. In competitive contexts, these characteristics may facilitate interpreting stressful situations as challenges rather than threats. This adaptive appraisal, together with higher activation levels, may help explain the positive association between extraversion and multiple dimensions of dispositional flow. Nevertheless, although extraversion emerged as the strongest personality correlate of dispositional flow in the present study, previous research on athletic performance has consistently identified low neuroticism as a more robust predictor of competitive level and elite success (Piepiora 2021; Piepiora et al. 2025). This suggests that the personality determinants of

dispositional flow may not fully overlap with those associated with objective performance outcomes.

Second, the personality factors that were negatively associated with some of the different dimensions of flow are agreeableness and conscientiousness. Specifically, in this study, it was found that the higher the agreeableness, the lower the sense of control, and the higher the conscientiousness, the lower the level of autotelic experience, the sense of control, and the clarity of goals. These results are in line with the study by Ross and Keiser (2014) and Danckert et al. (2018), who revealed the existence of a negative correlation between agreeableness and flow. This could be because altruism, collaboration, and empathy are precisely some of the traits that define agreeableness. Although they may be very appropriate dimensions in the sports context in areas related to team cohesion or when it comes to developing a sense of identity and improving motivation, it is possible that in other aspects related to performance and competition (Saale-Prasad 2013). For instance, those situations such as optimizing performance requires focusing on the most relevant aspects of the task; an excess of points in kindness may be a disruptive stimulus for good performance.

Third, a negative relationship has been found between conscientiousness and autotelic experience, clarity of goals, and sense of

TABLE 2 | Fit indexes and psychometric characteristics of the factors examined in the model.

Factors	Construct level statistics	Items/Parcels	SFL
1. OP	$\hat{\lambda}_1 = 2.10$; $\hat{\lambda}_2 = 0.62$ $\rho = 0.87$; AVE = 0.70	1	0.88
		2	0.89
		3	0.72
2. EXT	$\hat{\lambda}_1 = 2.11$; $\hat{\lambda}_2 = 0.71$ $\rho = 0.87$; AVE = 0.68	1	0.90
		2	0.72
		3	0.84
3. AGRE	$\hat{\lambda}_1 = 2.39$; $\hat{\lambda}_2 = 0.41$ $\rho = 0.92$; AVE = 0.79	1	0.82
		2	0.94
		3	0.89
4. CONSC	$\hat{\lambda}_1 = 1.84$; $\hat{\lambda}_2 = 0.68$ $\rho = 0.82$; AVE = 0.60	1	0.87
		2	0.84
		3	0.60
5. EMO	$\hat{\lambda}_1 = 1.99$; $\hat{\lambda}_2 = 0.68$ $\rho = 0.85$; AVE = 0.66	1	0.74
		2	0.88
		3	0.81
6. ST	$\hat{\lambda}_1 = 1.60$; $\hat{\lambda}_2 = 0.39$ $\rho = 0.89$; AVE = 0.76	1	0.76
		2	0.95
7. NREACT	$\hat{\lambda}_1 = 1.54$; $\hat{\lambda}_2 = 0.46$ $\rho = 0.86$; AVE = 0.74	1	0.76
		2	0.95
8. BAL	$\hat{\lambda}_1 = 2.48$; $\hat{\lambda}_2 = 0.71$ $\rho = 0.86$; AVE = 0.61	1	0.74
		2	0.76
		3	0.84
		4	0.78
9. MERG	$\hat{\lambda}_1 = 2.84$; $\hat{\lambda}_2 = 0.53$ $\rho = 0.90$; AVE = 0.70	1	0.72
		2	0.86
		3	0.89
		4	0.86
10. CLEARG	$\hat{\lambda}_1 = 2.90$; $\hat{\lambda}_2 = 0.44$ $\rho = 0.91$; AVE = 0.72	1	0.90
		2	0.83
		3	0.82
11. CLEARDF	$\hat{\lambda}_1 = 2.95$; $\hat{\lambda}_2 = 0.50$ $\rho = 0.91$; AVE = 0.73	4	0.83
		1	0.78
		2	0.89
		3	0.86
12. CONT	$\hat{\lambda}_1 = 3.18$; $\hat{\lambda}_2 = 0.34$ $\rho = 0.93$; AVE = 0.79	4	0.89
		1	0.87
		2	0.89
		3	0.88
13. SENSC	$\hat{\lambda}_1 = 2.94$; $\hat{\lambda}_2 = 0.44$ $\rho = 0.91$; AVE = 0.73	4	0.91
		1	0.84
		2	0.86
		3	0.83
		4	0.88

(Continues)

TABLE 2 | (Continued)

Factors	Construct level statistics	Items/Parcels	SFL
14. LOSS	$\hat{\lambda}_1 = 2.61$; $\hat{\lambda}_2 = 0.84$ $\rho = 0.87$; AVE = 0.64	1	0.90
		2	0.60
		3	0.83
		4	0.92
15. DIS	$\hat{\lambda}_1 = 2.57$; $\hat{\lambda}_2 = 0.79$ $\rho = 0.87$; AVE = 0.63	1	0.73
		2	0.77
		3	0.89
		4	0.76
16. AUTOTE	$\hat{\lambda}_1 = 3.00$; $\hat{\lambda}_2 = 0.46$ $\rho = 0.92$; AVE = 0.74	1	0.76
		2	0.91
		3	0.87
		4	0.89

Note: ρ : composite reliability; $\hat{\lambda}_1$: 1st eigenvalue. All Standard Factors Loadings were significant at $p < 0.001$.

Abbreviations: AGRE, agreeableness; AUTOTE, autotelic experience; AVE, average variance extracted; BAL, challenge skill balance; CLEARDF, unambiguous feedback; CLEARG, clear goals; CONSC, conscientiousness; CONT, concentration on the task; DIS, transformation of time; EMO, emotional stability; EXT, extraversion; LOSS, loss of self-consciousness; MERG, merging of action and awareness; NREACT, negative reactions to imperfection; OP, openness; SENSC, sense of control; SFL, standardized factor loadings; ST, striving for perfection.

control. These results are in line with those obtained by Tozman et al. (2017). These authors observed in their study that higher levels of conscientiousness were associated with lower levels of flow during chess practice. Conscientiousness has to do with the ability to plan, be methodical, control impulses, abide by and respect norms and rules. All these qualities are very important for learning, but without a doubt in competition, one must also be aware of a series of random factors that are essential to successfully face even if they are not within what was previously planned. It is possible that a very high score in conscientiousness may be an element of vulnerability when making decisions, given the changing situations and contexts that occur at certain times in competition and sports life: adverse results, injuries, time pressure, etc.

However, on the other hand, the results obtained in this research contradict those found by Martínez and Scott (2016) and Ross and Keiser (2014), who highlighted a positive relationship between conscientiousness and flow. In the same way that high levels of conscientiousness could be a vulnerability factor in the face of the demanding variable demands of competition, certain planning and methods are necessary to be able to accumulate experiences, learning and knowledge that allow the athlete to exhibit optimal performance. This may be due to the fact that in the present study, the flow state has not been categorized as a single variable, but rather, it has been detailed in nine factors and within those nine, there are three that do not show this positive relationship. Perhaps, by categorizing the flow variables in a single factor, it is more difficult to find a negative correlation since the rest of the variables weigh positively.

Finally, emotional stability was significantly and positively associated with transformation of time. This result implies

TABLE 3 | Paths of the structural model.

Variables	Total sample (<i>n</i> = 216)	
	BME	Confidence interval
OP > BAL	−0.06	−0.27; 0.14
OP > MERG	−0.10	−0.30; 0.11
OP > CLEARG	−0.11	−0.30; 0.09
OP > CLEARDF	−0.10	−0.29; 0.11
OP > CONT	0.00	−0.19; 0.18
OP > SENS	−0.04	−0.22; 0.13
OP > LOSS	−0.11	−0.31; 0.09
OP > DISS	0.00	−0.19; 0.20
OP > AUTOTE	−0.09	−0.29; 0.10
EXT > BAL	0.47*	0.23; 0.65
EXT > MERG	0.39*	0.15; 0.60
EXT > CLEARG	0.43*	0.24; 0.60
EXT > CLEARDF	0.42*	0.20; 0.59
EXT > CONT	0.18	−0.04; 0.38
EXT > SENSC	0.29	0.05; 0.50
EXT > LOSS	0.33*	0.13; 0.53
EXT > DIS	0.24*	0.02; 0.47
EXT > AUTOTE	0.25	0.00; 0.48
AGRE > BAL	−0.00	−0.24; 0.16
AGRE > MERG	−0.09	−0.32; 0.11
AGRE > CLEARG	−0.04	−0.25; 0.13
AGRE > CLEARDF	−0.07	−0.27; 0.08
AGRE > CONT	−0.08	−0.30; 0.10
AGRE > SENSC	−0.20*	−0.42; −0.03
AGRE > LOSS	−0.09	−0.31; 0.12
AGRE > DIS	−0.04	−0.27; 0.18
AGRE > AUTOTE	0.06	−0.16; 0.24
CONSC > BAL	−0.12	−0.29; 0.07
CONSC > MERG	−0.12	−0.29; 0.07
CONSC > CLEARG	−0.25*	−0.40; −0.09
CONSC > CLEARDF	−0.09	−0.28; 0.08
CONSC > CONT	−0.12	−0.32; 0.07
CONSC > SENSC	−0.19*	−0.35; −0.01
CONSC > LOSS	−0.12	−0.34; 0.10
CONSC > DIS	−0.09	−0.27; 0.12
CONSC > AUTOTE	−0.27*	−0.46; −0.07
EMO > BAL	−0.00	−0.18; 0.16

(Continues)

TABLE 3 | (Continued)

Variables	Total sample (<i>n</i> = 216)	
	BME	Confidence interval
EMO > MERG	0.09	−0.09; 0.27
EMO > CLEARG	−0.03	−0.20; 0.13
EMO > CLEARDF	−0.11	−0.29; 0.06
EMO > CONT	−0.14	−0.31; 0.02
EMO > SENSC	−0.01	−0.18; 0.13
EMO > LOSS	0.09	−0.12; 0.28
EMO > DIS	0.20*	−0.01; 0.38
EMO > AUTOTE	0.04	−0.17; 0.25
ST > BAL	0.10	−0.27; 0.46
ST > MERG	0.25	−0.13; 0.54
ST > CLEARG	0.10	−0.21; 0.40
ST > CLEARDF	0.06	−0.26; 0.41
ST > CONT	−0.11	−0.44; 0.29
ST > SENSC	0.14	−0.27; 0.46
ST > LOSS	0.16	−0.20; 0.46
ST > DIS	0.24	−0.19; 0.59
ST > AUTOTE	−0.30	−0.58; 0.17
NREACT > BAL	−0.02	−0.29; 0.24
NREACT > MERG	−0.02	−0.25; 0.25
NREACT > CLEARG	0.02	−0.25; 0.30
NREACT > CLEARDF	−0.07	−0.32; 0.23
NREACT > CONT	0.13	−0.15; 0.40
NREACT > SENSC	0.00	−0.24; 0.30
NREACT > LOSS	−0.19	−0.44; 0.16
NREACT > DIS	−0.32	−0.55; −0.01
NREACT > AUTOTE	0.20	−0.10; 0.46

Abbreviations: AGRE, agreeableness; AUTOTE, autotelic experience; BAL, challenge skill balance; CLEARDF, unambiguous feedback; CLEARG, clear goals; CONSC, conscientiousness; CONT, concentration on the task; DIS, transformation of time; EMO, emotional stability; EXT, extraversion; LOSS, loss of self-consciousness; MERG, merging of action and awareness; NREACT, negative reactions to imperfection; OP, openness; SENSC, sense of control; ST, striving for perfection.

**p* < 0.05.

that athletes who are able to plan, control impulses, respect and abide by rules may lose awareness of time because they are absorbed in the task. In this regard, no studies have been found that specifically predict these two variables, but Stavrou et al. (2007) revealed that flow state and individual dimensions of flow, except transformation of time, were significantly associated with subjective and objective performance in several sports. Furthermore, emotional stability is a variable related to sports coping in previous works (Allen et al. 2011), as such, it makes sense that it is also related to the flow state.

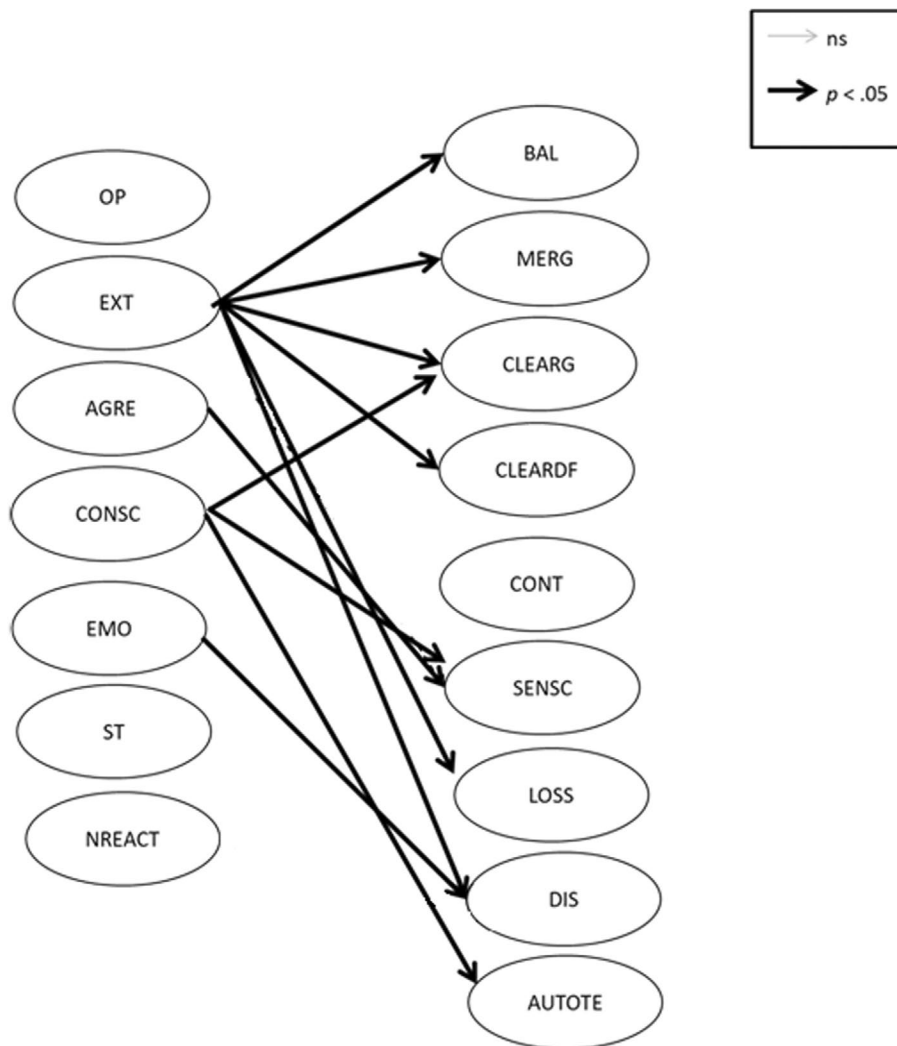


FIGURE 1 | Relationships between the study variables. AGRE, agreeableness; AUTOTE, autotelic Experience; BAL, challenge skill balance; CLEARDF, unambiguous Feedback; CLEARG, clear goals; CONSC, conscientiousness; CONT, concentration on the task; DIS, transformation of time; EMO, emotional stability; EXT, extraversion; LOSS, loss of self-consciousness; MERG, merging of action and awareness; NREACT, negative reactions to imperfection; OP, openness; SENSEC, sense of control; ST, striving for perfection.

4.1 | Limitations and Prospective

First, because the study is cross-sectional, causal inferences cannot be drawn. Although PLS-PM allows for the testing of complex predictive models, the relationships observed between personality, perfectionism, and dispositional flow should be interpreted as associative rather than causal. Second, the present study assessed the disposition to experience flow rather than the state of flow during specific performance episodes. It should be noted that this type of measurement does not capture the situational fluctuations that occur in real competitive contexts. Therefore, the results should be interpreted as reflecting stable predispositions rather than momentary optimal experiences. Future research would benefit from incorporating both types of measures to better understand how personality and perfectionism operate in real performance settings. Another limitation of this study is the reliance on self-report measures, which should be interpreted with caution, as they are subject to various biases (e.g., social desirability, acquiescence, and response distortion). Moreover, personality assessment was conducted within

the framework of the Big Five theory (Costa and McCrae 1992), and thus findings should be understood in light of this specific theoretical model. Finally, it is important to note that the sample included athletes from different sports, competitive levels, and professional statuses. While this enhances the ecological validity of the study and facilitates the generalization of the results, it may also complicate sport-specific or performance-level interpretations. The relationships between personality, perfectionism, and flow may differ between individual and team sports, as well as between high-performance and regional contexts. Therefore, future research should examine potential moderators such as type of sport and competitive level, or replicate the model in more homogeneous samples to verify the consistency of the findings.

4.2 | Practical Applications

As a future line of research, it would be interesting to create similar works to this one, in which the relationship of each of the

nine dimensions of the flow state with the five personality traits is analyzed. This is because previous studies are scarce and it is complex to compare the findings found. In addition, examining these variables with distinct populations may prove the consistency of the results obtained in this study, which may differ from the personality patterns of other sports practitioners. Finally, it would be advisable to examine personality and perfectionism following a multivariate perspective in creating profiles, understanding that it could be a combination of different scores in the experience of personality and perfectionism and their relationship with flow (Arslan and Altan-Atalay 2022).

As practical applications, the data shown can help coaches and athletes to know where they should focus on improving their goals. Psychology practitioners aimed at developing personality traits may positively influence the state of flow and perfectionist strivings. It is also worth noting that personality traits can be modified long-term, as claimed by some authors (Roberts et al. 2006). This may help to improve the athlete's behavioral, emotional, and cognitive commitment, as well as greater task concentration and activity enjoyment, thus increasing performance. Hence, this study can help coaches and psychology practitioners design exercises with psychological loads that may favor the development of extraversion and all the dimensions that enhance the flow state.

5 | Conclusion

It is important to highlight the predisposition of personality in the experience of flow, which may hinder the performance of those athletes who have not developed certain personality traits. The importance of knowledge of personality and perfectionism, and their association with flow states and each of its nine dimensions, lies in its potential when designing learning spaces where athletes can develop competency skills that help them generate these flow states. Thus, it becomes a more controllable variable in training and competition.

Author Contributions

Conceptualization: Francisco Daniel Martínez-Martínez, Pablo Asencio, and Higinio González-García; Methodology: Francisco Daniel Martínez-Martínez, Pablo Asencio, and Higinio González-García; Formal analysis: Francisco Daniel Martínez-Martínez and Higinio González-García; Investigation: Amaia Ramírez-Muñoz and Pablo Asencio; Data curation: Amaia Ramírez-Muñoz and Higinio González-García; Writing – original draft preparation: Francisco Daniel Martínez-Martínez and Amaia Ramírez-Muñoz; Writing – review and editing: Higinio González-García; Supervision: Higinio González-García.

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The authors have nothing to report.

Ethics Statement

The research was approved by the ethics board of Universidad Internacional de La Rioja (UNIR; PI:018_2019).

Conflicts of Interest

The authors declare no conflicts of interest.

Data Availability Statement

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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