scientific reports

Check for updates

OPEN

The mediating role of perfectionism in parental involvement and young athletes' performance

Marco Teixeira[1], Catarina Morais[2]✉ & A. Rui Gomes[3]

This study explored the relationship between perceived parental involvement, perfectionist dispositional-like traits (striving for perfection; negative reactions to imperfection), and sports performance. Specifically, it examined whether perfectionism mediates the relationship between parental involvement and sports performance. Data were collected on perceived parental involvement, perfectionism in sports, and sports performance using both subjective and objective measures. The sample included 299 young male football athletes (from 15 teams across 8 clubs), all competing in U15 to U19 national championships. Path analysis revealed several findings, namely that (a) athletes who perceived higher parental involvement exhibited greater striving for perfection and reported higher levels of perceived individual and collective sports performance; (b) striving for perfection positively predicted both perceived collective sports performance and objective performance; (c) negative reactions to imperfection negatively predict objective performance; (d) striving for perfection positively mediated the relationship between perceived parental involvement and performance (both perceived individual and collective performance as well as objective sports performance). These findings underline the complex role parental behaviors, especially as perceived by young athletes, have in shaping athletic development and performance, and also highlight both the positive and potential negative effects of parental involvement, stressing the importance of providing parents with guidance on fostering a supportive sports environment.

Keywords Parental involvement, Striving for perfection, Negative reactions to imperfection, Performance

Sport assumes a pivotal role in shaping the identity and personality of young children and adolescents. In this context, social expectations can profoundly impact athletes' psychological development[1]. Among these influences, interactions with significant individuals, particularly parents, are pivotal in shaping the personality development of young individuals'[2].

According to Dorsch's integrated model of the youth sport system[3], parents hold a central role in shaping behaviors, actions, and outcomes of young individuals within their environment. As key figures, parents' involvement in youth sports serve as a crucial source of feedback and evaluation of their children's performance[4,5], which affects performance outcomes[6].

Despite this understanding, there's still a limited understanding of the relationship between parental involvement, children's sports performance, and the development of personality traits, as is the case of perfectionism[7]. Perfectionism is characterized by a disposition like-trait that is manifested by the pursuit of flawlessness, excessively high standards of performance, and overly critical self-assessment[8,9].

While research on perfectionism has grown significantly in recent years[10], our comprehension of this phenomenon in the context of sports remains fragmented[11]. Between 1989 and 2016, perfectionistic tendencies among young individuals increased by 60%[12]. This rise may be attributed, in part, to the demanding and critical parenting styles that foster heightened expectations and perfectionist tendencies in children[13,14]. Most existing literature primarily focuses on the link between parental involvement and self-esteem or sports engagement. These do not directly address how athletes perceived parental involvement affects their sports performance.

Thus, the present study aims to fill that gap by exploring the relationship between perceived parental involvement and sports performance, incorporating both subjective and objectives measures, with perfectionist dispositional-like traits serving as a mediator.

[1]Faculty of Education and Psychology, Universidade Católica Portuguesa, Porto, Portugal. [2]Research Center for Human Development, Faculty of Education and Psychology, Universidade Católica Portuguesa, Porto, Portugal. [3]Psychology Research Centre, School of Psychology, University of Minho, Braga, Portugal. ✉email: ctmorais@ucp.pt

Parental involvement and athletes' performance

Youth involvement in sport contexts optimizes the development of values, beliefs, skills, and the demystification of social labels that extend beyond sports[15]. At the same time, parental involvement in children's sport activities also fosters interactions between parents and children. This engagement stimulates an emotional bond[16] and provides support to children's sporting experiences[17]. However, ensuring young athletes' participation can be a significant source of stress for parents. Due to the personal and financial investment made to support their children's sports activities, parents may feel entitled to rewards or performance-based returns from the athletes[18].

Within the scope of this study, parental involvement refers to a set of actions carried out by parents that are perceived by their children as having the potential to influence their sports activity[19]. The quality and intensity of these behaviors may lead to positive (e.g., strengthening the relationship between parents and athletes) or negative (low self-perception regarding skills and a negative performance) outcomes[20–23].

Following this idea, the parental role manifests in various ways and intensities. Supportive behaviors (e.g., positive reinforcement and encouragement commentaries) tend to enhance adaptive outcomes in youth sports[24]; conversely, pressure-related behaviors (e.g., constant out of order corrective feedback and punishment) may be related to negative consequences to youth athletes[25].

There is substantial evidence to support these differential impacts of parental behaviors. For example, Rouquette and colleagues evaluated the effect of parental responsiveness on young athletes' self-perception and thriving, concluding that perceived parental responsive support correlates with athletes' self-efficacy perception and self-esteem[26]. Behaviors such as negative body language or emphasizing performance, may be perceived by the athlete as unsupportive parental conduct, leading to feelings of pressure[27]. Thus, in this study, it is expected that:

H1 Positive perceptions of parental involvement predict better perceptions of sports performance.

Parental involvement and athletes' perfectionism

The development of perfectionism in sports stems from the pressure to succeed in competition and achieve certain performance[28]. Initially characterized as a demanding pursuit of excellence in task performance[29], this definition lacked any interpersonal or motivational dimensions. It is known that the presence of psychosocial factors, such as positive *feedback* or support, play a crucial role in athletes' adaptive development[30].

Therefore, Flett and Hewitt theorize that the perfectionistic individual sets exceptionally high-performance standards, critically evaluates their own and others' achievements, and is relentlessly driven by the pursuit of specific goals and outcomes[8]. Yet, once these goals are attained, the individual tends to diminish their significance and fixate on unmet expectations, referring again to the goal-oriented action[8].

Considering the study's focus on the relationship between perceived parental behaviors, the development of perfectionist dispositional-like traits, and performance, the Social Expectations Model[31] becomes relevant. This theoretical framework helps understanding how parental behaviors shape an individual's perfectionist beliefs. Specifically, individuals with high perfectionism dictate their self-worth by achieving high standards, being more vulnerable to the development of psychological disturbances due to the constant inability to meet parental expectations, as well as to the physical and emotional demands associated with performance[31]. In this sense, perfectionism is an outcome of the youth's effort to gain parental approval[9].

Research from Stöeber and colleagues has conceptualized perfectionism alongside two different dimensions: *striving for perfection*, where the individual chases perfectionistic behaviors that are inserted in high and demanding patterns of expectations in a self-oriented way, with a tendency for positive outcomes; and a dimension with a maladaptive character, *perfectionist concern*s, which gathers an excessive concern regarding error, a fear that significant others adopt a negative perception towards the self, an unbalanced feeling between performance and the expectations of others, and negative reactions to imperfection[32]. This study model, while drawing inspiration by the Hewitt and Flett socially prescribed perfectionism and self-oriented perfectionism domains of the Multidimensional Perfectionism Scale[33], includes Stöeber and colleagues Multidimensional Inventory of Perfectionism in Sport[34], allowing to assess the influence of parental behaviors on these perfectionistic dispositional-like traits, and the impact of these set traits performance wise.

Considering previous studies that found an association between parental behavior and the development of perfectionism in children/athletes[35,36], Olsson and colleagues point out that children´s perfectionism may be a tendency to copy parental behavior[11] (idea also supported by the Social Learning Theory)[37]. Such characteristics can be a product of the unrealistic expectations set by parents, as reaction to a demanding social context or as a response to the parental tendency to deliver negative reactions to mistakes.

If we revise the existing literature on the topic, the predictive effect of parental involvement in the development of perfectionism is demonstrated. In 2018, Curran, while assessing the relationship between parental involvement and the development of perfectionistic dispositional-like traits through self-perceived competence in a sample of British soccer athletes, identified that parental involvement serves as a significant predictor of the development of both dimensions of perfectionism[38].

Nonetheless, when testing the viability of the 2 × 2 Model of Perfectionistic Pressure in youth sport, Flemimg and colleagues found that parental pressure is a significant predictor of both perfectionistic striving and negative reactions to imperfection[39]. Similarly, Olsson et al. examined the predictive role of perfectionistic parental behaviors on athletes' and concluded that the more pronounced the parents' tendency to strive for perfection and react negatively to imperfection, the greater the athlete´s display of these dispositional-like traits[11]. The presence of positive behaviors such as autonomy support and responsiveness, are also linked with the development and maintenance of perfectionistic dispositional-like traits[40]. According to a study conducted by McArdle. a higher

and more positive parental involvement (e.g., acceptance and autonomy support) was associated with low perfectionistic concerns[41].

Other positive behaviors such as parental emotional warmth has also been shown to have an impact on the development of perfectionism[42]. Thus, literature supports that both protective and risk parental behaviors also dispose an influence on the development of perfectionism[40]. Considering the aforementioned literature, it is expected that:

H2 Positive perceptions of parental involvement (a) positively predict striving for perfection and (b) negatively predict negative reactions to imperfection of young athletes.

Perfectionism and sports performance

In sports, athlete's performance serves as the main source of fulfillment of established goals[43] and the key factor to demonstrate sport skills[44]. Thus, it is not surprising that authors dedicate a lot of effort in analyzing potential factors that contribute to athletes' performance. This same idea applies to the relation between perfectionism and sports performance. For example, Madigan and colleagues, conducted a study with basketball players ($N=90$) and concluded that athletes with higher levels of striving for perfection have a higher probability of overcoming performance comparing to those with low levels of striving for perfection[45]. Similarly, Stoll and colleagues and Stöeber and colleagues also discovered a positive relationship between perfectionist strivings and performance[46,47]. In short, current literature seems consistent in showing that striving for perfection is correlated with better performance[28,45].

However, the same consistency does not apply to the potential relationship between negative reactions to imperfection and performance. Madigan and colleagues concluded that negative reactions to imperfection do not predict performance[45], whereas Stoll and colleagues found performance increments to be higher when athletes hold both high perfectionist strivings and negative reactions to imperfection[46].

Not only are the existing results contradicting but there are also few studies that analyze this topic. Lizmore and colleagues reported that, up to the publication date of the referenced study, only six other studies had examined the link between striving for perfection, negative reaction to imperfection, and performance in sports contexts[48]. Of these studies, three identified a significant positive association between perfectionistic strivings and sports performance[45–47], one identified a significant negative association between perfectionistic strivings and sports performance[4], and the remaining two studies did not find significant relationships between these variables[49,50]. Regarding the negative reaction to imperfection, four studies did not identify any significant association between negative reaction to imperfection and sports performance[45–47,49], and the remaining two studies identified a negative association of negative reaction to imperfection with sports performance[4,50].

Similarly, Waleriańczyk and colleagues while re-examining the interaction between perfectionistic strivings and negative reactions to imperfection in predicting burnout and engagement in athletes ($N=377$), showed a significant positive correlation between negative reactions to imperfection and physical/emotional exhaustion, sport devaluation and reduced sense of accomplishment[51], variables that have an impact in the quality and outcome of the athlete's performance.

Nonetheless, it is common for the two dimensions to coexist in individuals, creating a rather murky picture as to the adaptive or maladaptive effects of each. In sum, while evidence suggests possible relation between perfectionism and sports performance, it is needed to better comprehend and, ultimately, explain these possible links. In line with this statement, it is expected:

H3 Higher levels of (a) striving for perfection and (b) lower levels of negative reactions to imperfection predict more positive sports performance;

As demonstrated, the influence of multiple extrinsic factors, such as parental goal-setting and parental behaviors, are directly connected to the athletes' development[7]. Assuming the impact of the involving sociocultural context in sports, and the development of characteristics mattering to sports performance (e.g., physical and psychosocial), it is common for the athlete to judge their performance or be judged by others (e.g., parents). This type of judged-based behavior by parents may have positive or negative consequence on the athletes' development and performance. This judgment, coupled with the belief that approval is based on the fulfillment of unrealizable goals, may lead to the development of unrealistic expectations by the athlete. To achieve these expectations, the athlete may adopt self-demanding behaviors that potentially affect performance[33].

Given the evidence claiming that parental involvement supports the development of perfectionistic dispositional-like traits in children[11,35], and has an impact in the athlete perceived sports performance, this study takes a step further in the current literature. Specifically, we propose that young athletes' perfectionism acts as a mediator between their perceptions of parental involvement and their performance. Specifically, it is expected that:

H4 Positive perceptions of parental involvement positively predict sports performance; this relationship is mediated by perfectionism (higher levels of striving for perfection and lower levels of negative reactions to imperfection).

Methods

Procedure

The main aim of this study was to test the relationship between perceived parental involvement and both perceived and objective sports performance, mediated by perfectionism dispositional-like traits. The study was

validated by the Ethics Committee of the University of Minho (Reference CEICSH 030/2020). All methods were performed in accordance with the relevant guidelines and regulations.

Eligibility criteria
In the present study, only elite male football athletes competing in the U15, U17 and U19 national championship were able to participate. The inclusion of teams participating in the national championships is justified by the higher levels of demand and pressure surrounding these athletes, as well as this being the most significant competitive and athletic milestone to reach in their age groups.

Sample size estimation procedure
Considering Westland's formula[52] [$N \geq 50\ r^2 - 450r + 1100$], there was an estimate of 88 participants given the value of $r = 4.44$ (40 items; 9 dimensions). However, Structural Equation Modeling (SEM), used in this study as described in the *Data Analysis Strategy* section, can only be reliable when the sample consists of 200 participants (minimum)[53], thus being our expected sample size ($N = 200$).

Sampling method and recruitment procedure
A total of 144 teams (belonging to 90 different clubs) met the inclusion criteria. The sports clubs were contacted via *email* or telephone to explain the study goals, and they were asked to participate in the study; It was possible to contact 27 clubs, totaling 58 teams. Of these, 8 clubs, comprising 15 teams, agreed to participate.

Data collection procedure
Once clubs agree to participate, a consent form including the goals of the study, explaining the anonymity and confidentiality of data analysis, was sent to the parents of the underaged athletes. An opt-out approach was used, meaning that the guardians were given a two-week period to express their disagreement with their child's participation in the study; if no objection was raised, consent was assumed.

Once permission from parents was obtained, athletes were contacted, and the study aims and procedures were explained. Data collection was scheduled with the club and occurred prior or after practice in the presence of a member of the research team in the team facilities. Questionnaires were completed either on paper or using a link generated by Qualtrics®. The data was collected following a cross-sectional design. Each data collection lasted, on average 15 min, and it was conducted during the first half of the national league (November 2021 and February 2022). At the end of the first half of the national league, the points of the clubs' teams (U15, U17 and U19) were gathered from the Portuguese Football Federation website to calculate the "objective performance" measure.

Participants
The initial sample comprised 310 athletes. However, 11 athletes were excluded due to several missing values on at least one or complete instrument. Thus, the final sample included 299 young soccer players, all males, competing in Portugal 1st-division teams (national division) at U15 (52%), U17 (36%) and U19 (13%) levels. All athletes were fluent in Portuguese language. Their ages ranged from 12 to 19-years old ($M = 15.01$; $SD = 1.48$), and the number of years of competition at official levels varied from 1 to 15 years ($M = 7.42$; $SD = 2.53$). The number of regional or national titles varied between 0 and 3 ($M = 0.67$; $SD = 0.52$).

Measures
Parental involvement
Athletes were asked to complete the Parental Behaviors in Sports Questionnaire (PBSQ; Gomes et al., 2019). Athletes rated (1 = *Never,* 5 = *Always*) 18 different statements on how often their father or their mother (or other significant figures) displayed these behaviors (1) Sports support (e.g., "My mother/father is happy that I practice this sport ", 4 items, αfather = 0.90, αmother = 0.82; α global = 0.83); (2) Competition attendance (e.g., "My mother/father watches my games/competitions ", 3 items, αfather = 0.96, αmother = 0.95; α global = 0.87); (3) Technical influence (e.g., "My mother/father gives me advice about how I should train and play/compete), 4 items, αfather = 0.93, αmother = 0.90; α global = 0.87); (4) Performance pressure (e.g., "My mother/father is disappointed in me if I play/compete badly", 4 items, αfather = 0.93, αmother = 0.92; α global = 0.85; this dimension was reverse coded); and (5) Sports expectations (e.g., "My mother/father believes that I can become a successful athlete in the future ", 3 items, αfather = 0.74, αmother = 0.73; α global = 0.84). A score for each dimension was calculated based on participants' average of responses (held jointly for the father and the mother). A confirmatory factor analysis showed a good fit of the instrument structure with five dimensions: $\chi^2(123) = 245.94$, $p < 0.001$, $\chi^2/df = 2.00$; RMSEA = 0.059, 90% C.I. [0.05; 0.07], $p_{RMSEA} = 0.083$; SRMR = 0.055; CFI = 0.973; TLI = 0.966. Moreover, a global measure of "Parental Involvement" that holds the average of the results of the dimensions assessed regarding parents' behaviours was calculated.

Perfectionism
Athletes were asked to complete the Multidimensional Inventory of Perfectionism in Sport (MIPS; Stöeber et al., 2006 – short version). The scale was translated from the English language to Portuguese by one member of the team and back translated by the other two members of the team. The translated version was congruent with the original version. Participants rated 10 statements on how often (1 = *Never, 6* = *Always*) during matches/competitions they felt feelings of (1) Striving for perfection (e.g., "During matches/competitions, I strive to the most perfect I can be", 5 items, α = 0.79); (2) Negative reactions to imperfection (e.g., "During matches/competitions, I feel irritated if I make a mistake", 5 items, = 0.84). A score for each dimension was calculated based on participants' average of response. A confirmatory factor analysis showed a good fit of the bi-dimensional

structure: $\chi^2(32) = 71.60$, $p < 0.001$, $\chi^2/df = 2.24$; RMSEA = 0.065, 90% C.I. [0.05; 0.09], $p_{RMSEA} = 0.110$; SRMR = 0.080; CFI = 0.965; TLI = 0.951.

Perceived performance

Athletes were asked to complete the Sport Performance Perception Questionnaire (SPPQ; Gomes et al., 2019), and rated their agreement (1 = *Completely disagree,* 5 = *Completely agree*) regarding 10 different statements evaluating their perceptions of (1) Individual performance (e.g., "In my last game/competition, I performed as I expected", 5 items, α = 0.87); (2) Collective performance (e.g., "In my last game/competition of my team, we performed as expected", 5 items, α = 0.85). A score for each dimension was calculated based on participants' average of response. A confirmatory factor analysis for this study showed a good fit of the bi-dimensional structure: $\chi^2(29) = 75.95$, $p < 0.001$, $\chi^2/df = 2.62$; RMSEA = 0.074, 90% C.I. [0.05; 0.09], $p_{RMSEA} = 0.027$; SRMR = 0.080; CFI = 0.974; TLI = 0.959.

Objective performance

Given that the collective performance is a direct output of individual performance, moreover, an objective measure of collective performance was used. This measure consisted of the number of points obtained by the team at the end of the first round of national league at their level. This data was gathered trough the public files in the Portuguese Football Federation website. This measure allowed to assess the relation between parental involvement, the overall perfectionism levels of a team and the perception of individual/collective performance with actual team performance.

Data analysis strategy

First, normality and multicollinearity assumptions were checked. Normality assumptions were tested by calculating variables' skewness and kurtosis as proposed by Kline[54]; no severe deviations were verified if skewness and kurtosis values were all between − 3 and 3, and − 10 and 10, respectively. Multicollinearity assumptions were confirmed by considering Pearson correlations < 0.80 and VIF coefficients < 5[53]. The presence of outliers was tested using the Mahalanobis distance (d^2), considering outliers cases in which both p values were below 0.05[54]. Hypotheses were tested using path analysis from AMOS® software (IBM, v. 28). Parents' different behaviors regarding sport were aggregated to form an overall perception of positive/negative parental involvement. To conduct this analysis and following Westland's recommendation[52], a minimum of 300 participants was required. Thus, the sample size of 299 athletes used in this study was considered appropriate. Model fit was evaluated using the following indicators: Chi-square statistics (χ^2), Confirmatory fit index (CFI), the Goodness of fit (GFI), the Root-mean-square error of approximation (RMSEA), and the standardized root-mean-square residual (SRMR). CFI and GFI values ≥ 0.95, and RMSEA and SRMR values ≤ 0.06 indicate good fit of the model to the data, while CFI and GFI values ≥ 0.90, and RMSEA and SRMR ≤ 0.08 indicate an adequate fit of the model to the data[53,55].

Results

Preliminary analysis

Skewness and kurtosis were checked for normality assumptions. Following Kline's guidelines[54], the data did not present severe deviations from normal distribution (|0.25| > *sk* < |1.95|; |0.02| > *ku* < |5.61|). Based on correlations and VIF coefficients, no indications of multicollinearity were found (0.013 > r < 0.473; 1.04 > VIF < 1.44). Regarding the presence of multivariate outliers, the analysis of Mahalanobis distance reveals the presence of two outliers ($d^2 = 41.27$ and $d^2 = 31.24$; p_1 and $p_2 < 0.001$), these outliers constitute approximately 0.6% of the sample. Thus, is very close to what one would typically expect in a normally distributed dataset[56] and, for that reason, they were considered in the analysis.

Descriptive statistics

Descriptive statistics and correlations among variables are displayed in Table 1. Overall, athletes perceive a positive parental involvement, which is positively and significantly correlated with their striving for perfection, as well as their perceptions of individual and collective performance. It is, however, important to note that performance pressure dimension is negatively correlated with the remaining dimensions of the scale – this dimension was reverse coded and, therefore, lower levels indicate higher perceptions of performance pressure. Thus, the more athletes perceive their parents to pressure them to perform, the higher they perceive their involvement in sport.

On the other hand, athletes' striving for perfection was positively and significantly related to their perceptions of performance and the objective performance of the team. Negative reactions to imperfection showed a significant negative correlation with objective performance, therefore the more athletes report negative reactions to imperfection, the lower their objective performance, and vice-versa.

The mediating role of perfectionism

The mediated model (perfectionism as a mediator of the relationship between parental involvement and sports performance) showed an excellent fit to the data: $\chi^2(1) = 0.04$, $p = 0.847$; CFI = 1.00, PCFI = 0.067; GFI = 1.00, PGFI = 0.048; RMSEA < 0.001 (90% C.I. [0.000; 0.087], $p_{close} = 0.170$); SRMR = 0.003; AIC = 40.04; BCC = 41.00, MECVI = 0.14. Therefore, direct and indirect effects were analyzed. The results are summarized in Tables 2 and 3.

Direct effects of perfectionism

The direct effects allowed for testing H1, H2, and H3. Concerning H1, it was expected that athletes' perceptions of parental involvement would positively predict their perceptions of individual performance (H2). The results

	M(SD)	1	2	3	4	5	7	8	9	10
1. Parental involvement	3.91 (0.67)									
2. Sports support	4.53 (0.61)	0.75***								
3. Competition attendance	4.05 (1.01)	0.70***	0.52***							
4. Technical influence	3.45 (0.97)	0.78***	0.40***	0.34***						
5. Performance pressure	3.63 (1.23)	− 0.32***	− 0.02	− 0.11*	− 0.40***					
6. Sports expectations	3.62 (1.01)	0.75***	0.47***	0.22***	0.51***	− 0.33***				
7. Striving for perfection	5.43 (0.67)	0.29***	0.25***	0.17**	0.21***	− 0.08				
8. Negative reactions to imperfection	3.75 (1.17)	0.09	− 0.09	− 0.05	0.17**	− 0.41***	0.18**			
9. Perceived individual performance	3.33 (0.96)	0.37***	0.27***	0.33***	0.25***	− 0.09	0.17**	0.02		
10. Perceived collective performance	3.73 (0.82)	0.18**	0.09	0.15*	0.13*	− 0.01	0.18**	0.01	0.47***	
11. Objective performance	22.80 (9.16)	0.02	0.11	− 0.02	− 0.07	0.19***	0.14*	− 0.14*	− 0.15*	0.23***

Table 1. Means, Standard Deviations, and Correlation Matrix. Note: $^{*}p < 0.050$, $^{**}p < 0.010$, $^{***}p < .001$; The "performance pressure" dimension is reversely coded. That is, higher values refer to lower perceived pressure.

	b	SE	p	β
Direct effects				
Parental involvement → Individual PP (H1)	0.40	0.07	< 0.001	0.28
Parental involvement → Collective PP (H1)	0.17	0.07	0.013	0.14
Parental involvement → Striving for perfection (H2a)	0.28	0.06	< 0.001	0.28
Parental involvement → Negative reactions (H2b)	0.15	0.10	0.131	0.09
Striving for perfection → Individual PP (H3a)	0.13	0.08	0.094	0.10
Striving for perfection → Collective PP (H3a)	0.23	0.07	0.001	0.19
Striving for perfection − > Objective performance (H3a)	2.38	0.78	0.002	0.18
Negative reactions → Individual PP (H3b)	− 0.02	0.05	0.723	− 0.02
Negative reactions → Collective PP (H3b)	− 0.01	0.04	0.731	− 0.02
Negative reactions − > Objective performance (H3b)	− 1.36	0.45	0.003	− 0.17

Table 2. Direct effects of the mediated model. PP = Perceived Performance.

Indirect effects	SE	p	β
Parental involvement → Individual PP (via Striving for perfection) (H4a)	0.03	0.023	0.04
Parental involvement → Collective PP (via Striving for perfection) (H4a)	0.05	0.003	0.06
Parental involvement → Individual PP (via Negative reactions) (H4b)	− 0.003	0.374	− 0.01
Parental involvement → Collective PP (via Negative reactions) (H4b)	− 0.003	0.361	− 0.01
Parental involvement → Objective performance (via Striving for perfection) (H4a)	0.67	0.005	0.67
Parental involvement → Objective performance (via Negative reactions) (H4b)	− 0.21	0.140	− 0.21

Table 3. Indirect effects of the mediated model. Note: PP = Perceived Performance.

showed the more athletes perceive a positive parental involvement, the higher their perceptions of individual performance. Regarding Hypothesis 2, it was expected that athletes' perceptions of parental involvement would positively predict striving for perfection (H2a), and negatively predict their negative reactions to imperfection (H2b). The results supported H2a, as the more athletes perceived a positive parental involvement, the higher their striving for perfection. Perceptions of parental involvement did not predict negative reactions to imperfection and, therefore, H2b was not supported.

Regarding H3a and H3b, it was expected that athletes' striving for perfection would positively predict their performance (H3a) and that athletes' negative reactions to imperfection would negatively predict their performance (H3b). However, the results showed partial support for H3a: athletes striving for perfection positively predicts their perceptions of collective performance (but not individual). No direct effects between negative reactions to imperfection and perceptions of performance were found significant. Furthermore, athletes high strive for perfection and low negative reactions to imperfection predicted their objective performance (cf. Fig. 1).

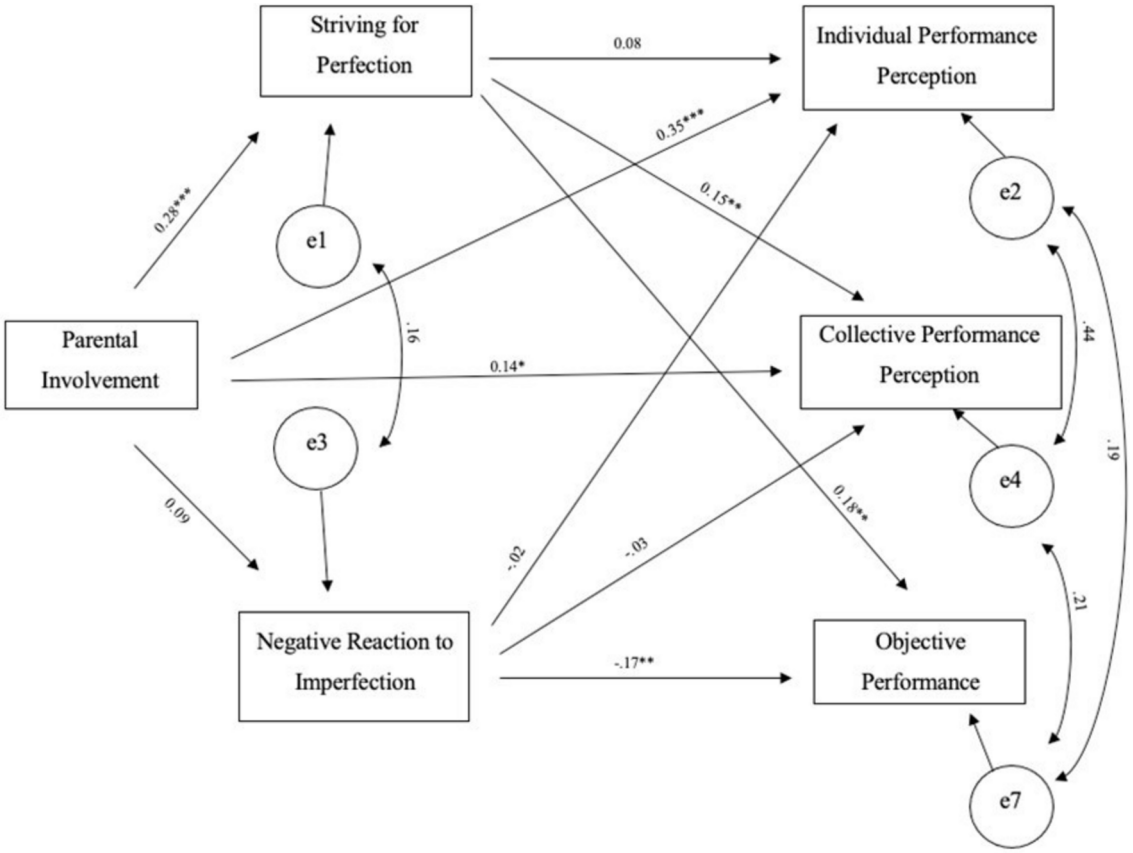

Fig. 1. Mediated tested model: path coefficients of the tested model.

Indirect effects of perfectionism

Regarding the mediation effects, results showed that parental involvement predicted performance (individual and collective perceptions, but also objective performance), via athletes' striving for perfectionism, supporting H4a. In other words, the more athletes perceive their parents to be positively involved in sport, the more they strive for perfectionism, and the higher their perceptions of performance (both individual and collective), as well as the higher their objective performance (scored more points/higher ranked team). The negative dimension of perfectionism did not mediate the relationship between perceptions of parental involvement and performance and, therefore, H4b was not supported.

Discussion

This study aimed to delve further into the relationship between parental involvement, perfectionism, and sports performance. Understanding this relationship is crucial due to the absence in literature of theoretical models that analyze the impact of the parental involvement in perfectionism[36,57]. Consequently, this investigation sought to determine if athletes' perception of parental involvement (sports support, competition attendance, technical influence, performance pressure, sports expectations) significantly predicts their performance. Additionally, the study explored whether this relationship is mediated by perfectionism dispositional-like traits (striving for perfection, negative reactions to imperfection). Overall results showed that perfectionist strivings mediate the relationship between perceived parental involvement and performance (both perceived individual and collective performance, as well as objective performance indicators).

Regarding the relationship between perceived parental involvement and sport performance, it was expected that positive perceptions of parental involvement would predict a better perception of sports' performance (H1). The hypothesis was supported for both perception of individual and collective sports' performance. These results align with previous research, indicating that athletes' perception of encouragement and support behaviors by the parents enhances motivation and self-confidence levels, which are directly connected to performance[58,59]. Conversely, when athletes perceive low parental involvement, they tend to have diminished perceptions of sports' performance and commitment to sports' activities[60]. Thus, this study provides evidence that positive parental behaviors (e.g., being present at athletes' games and training sessions, provide feedback on their efforts) contribute to increased motivation, self-confidence and the ability to overcome difficulties[61,62], leading to more positive performance perceptions.

In this study, we have argued that parental involvement would predict athletes' perfectionist dispositional-like traits. Specifically, it was expected that positive perceptions of parental involvement would positively predict striving for perfection (H2a), and negatively predict negative reactions to imperfection (H2b). Regarding

perfectionist strivings, the results supported the hypothesis and are align with prior research, showing that parental involvement positively predicts perfectionism levels in young athletes[38,63,64] as children tend to follow similar patterns as their parents[11], supporting the idea of social learning.

However, when it comes to negative reactions to imperfection (H2b), parental involvement did not predict this maladaptive side of perfectionism. This finding diverges from previous research that indicated a significant predictive relationship between parental involvement and negative reactions to imperfection[14,65–67].

Additionally, we explored the relationships between perfectionist dispositional-like traits and performance levels (H3). Alarmingly, literature is relatively scarce regarding these relationships and presents contradictory results[48]. Our study supports previous research on the notion that perfectionist strivings positively predict sport performance. Specifically, it was observed that the more athletes strive for perfection, the more positively they perceive collective performance and their actual objective performance. The lack of a predictive relationship regarding perceptions of individual performance can be attributed to the collective nature of the sport in our sample (soccer), as previous studies with individual sports (e.g., golf) found that perfectionist strivings positively predict individual performance[48].

When examining the relationship between perfectionist strivings and performance levels (H3a), these scattered results prevail. For instance, Hill and colleagues conducted a meta-analysis in 2019 examining the relations between perfectionistic dispositional-like traits and performance concerns. Whilst considering 52 studies and data sets, perfectionist strivings exhibited a small to medium positive relationship with performance[10]. Previous research has yielded both positive[45–47] and negative[4] associations between perfectionist strivings and performance. Additionally, some studies have found no significant relationships between these two variables[49,50].

Regarding negative reactions to imperfection predicting performance (H3b), literature results are also inconsistent. In this study, no predictive relationship was found between negative reactions to imperfection and perceived performance (i.e., performance measured subjectively), which is consistent with Vink and Raudsepp results[68]. Some studies report no effects[45,47,68], negative effects[48,69], and even positive effects after the first attempt of performing a task and when combined with high levels of perfectionist strivings[46].

Considering the above-mentioned meta-analysis conducted by Hill and colleagues in 2019, negative reactions to imperfection did not show a significant relationship with sports performance[10]. However, in the present study, when evaluating objective performance, higher negative reactions to imperfection predicted lower objective performance, consistently with Lizmore and colleagues' findings[48], but contradicting Stöeber and colleagues[47] and Madigan and colleagues results[45]. It's worth noting that these latter two studies used an individual measure of objective performance.

Lastly, it was expected that positive perceptions of parental involvement would positively predict performance, when mediated by perfectionism (higher levels of striving for perfection and lower levels of negative reactions to imperfection) (H4). This hypothesis was partially accepted, as this relationship was significant only when mediated by striving for perfection. Athletes' perceptions of both individual and collective performance, as well as objective performance, were all influenced when mediated by striving for perfection. Negative reaction to imperfection didn't mediate any relation with performance.

Overall, these results highlight the importance of perceived parental involvement as a predictor of both perceived and actual performance, particularly when considering athletes' striving for perfection. In essence, the more positively athletes evaluate their parents' involvement in sport, the higher their strivings for perfectionism, and the better their objective performance and perceptions of individual and collective performance.

Limitations and future research

The present research has some notable strengths. First, the sample included 299 athletes of an important age gap to the development of their perfectionist dispositional-like traits[10]. Moreover, only athletes competing at the highest level of their age group (national first division) were included, ensuring a focused and elite participant pool. In this study, we also considered both subjective and objective measures of performance, and the different patterns in results suggest that this differentiation could be significant for future investigations, especially given the imbalances of results in recent literature. However, the study also has some important limitations that may impact the results.

Firstly, the fact that only an objective measure of collective performance was used, which can bias the objective individual performance. Future studies should incorporate both an individual and collective objective performance indicator. Secondly, the sample was exclusively constituted by male participants, recognizing that gender plays a role in the perception and interpretation of parental behaviours[70], as well as in the levels of perfectionism influencing sports' performance[10]. In the same way, the sample only consisted in football athletes. Given the divergent results regarding the relation between perfectionism and sports performance, future studies should deepen potentials variables that account for significant differences across distinct sports (e.g., basketball, volleyball), and both individual and collective sports.

The decision to employ a cross-sectional mediating model instead of a longitudinal approach allowed for a clear assessment of the hypotheses. Longitudinal data collection could introduce external variables (e.g., team performance fluctuations, changes in family context) that might bias the gathered information. Lastly, regarding parental involvement, no sociodemographic about family household (i.e., who lives with) was gathered, and the level and frequency of contact with these figures was not controlled for. Future studies should incorporate parents' perceptions and explore the parent–child relationship, including dyadic analyses.

Conclusions and implications for practice

This study aimed to explore the relationship between perceived parental involvement, perfectionist dispositional-like traits (striving for perfection; negative reactions to imperfection), and sports performance both in a

subjective and objective levels, while also assessing whether perfectionism mediated the relationship between parental involvement and sports performance. By shedding light on the relationship between these variables, which is not frequent in the literature, it was possible to determine that, in fact, parental involvement plays a massive role in the development of the athletes' perfectionism (e.g., striving for perfection) and both subjective and objective performance. Striving for perfection dispositional like- trait influenced the perceived collective sports performance, and both perfectionistic dispositional like-traits playing a role on objective performance. Nonetheless, the relation of parental involvement with both subjective and collective performance was mediated by the striving for perfection dispositional like-trait.

More important, this study has several contributions to practice, as it identifies dimensions where intervention may promote athletes' well-being and development. More specifically, it enhances the need to increase the parents' involvement in their children sport activity, and to promote an adequate parental involvement in sports settings given the influence of such behavior on dispositional-like perfectionistic traits and performance. On the other side, the negative relation between negative reactions to imperfection and objective performance may suggest the need to implement interventions that promote coping strategies directed to the dimensions of the dispositional-like traits (e.g., fear of failure) and to the positive pattern of perfectionism[71].

In summary, this study reinforces the importance to consider the relations between parental involvement, perfectionistic dispositional-like traits and sports' performance, as they all may be involved in the way athletes perceive and respond to youth sports.

Data availability

The dataset generated during and/or analyzed during the current study is available from the corresponding author on reasonable request.

Received: 29 June 2024; Accepted: 15 December 2024
Published online: 30 December 2024

References

1. Bronfenbrenner, U. & Morris, P. A. The ecology of developmental processes. In *Handbook of Child Psychology: Theoretical Models of Human Development* (eds Damon, W. & Lerner, R. M.) 993–1028 (Wiley, New York, 1998).
2. Lamb, M. E. How do fathers influence children's development? Let me count the ways. In *The Role of the Father in Child Development* (ed. Lamb, M. E.) 1–26 (Wiley, New York, 2010).
3. Dorsch, T. E. et al. Toward an integrated understanding of the Youth Sport System. *Res. Q. Exerc. Sport* https://doi.org/10.1080/02701367.2020.1810847 (2022).
4. Anshel, M. H., & Mansouri, H. Influences of perfectionism on motor performance, affect, and causal attributions in response to critical information feedback. *J. Sport Behav.* **28**(2) (2005).
5. Fredricks, J. A. & Eccles, J. S. Parental influences on youth involvement in sports. In *Developmental Sport and Exercise Psychology: A Lifespan Perspective* (ed. Weiss, M. R.) 145–164 (Fitness Information Technology, 2004).
6. Thrower, S. N., Harwood, C. G. & Spray, C. M. Educating and supporting tennis parents: A grounded theory of parents' needs during childhood and early adolescence. *Sport Exerc. Perform. Psychol.* **5**(2), 107–124. https://doi.org/10.1037/spy0000054 (2016).
7. Pinto, M. et al. Perfectionism and physical activity among adolescents. *PsychTech Health J.* **3**(2), 3–14. https://doi.org/10.26580/PTHJ.art21-2020 (2020).
8. Flett, G. L. & Hewitt, P. L. *Perfectionism: Theory, Research, and Treatment* (American Psychological Association, 2002). https://doi.org/10.1037/10458-000.
9. Frost, R. O., Marten, P., Lahart, C. & Rosenblate, R. The dimensions of perfectionism. *Cogn. Ther. Res.* **14**(5), 449–468. https://doi.org/10.1007/BF01172967 (1990).
10. Hill, A. P., Mallinson-Howard, S. H. & Jowett, G. E. Multidimensional perfectionism in sport: A meta-analytical review. *Sport Exerc. Perform. Psychol.* **7**(3), 235. https://doi.org/10.1037/spy0000125 (2018).
11. Olsson, L. F., Hill, A. P., Madigan, D. J. & Woodley, G. Development of perfectionism in junior athletes: Examination of actual and perceived parental perfectionism. *J. Sports Sci.* **38**(6), 669–675. https://doi.org/10.1080/02640414.2020.1723387 (2020).
12. Curran, T. & Hill, A. P. Perfectionism is increasing over time: A meta-analysis of birth cohort differences from 1989 to 2016. *Psychol. Bull.* **145**(4), 410–429. https://doi.org/10.1037/bul0000138 (2019).
13. Curran, T. & Hill, A. P. Young people's perceptions of their parents' expectations and criticism are increasing over time: implications for perfectionism. *Psychol. Bull.* **148**, 107–128. https://doi.org/10.1037/bul0000347 (2022).
14. Fletcher, K. L., Pierson, E. E., Speirs Neumeister, K. L. & Finch, W. H. Overparenting and perfectionistic concerns predict academic entitlement in young adults. *J. Child Fam. Stud.* **29**(2), 348–357. https://doi.org/10.1007/s10826-019-01663-7 (2020).
15. Schwebel, F. J., Smith, R. E. & Smoll, F. L. Measurement of perceived parental success standards in sport and relations with athletes' self-esteem, performance anxiety, and achievement goal orientation: Comparing parental and coach influences. *Child Dev. Res.* https://doi.org/10.1155/2016/7056075 (2016).
16. Neely, K. C., McHugh, T. L. F., Dunn, J. G. & Holt, N. L. Athletes and parents coping with deselection in competitive youth sport: A communal coping perspective. *Psychol. Sport Exerc.* **30**, 1–9. https://doi.org/10.1016/j.psychsport.2017.01.004 (2017).
17. Knight, C. J. & Holt, N. L. Factors that influence parents' experiences at junior tennis tournaments and suggestions for improvement. *Sport Exerc. Perform. Psychol.* **2**(3), 173. https://doi.org/10.1037/a0031203 (2013).
18. Rafferty, A. et al. Parents report competing priorities influence snack choice in youth sports. *J. Nutr. Educ. Behav.* **50**(10), 1032–1039. https://doi.org/10.1016/j.jneb.2018.04.275 (2018).
19. Gomes, A. R., Gonçalves, M. A., Dias, O. & Morais, C. Parental behavior, cognitive appraisal, and motivation in young athletes. *Res. Q. Exerc. Sport* **90**(1), 80–94. https://doi.org/10.1080/02701367.2018.1563278 (2019).
20. Charbonneau, E. & Camiré, M. Parental involvement in sport and the satisfaction of basic psychological needs: Perspectives from parent–child dyads. *Int. J. Sport Exerc. Psychol.* **18**(5), 655–671. https://doi.org/10.1080/1612197X.2019.1570533 (2020).
21. Hayward, F. P., Knight, C. J. & Mellalieu, S. D. A longitudinal examination of stressors, appraisals, and coping in youth swimming. *Psychol. Sport Exerc.* **29**, 56–68. https://doi.org/10.1016/j.psychsport.2016.12.002 (2017).
22. Knight, C. J., Boden, C. M. & Holt, N. L. Junior tennis players' preferences for parental behaviors. *J. Appl. Sport Psychol.* **22**, 377–391. https://doi.org/10.1080/10413200.2010.495324 (2010).
23. Tamminen, K. A., Poucher, Z. A. & Povilaitis, V. The car ride home: An interpretive examination of parent–athlete sport conversations. *Sport Exerc. Perform. Psychol.* **6**(4), 325–339. https://doi.org/10.1037/spy0000093 (2017).
24. Holt, N. L., Tamminen, K. A., Black, D. E., Sehn, Z. L. & Wall, M. P. Parental involvement in competitive youth sport settings. *Psychol. Sport Exerc.* **9**(5), 663–685. https://doi.org/10.1016/j.psychsport.2007.08.001 (2008).

25. Dorsch, T. E., Smith, A. L. & Dotterer, A. M. Individual, relationship, and context factors associated with parent support and pressure in organized youth sport. *Psychol. Sport Exerc.* **23**, 132–141. https://doi.org/10.1016/j.psychsport.2015.12.003 (2016).
26. Rouquette, O. Y., Knight, C. J., Lovett, V. E. & Heuzé, J. P. Effect of parent responsiveness on young athletes' self-perceptions and thriving: An exploratory study in a Belgian French-Community. *Psychol. Sport Exerc.* **52**, 101801. https://doi.org/10.1016/j.psychsport.2020.101801 (2021).
27. Burke, S., Sharp, L. A., Woods, D. & Paradis, K. F. Advancing a grounded theory of parental support in competitive girls' golf. *Psychol. Sport Exerc.* **66**, 102400. https://doi.org/10.1016/j.psychsport.2023.102400 (2023).
28. Stöeber, J. Perfectionism and performance. In *The Oxford Handbook of Sport and Performance Psychology* (ed. Murphy, S. M.) 294–306 (Oxford University Press, Oxford, 2012). https://doi.org/10.1093/oxfordhb/9780199731763.013.0015.
29. Hollender, M. Perfectionism. *Compr. Psychiatry* **6**, 94–103. https://doi.org/10.1016/s0010-440x(65)80016-5 (1965).
30. Bengoechea, E. G., Wilson, P. M. & Dunn, S. Perceptions about quality of interpersonal processes and practice activities in youth sport are Interdependent. *Psychol. Rep.* **124**(6), 2684–2702. https://doi.org/10.1177/0033294120967273 (2021).
31. Flett, G. L., Hewitt, P. L., Oliver, J. M. & Macdonald, S. Perfectionism in children and their parents: A developmental analysis. In *Perfectionism: Theory, Research, and Treatment* (eds Flett, G. L. & Hewitt, P. L.) (American Psychological Association, 2002). https://doi.org/10.1037/10458-004.
32. Stöeber, J. The dual nature of perfectionism in sports: Relationships with emotion, motivation, and performance. *Int. Rev. Sport Exerc. Psychol.* **4**, 128–145. https://doi.org/10.1080/1750984X.2011.604789 (2011).
33. Hewitt, P. L., Flett, G. L., Turnbull-Donovan, W. & Mikail, S. F. The Multidimensional Perfectionism Scale: Reliability, validity, and psychometric properties in psychiatric samples. *Psychol. Assess. J. Consult. Clin. Psychol.* **3**(3), 464. https://doi.org/10.1037/1040-3590.3.3.464 (1991).
34. Stöeber, J., Otto, K., & Stoll, O. Multidimensional inventory of perfectionism in sport (MIPS): English version. School of Psychology, University of Kent. https://kar.kent.ac.uk/id/eprint/41560 (2006).
35. Damian, L. E., Negru-Subtirica, O., Pop, E. & Stöeber, J. Becoming a perfectionistic adolescent: Perceived parental behaviors involved in developmental trajectories of perfectionism. *Eur. J. Pers.* https://doi.org/10.1177/08902070211012902 (2021).
36. Madigan, D. J. et al. Development of perfectionism in junior athletes: A three-sample study of coach and parental pressure. *J. Sport Exerc. Psychol.* **41**(3), 167–175. https://doi.org/10.1123/jsep.2018-0287 (2019).
37. Bandura, A. & Walters, R. H. *Social Learning Theory* Vol. 1 (Prentice Hall, Englewood Cliffs, 1977).
38. Curran, T. Parental conditional regard and the development of perfectionism in adolescent athletes: The mediating role of competence contingent self-worth. *Sport Exerc. Perform. Psychol.* **7**(3), 284. https://doi.org/10.1037/spy0000126 (2018).
39. Fleming, D. J., Madigan, D. J., Mallinson-Howard, S. H. & Hill, A. P. A test of the 2 × 2 model of perfectionistic pressure in youth sport. *Psychol. Sport Exerc.* **66**, 102391. https://doi.org/10.1016/j.psychsport.2023.102391 (2023).
40. Damian, L. E., Negru-Subtirica, O., Pop, E. I. & Stoeber, J. Becoming a perfectionistic adolescent: Perceived parental behaviors involved in developmental trajectories of perfectionism. *Eur. J. Pers.* **36**(1), 24–46. https://doi.org/10.1177/08902070211012902 (2022).
41. McArdle, S. Exploring the development of perfectionistic cognitions and self-beliefs. *Cogn. Ther. Res.* **33**, 597–614. https://doi.org/10.1007/s10608-008-9206-x (2009).
42. Feng, L., Zhang, L. & Zhong, H. Perceived parenting styles and mental health: The multiple mediation effect of perfectionism and altruistic behavior. *Psychol. Res. Behav. Manag.* https://doi.org/10.2147/PRBM.S318446 (2021).
43. Weinberg, R. & Butt, J. Goal-setting and sport performance. In *Routledge Companion to Sport and Exercise Psychology: Global Perspectives and Fundamental Concepts* (eds Papaioannou, A. & Hackfort, D.) 343–355 (Routledge, London, 2014).
44. Farrow, D. A multi-factorial examination of the development of skill expertise in high performance netball. *Talent Dev. Excell.* **2**(2), 123–135 (2010).
45. Madigan, D., Stöeber, J., Culley, T., Passfield, L. & Hill, A. Perfectionism and training performance: The mediating role of other-approach goals. *Eur. J. Sport Sci.* **18**(9), 1271–1279. https://doi.org/10.1080/17461391.2018.1508503 (2018).
46. Stoll, O., Lau, A. & Stöeber, J. Perfectionism and performance in a new basketball training task: Does striving for perfection enhance or undermine performance?. *Psychol. Sport Exerc.* **9**(5), 620–629. https://doi.org/10.1016/j.psychsport.2007.10.001 (2008).
47. Stöeber, J., Uphill, M. A. & Hotham, S. Predicting race performance in triathlon: The role of perfectionism, achievement goals, and personal goal setting. *J. Sport Exerc. Psychol.* **31**(2), 211–245. https://doi.org/10.1123/jsep.31.2.211 (2009).
48. Lizmore, M. R., Dunn, J. G., Dunn, J. C. & Hill, A. P. Perfectionism and performance following failure in a competitive golf-putting task. *Psychol. Sport Exerc.* **45**, 101582. https://doi.org/10.1016/j.psychsport.2019.101582 (2019).
49. Hill, A. P., Hall, H. K., Duda, J. L. & Appleton, P. R. The cognitive, affective and behavioural responses of self-oriented perfectionists following successive failure on a muscular endurance task. *Int. J. Sport Exerc. Psychol.* **9**, 189–207. https://doi.org/10.1080/1612197x.2011.567108 (2011).
50. Thompson, R. W., Kaufman, K. A., De Petrillo, L. A., Glass, C. R. & Arnkoff, D. B. One year follow-up of Mindful Sport Performance Enhancement (MSPE) with archers, golfers, and runners. *J. Clin. Sport Psychol.* **5**(2), 99–116. https://doi.org/10.1123/jcsp.5.2.99 (2011).
51. Waleriańczyk, W., Hill, A. P. & Stolarski, M. A re-examination of the 2x2 model of perfectionism, burnout, and engagement in sports. *Psychol. Sport Exerc.* **61**, 102–190. https://doi.org/10.1016/j.psychsport.2022.102190 (2022).
52. Westland, J. C. Lower bounds on sample size in structural equation modeling. *Electron. Commer. Res. Appl.* **9**(6), 476–487. https://doi.org/10.1016/j.elerap.2010.07.003 (2010).
53. Marôco, J. Análise de equações estruturais: fundamentos teóricos, software & aplicações. In *Structural Equation Modelling: Theoretical Foundations, software & Applications*, 2nd ed (ReportNumber, 2014)
54. Kline, R. B. *Principles and Practice of Structural Equation Modeling Analysis* 5th edn. (The Guilford Press, London, 2015).
55. Hu, L. T. & Bentler, P. M. Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Struct. Equ. Model. Multidiscip. J.* **6**(1), 1–55. https://doi.org/10.1080/10705519909540118 (1999).
56. Leys, C., Delacre, M., Mora, Y. L., Lakens, D. & Ley, C. How to classify, detect, and manage univariate and multivariate outliers, with emphasis on pre-registration. *Int. Rev. Soc. Psychol.* **32**(1), 5–10. https://doi.org/10.5334/irsp.289 (2019).
57. Appleton, P. R. & Curran, T. The origins of perfectionism in sport, dance, and exercise. In *The Psychology of Perfectionism in Sport, Dance and Exercise* (ed. Hill, A. P.) 73–98 (Routledge, London, 2016).
58. O'Rourke, D. J., Smith, R. E., Smoll, F. L. & Cumming, S. P. Parent-initiated motivational climate, self-esteem, and autonomous motivation in young athletes: Testing propositions from achievement goal and self-determination theories. *Child Dev. Res.* https://doi.org/10.1155/2012/393914 (2012).
59. Ramos, A. A. M. et al. Self-confidence and its relation to the performance, place of origin, achievements and age in Peruvian volleyball players in training category. *Sport Sci. Tech. J. Sch. Sport, Phys. Educ. Psychomot.* **6**, 145–165 (2020).
60. González-García, H. & Pelegrín, A. Influence of perceived parental education styles on hardy personality in sport. *J. Sports Sci. Med.* **19**(1), 158 (2020).
61. Freire, G. L. M. et al. Development of life skills in adolescents practicing individual sports. *Res. Soc. Dev.* https://doi.org/10.33448/rsd-v9i8.5557 (2020).
62. Schubert, A., Januário, R. S. B., Casonatto, J. & Sonoo, C. N. Physical fitness and sports activities for children and adolescents. *Rev. Bras. Med. Esporte* **22**, 142–146. https://doi.org/10.1590/1517-869220162202103473 (2016).

63. Fleming, D. J., Dorsch, T. E. & Dayley, J. C. The mediating effect of parental warmth on the association of parent pressure and athlete perfectionism in adolescent soccer. *Int. J. Sport Exerc. Psychol.* https://doi.org/10.1080/1612197X.2022.2058584 (2022).
64. McArdle, S. & Duda, J. L. Exploring the etiology of perfectionism and perceptions of self-worth in young athletes. *Soc. Dev.* **17**(4), 980–997. https://doi.org/10.1111/j.1467-9507.2007.00456.x (2008).
65. Hong, R. Y. et al. Developmental trajectories of maladaptive perfectionism in middle childhood. *J. Pers.* **85**(3), 409–422. https://doi.org/10.1111/jopy.12249 (2017).
66. Sapieja, K. M., Dunn, J. G. H. & Holt, N. L. Perfectionism and perceptions of parenting styles in male youth soccer. *J. Sport Exerc. Psychol.* **33**, 20–39. https://doi.org/10.1123/jsep.33.1.20 (2011).
67. Shih, S.-S. Autonomy support versus psychological control, perfectionism, and Taiwanese adolescents' achievement hoals. *J. Educ. Res.* https://doi.org/10.1080/00220671.2012.692734 (2013).
68. Vink, K. & Raudsepp, L. Longitudinal associations between perfectionistic strivings, perfectionistic concerns, and sport-specific practice in adolescent volleyball players. *Percept. Motor Skills* **127**(3), 609–625. https://doi.org/10.1177/0031512520908699 (2020).
69. Květon, P., Jelínek, M. & Burešová, I. The role of perfectionism in predicting athlete burnout, training distress, and sports performance: A short-term and long-term longitudinal perspective. *J. Sports Sci.* **39**(17), 1969–1979. https://doi.org/10.1080/02640414.2021.1911415 (2021).
70. Dias, M. D. L. V. & Berardo, C. S. Parental attitudes' perceptions and adolescents behaviour problems. *Int. J. Dev. Educ. Psychol.* **2**(2), 135–146. https://doi.org/10.17060/ijodaep.2019.n2.v2.1749 (2019).
71. Cosma, G. et al. Impact of coping strategies on sport performance. *J. Phys. Educ. Sport* **20**(3), 1380–1385. https://doi.org/10.7752/jpes.2020.03190 (2020).

Author contributions

MT was responsible for data collection and writing the first draft of manuscript. CM was responsible for data analysis and project supervision. All authors were responsible for study conceptualization and planning, and contributed to reviewing and editing the manuscript.

Funding

This study was conducted at two different research centres: Research Centre for Human Development (supported by the Foundation for Science and Technology, ref. UIDB/04872/2020) and by the Psychology Research Centre (CIPsi/UM) School of Psychology, University of Minho (supported by the Foundation for Science and Technology, ref. UIDB/01662/2020).

Declarations

Competing interests

The manuscript has never been published before and constitutes an original article. The author(s) declare that they have no competing interests.

Additional information

Correspondence and requests for materials should be addressed to C.M.

Reprints and permissions information is available at www.nature.com/reprints.

Publisher's note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.