

## Personal engagement of basketball athletes: Insights from mixed methods research

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### Abstract

Research on sports training is carried out in numerous countries. However, the majority is carried out with athletes who have reached the elite of the sport, observing gaps in the analysis of the training process of athletes in the final phase of training and in transition to the adult categories. This study aimed to explore basketball players' perspectives on their engagement in physical and sporting activities, considering their motivation levels, weekly frequency of participation, and additional physical activities undertaken during their training. A mixed methods research (MMR) approach was employed, using a sequential explanatory strategy. First, a quantitative study was performed with Brazilian athletes aged 18 and 19 (n=141; 78.7% male, 21.3% female). Subsequently, 24 in-depth qualitative interviews were carried out. Differences between age groups were analyzed using the Kruskal-Wallis test and the association between qualitative variables was analyzed using the Chi<sup>2</sup> test. Coding and analysis of qualitative data were guided by Thematic Analysis. The results showed that up to the age of 10, few athletes played basketball, and those who did pursued the sport for leisure. From the age of 11, most were already training systematically and at 13 they started participating in competitions. At the age of 15, the weekly training frequency increased significantly, as did the motivation to practice and the influence of school sports involvement in basketball, remaining high until the ages of 18 and 19. Following the Developmental Model of Sports Participation logic, the results obtained demonstrated that athletes have a sporting diversification until the age of 10, approximately from 11 to 14 years old they experience the specialization stage and at 15 they begin to dedicate themselves specifically to basketball. This study has the potential to significantly impact theory and practice, regarding MM research and the elements that influence athletes' personal engagement and, consequently, the youth sports system.

**Key Words:** Personal Engagement, Youth Sports, Basketball, Mixed Method Research, Pragmatism

### Introduction

In sports science, studying the factors that influence an athlete's development, from the initial stages to the last stages of the training process in a sport, is highly necessary (Sáenz-López, Ibañez, Giménez, Serra, Sanchez, 2005; Ibañez, Sáenz-López, Feu, Giménez & García, 2010). Various conceptual models of sports development highlight the extent to which the intertwined nature of the athlete's engagement, their relationships with close people (McLaren, Shanmugaratnam & Bruner, 2024), and the unique context surrounding athletic activities (Jaramillo-Tapia, Dias, Barreiros, Calvo & Gajardo, 2024) inevitably mediate experiences and results (Bronfenbrenner, 1999; Lerner, Fisher & Weinberg, 2000; Côté, Murata & Martin, 2022).

Among various youth development models, the Personal Assets Framework (PAF) presents mechanisms and results that constitute Positive Youth Development (PYD) through sport. The PAF suggests that sporting experiences are influenced by three dynamic elements: personal engagement in activities (*what*), quality social dynamics (*who*), and appropriate contexts (*where*) (Côté, Turnnidge & Evans, 2014; Côté, Turnnidge, Murata, Mcguir, & Martin, 2020; Coté et al., 2022). These elements, represented as gears, work together to promote positive assets in the development of athletes (Coté et al., 2022).

Personal engagement, the focus of this study, is related to the athlete's involvement in activities related to the diversity, quantity, and quality of sporting experiences and participation in structured and unstructured activities (Galatti et al., 2019). Although the PAF is rooted in developmental systems theory (Lerner et al., 2000) and explicitly emphasizes the interactions between personal, relational, and organizational factors necessary for understanding development through sport, the specific factors within each element have yet to be explored (Coté et al., 2020).

It is widely known that sport is a privileged social context that offers rich opportunities for social interaction (Coutinho et al., 2021; Maciel et al., 2021). Previous research has consistently highlighted that social dynamics are one of the most influential components of the sporting environment (Côté et al., 2016; Coutinho et

al., 2021; Maciel et al., 2021). As a result, in recent decades, there is a growing interest in investigating the trajectory of athletes in basketball (Ibáñez, Mazo, Nascimento & García-Rubio; Folle et al., 2020; Galatti, Marques Filho & Santos, 2021), volleyball (Coutinho, Mesquita, Fonseca & Côte, 2015; Collet, Nascimento, Folle, Mendes & Ibáñez, 2018), futsal (indoor football) (Mascarin, Vicentini & Marques, 2019), handball (Lima, Reverdito, Scaglia & Galatti, 2023; Lima, Reverdito, Folle, Subijana & Galatti, 2022; Murcia-Sánchez & Ferri-Caruana, 2023), squash (Motta, Lima, Ginciene, Hernandez & Galatti, 2021), and cricket (Kelly, Brown & Reed, 2022).

Specifically in Brazilian basketball, Galatti et al. (2019) found that the athletes who achieved sporting excellence had a physically active childhood, with a high level of deliberate play, in open-access public spaces. The findings of Cunha, Fraiha, Darido, Pérez & Galatti (2017) revealed that the athletes started playing sports at around the age of 11 and began taking part in competitions at 12, i.e., the period between contact with the sport and entering the formal competitive context was short; evidence also found by Beneli, Galatti & Montagner (2017) and Galatti et al. (2021).

In other countries, Ibáñez et al. (2010) discovered that basketball talents revealed in youth do not usually reach sporting excellence in adulthood. Subijana, Galatti, Moreno, and Chamorro (2020) investigated the careers of athletes in team and individual sports and noticed that athletes in team sports reached peak performance later, enjoyed a longer athletic career, and combined sport with work more frequently than those in individual sports.

The literature also indicates that youth athletes who have achieved national-level performance started playing their main sport earlier, became less involved in other sports, and made faster initial progress than athletes who have not reached this level, which could indicate a possible development path for young athletes (Güllich, Macnamara & Hambrick, 2022). However, for the most part, these athletes did not become world-class adult-performance athletes.

Senior athletes who achieved world-class performance had more multi-sport practice in childhood and adolescence, accumulated greater amounts of coach-led practice of other sports, started their main sport later, and accumulated less time practicing their main sport, demonstrating that these would be the best recommendations for the long-term development of athletes (DiFiori et al., 2018). Therefore, understanding young athletes' sports training can contribute to better processes for their sports development in adulthood and, above all, more accurate guidelines for new generations of young athletes (DiFiori et al., 2018; Güllich et al., 2022; Barth, Güllich, Macnamara, & Hambrick, 2022).

Based on the scenario presented, it is considered that the study of the topic expands the understanding of the youth sports process and provides a structure to consolidate research on the subject (Dionigi et al., 2018). Despite the importance of this topic, the literature on the interaction of dynamic elements calls for more studies that consider athletes' perceptions at the end of the sports training process, using a mixed method approach and examining Brazilian reality. Therefore, this study aimed to ascertain basketball athletes' perceptions about their engagement in physical and sporting practices, considering their level of motivation, weekly frequency of involvement, and participation in complementary physical activities during their sporting education.

## **Material & methods**

### *Research design*

This is a mixed method (MM) research, with a sequential explanatory strategy (QUANT → qual), supported by a pragmatic philosophical orientation (Dewey, 1992; Jenkins, 2017). The literature often identifies pragmatism as the most appropriate paradigm for conducting MM research (Brierley, 2017; Creswell & Plano Clark, 2018; Ryba, Wiltshire, North & Ronkainen, 2022). Quantitative data (phase 1) was collected and analyzed, followed by qualitative data (phase 2), to broaden the understanding of the phenomenon and deepen the knowledge of the results found in the quantitative analysis (Creswell & Plano Clark, 2018).

### *Quantitative phase*

#### *Participants*

A total of 141 basketball players took part in this stage (78.7% men and 21.3% women), recruited through convenience sampling (Ibáñez, Pérez-Goye, García-Rubio & Courel-Ibáñez, 2019). To be eligible, the athletes had to be 18 or 19 years old and compete in Brazil in the year the data was collected. These criteria were based on the structure of the Brazilian competition, which is aimed at young people up to 19, the last category before entering adult competitions. This choice also aligns with the Brazilian Olympic Committee's Sports Development Model. It falls within the fourth stage of sports career development, called 'Train and Compete', which ends precisely at the transition from youth to adulthood (COB, 2022).

The athletes were recruited using the following strategies: e-mail lists available on the website of the Brazilian Basketball Confederation (CBB), social networks of state federations and affiliated clubs; sharing of the access link to the online instrument and publication of the publicity folder on social networks created exclusively for the study; support from the academic community, coaches, athletes and fans of the sport from all over the country; non-probability sampling method (snowball).

Figure 1 shows the characteristics of the participants (n=141). All of them gave their informed consent before starting the research.

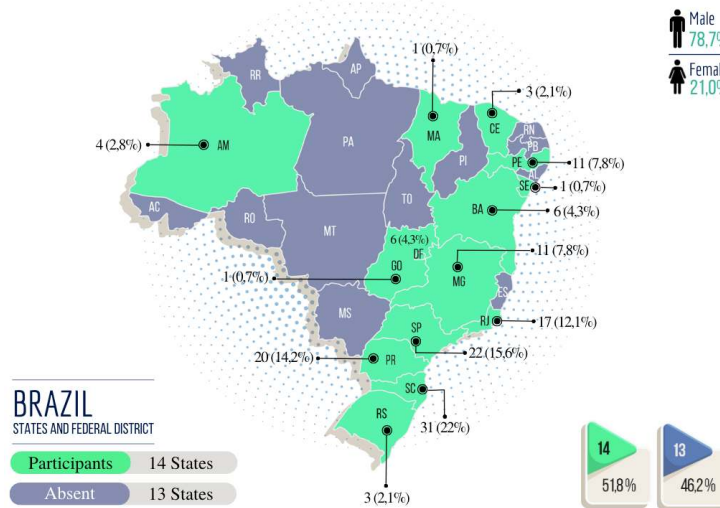


Figure 1. Distribution of athletes, considering the Brazilian states.

### Instruments

The athletes' engagement was assessed using the Instrumento de Avaliação da Formação Esportiva no Basquetebol (IAFEB) [Instrument for the Assessment of Sports Training in Basketball], adapted from the Instrumento de Avaliação da Formação Esportiva no Voleibol [Instrument for the Assessment of Sports Training in Volleyball] (Collet, Nascimento, Folle & Ibáñez, 2019). The IAFEB was validated by experts with knowledge in sports training who met previously established criteria.

The development of the IAFEB was based on the three dynamic elements proposed by the PAF (Côté et al., 2022; Côté et al., 2014; Côté et al., 2020). It is divided into sequential age groups according to Brazil's compulsory stages of Basic and higher education (Figure 2).

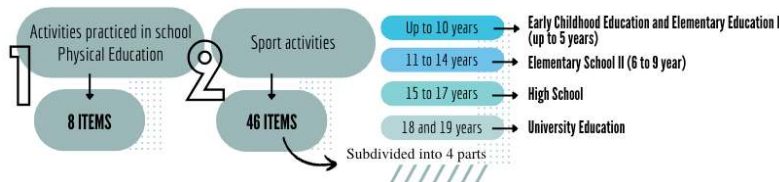


Figure 2. IAFEB items.

An athlete characterization form was also used to collect personal information (eight items) and sporting information (nine items).

### Procedures

The study was approved by the Research Ethics Committee for Human Beings (4.733.011). The athletes participated after signing an online Termo de Consentimento Livre e Esclarecido (TCLE) [Free and Informed Consent Form]. The athletes were then asked to fill in the form available on the Google Forms platform. The collection took place from June to December 2021.

### Data analysis

Quantitative variables were presented as means and standard deviations, while qualitative variables were summarized as relative and absolute frequencies. The Kolmogorov-Smirnov test analyzed the data's normality, finding that it did not follow a normal distribution.

The differences between the age groups were analyzed using the Kruskal-Wallis test, and the association between the qualitative variables was analyzed using the Chi<sup>2</sup> test. The SPSS 24 statistical package was used to carry out these analyses. Values of p<0.05 were considered statistically significant.

### Qualitative phase

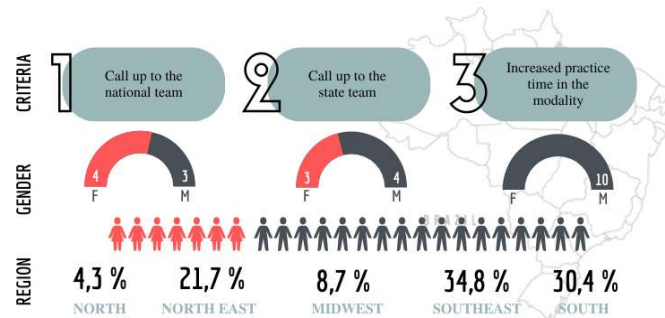
#### Participants

The participants in the semi-structured interviews were recruited on a non-probability- intentional basis. The characteristics presented in the quantitative phase were used to define the criteria for choosing the participants in this stage (McCrudden & Mctigue, 2018).

A total of 24 players took part in the second phase, according to the following selection criteria: those called up to the national team, those called up to the state team, those with the longest basketball experience in regions where there were no athletes of either sex, two athletes of the same sex were selected.

In this case, the first athlete was selected based on selection criteria 1 or 2. In contrast, the second participant was selected based on criterion 3 to obtain different evidence about the reality of athletes' sports training within the same region. When a selected athlete did not agree to participate in the second phase, another athlete who met the predetermined criteria was selected, and, if necessary, athletes who decided to participate in the second phase of the research were invited, regardless of the criteria.

To include athletes from all over Brazil, in regions where only one athlete took part in the quantitative phase, they were invited to participate in the interview (figure 3).



**Figure 3.** Diagram representing the inclusion of athletes in the qualitative phase.

#### *Instrument*

Retrospective interviews were conducted using a semi-structured script based on the dynamic element - personal engagement in activities, according to the IAFEB's sequential age groups. A pilot study with an athlete was conducted to assess the instrument's specificity and the quality of the data generated (Galatti et al., 2019).

#### *Procedures*

The athletes were contacted via the e-mail address provided in the quantitative phase, social media and WhatsApp messages obtained by sharing information. Each athlete made a maximum of four contact attempts at different times.

Participation occurred after signing the online TCLE and the Consent for Photographs, Videos, and Recordings (Consentimento para Fotografias, Vídeos e Gravações - CFVG). The day and time of the interview were scheduled individually with each athlete, and the interview was conducted by telephone, as requested by the interviewees, between April and July 2022.

Speeches were recorded by audio recording on the Windows platform, with prior authorization from the participants for later transcription and analysis. The interviews lasted an average of one hour. All the narratives were transcribed in full, and the material was sent to the participants so that they could validate the transcribed content.

#### *Qualitative analysis*

Thematic Analysis (TA) guided coding and data analysis with a deductive reasoning design (Braun & Clark, 2019). Before data collection, the themes were hypothesized based on the dynamic element 'personal engagement' (Braun, Clark & Hayfield, 2022). The TA was conducted based on the guidelines suggested by Braun and Clark (Braun & Clark, 2006): familiarization with the data (reading the transcripts); generation of initial codes; construction of themes; review and definition of the themes; and production of the report. NVivo 20.7 software was used to systematize and organize interviews and information.

To guarantee the quality of the analysis and the reliability of the data, the critical friend approach was adopted (Smith & McGannon, 2018). The premise of this strategy is to encourage introspection on the part of the main researcher through reflective dialogues with third parties who can offer possible alternative interpretations of the data. Data incorporation was carried out as described by Bazeley (2009), using the results of the analysis of one form of data to approach the analysis of another form of data. The results were mixed to produce a more complete picture, to avoid the biases intrinsic to monomethod design, and to build on the initial findings.

## **Results**

### *Characteristics related to basketball practice*

Table 1 provides an overview of the characteristics related to basketball practice in the different age groups. Few athletes practiced basketball until age 10, and those who did were doing it for leisure. From the age of 11, the athletes started practicing the sport, mainly with an interest in training, increasing their motivation to practice.

**Table 1.** Characteristics related to the practice of basketball in different age groups.

Variable		< 10 years		11 to 14		15 to 17		18 to 19		Chi <sup>2</sup>
Basketball practice	No	103	73,0	38	24,8	7	5,0	-	-	x <sup>2</sup> =299,5 p<0,001
	Yes	38	27,0	103	75,2	134	95,0	141	100	
Interest	Leisure	30	78,9%	29	27,4%	8	6,0%	6	4,3%	x <sup>2</sup> =144,2 p<0,001
	Health	3	7,9%	6	5,7%	3	2,2%	6	4,3%	
	Training	5	13,2%	71	67,0%	123	91,8%	129	91,5%	
Basketball motivation	Very low	1	3%	1	1%	2	1%	2	1%	x <sup>2</sup> =92,33 p<0,001
	Low	8	21,1%	4	3,8%	1	0,7%	0	0,0%	
	Moderate	16	42,1%	24	22,6%	9	6,7%	24	17,0%	
	High	9	23,7%	38	35,8%	39	29,1%	42	29,8%	
	Very high	4	11%	39	37%	83	62%	73	52%	

Note: X<sup>2</sup> - Chi-square.

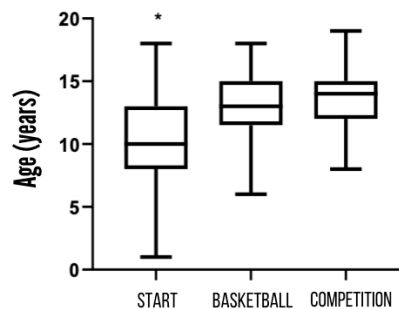
In the athletes' speeches, we can see how sport, especially soccer, was part of their lives from a very young age, influenced by close family members. Up until the age of 10, leisure was the main reason why children were interested in basketball, and the narratives below describe this phase:

*"[...] I started playing soccer when I was five, playing with my father, and I got a taste for it, enrolled for training when I was 11 for the first time" (Athlete 87).*

*"[...] my father played ball and I always wanted to play with him, so I asked him to take me to futsal. But when it came to futsal, it wasn't futsal, it was more like child's play [...]. I started basketball through the project at school, I was eight years old, then training and joking around, I was invited to play for the foundation, when I was 11" (Athlete 90).*

*"Initially, I always liked the training, but it was in squares. I never had a teacher or a coach. Back then, I played more for fun" (Athlete 88).*

Figure 4 shows the age at which the athletes had their first contact with the sport, started practicing basketball, and participated in competitions. The results showed a statistically significant difference, demonstrating that the athletes had experienced other activities before their initial basketball experiences and, consequently, sports competitions (p<0.001).



**Figure 4.** The age at which they start practicing sports, basketball, and competitions.

Note: \*significant difference concerning starting age in basketball and competitions (p<0.001 in the Kruskal-Wallis test).

Figure 5 shows the visual mapping of the qualitative results obtained from the interviews. The quantitative results presented below are complemented by the athletes' narratives and demonstrate the elements influencing young people's engagement in basketball.



**Figure 5.** Representation of qualitative results.  
*Motivation for playing basketball*

Consistent with the quantitative data, some brief quotes from the interviews provide examples of how the athletes' participation, specifically their interest and degree of motivation, impacted their development in the sport. Athletes have come to see sport as a goal in life. As a result, the dedication to improving performance-related aspects is expressed as follows:

*"[...] from the age of 11 I started training every day, I trained with two groups, sometimes I trained only with the group that was younger and the other day I trained with the group that was older [...]" (Athlete 19).*

*"[...] 12 to 13 years old, when I went to a club with a structure where there was a physical, physiotherapy, a court, a good coaching staff where every athlete, every professional in the field wants to work, I decided for myself, at that age, that I wanted to be a professional" (Athlete 8).*

*"[...] I started playing when I was 12. When I was 13, I went to live in [the city], [...] I was already more into basketball, more interested, trying to learn more, and I ended up joining a team, where I developed more, and it became more serious too [...]. It was more serious training, with a view to the championship, with a view to the future; it was already something more serious, something more real than just a hobby" (Athlete 59).*

*"[...] basketball two days a week, futsal two days, but when I fell in love with basketball, I gave up futsal and started training every day. Then I started playing for a club too, that was at school, and I started playing for the club. After that, I only grew in basketball" (Athlete 33).*

More than 90% of the athletes were already playing basketball at 15, and their main interest was training, which remained their priority until they were 18 or 19. The narratives also showed a change in mentality regarding dedication to practice, concurrent with the natural process of moving from childhood to adolescence.

*"We started the first three months as a joke but wanted to train seriously. At first, we joked around a lot, then we changed our mentality and started training seriously, some days it was physical, ball control, shooting, cardio [...]" (Athlete 107).*

*"The year I turned 15, I started training, going to the gym, physical training stuff. That's when I started to develop more in basketball and focus more on learning basketball. I was still studying but was more focused on basketball than my studies" (Athlete 33).*

*"[...] when I was 15, 16, I decided I wanted to carry on playing, and I wanted to pursue it until then an athlete trains every day and has to give up a lot, and I liked doing that" (Athlete 19).*

The motivation for basketball has been progressive over the years. However, significant differences were found, especially among athletes aged 11 and 17, when motivation to practice the sport remained very high. Athletes 5, 59, and 88, respectively, describe this phase:

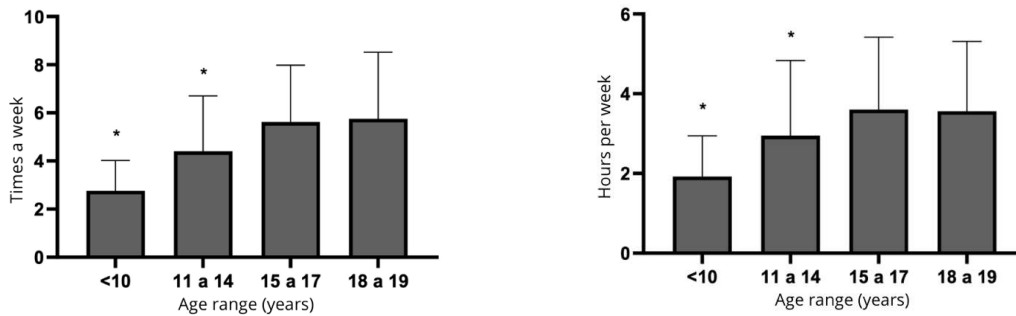
*"From then on, I started training off the court. I started doing individual training sessions, and that's how I began to evolve more".*

*"[...] I was 15, I trained with the 16-year-old category and went to train with the 18-year-old category, too, so I was already training with the older players. I ended up playing these two categories, and there were a lot of championships; I ended up playing two games a week, one game a week, and it was [...] a time when there were a lot of games, a lot of training [...]"*

*"I dreamed of becoming a professional athlete and did much more for myself; I went there daily to train. My friends and those in the club with me and who lived near my house also encouraged me, but it was down to me".*

*Weekly frequency of involvement in basketball*

Figure 6 shows that athletes' dedication volume before age 14 was significantly lower than older athletes ( $p < 0.001$ ). The number of hours dedicated to training increased when the athletes devoted themselves more frequently to the sport from age 15.



**Figure 6.** Weekly frequency of basketball practice according to age groups.

Note: \*significant difference in all groups ( $p < 0.001$  - Kruskal-Wallis test).

These results are expressed in the narratives below since the weekly training frequency increased progressively as the youngsters progressed through the competition categories. Initially, contact with the practice was two to three times a week.

*"[...] it was twice." [...] "around an hour, an hour and a half" (Athlete 32).  
"From the age of seven to ten at training, I trained two or three times a week [...], but the training was basically that, no physical training, it was just an hour-long soccer match, an hour and a bit every training session, about two or three days a week" (Athlete 102).*

Over the years, there has been an increase in the frequency and workload of training sessions due to participation in more than one category of competition. This is clearly illustrated by athletes 12 and 16, respectively:

*"I actually trained the same amount, the same number of times, three times a week, but the workload increased a little because I was U15, and I often stayed for U17 training."  
"[...] at U12, I stayed for two years because as I joined at 10, I had to repeat many years at U12, U13. In those early years, it was three times a week, but from U14 onwards, it was four times, and by U17, it was every day."*

At the same time as the athletes were going through the changes typical of adolescence, competitions were becoming more intense and demanding, making it necessary to include physical preparation in the training routine to avoid injuries and better prepare for the competitive season.

*"I trained four times [...]. It was usually from 3:30 to 5:30 PM; I'd take a break and then go until 7:30 in the evening." [...] "four hours a day, give or take" (Athlete 7).  
"They were more intense. I started training more times a week, training more hours too. I usually trained about five times a week, an hour and a half, two hours a day" (Athlete 33).  
"Total focus on performance. We had physicals twice a week, skills five times a week, apart from the gym, I think it was four or three times a week" (Athlete 61).*

*Complementary physical activities*

Many athletes practiced other activities outside school PE up to the age of 10. From age 11, many athletes focused on basketball (Table 2).

**Table 2.** Participation in physical and sporting activities outside of school PE.

Another activity	Up to 10 years	11 to 14 years	15 to 17 years	18 to 19 years	Chi <sup>2</sup>
No	22%	62%	59%	67,9%	$\chi^2=52,3$
Yes	78%	38%	41%	32,1%	$p < 0,001$

Note:  $\chi^2$  - Chi-square.

*"I've always loved playing sport. When I was little, about eight years old, my friends started playing futsal, and I followed the crowd and started too [...]" (Athlete 33).*

*"[...] I started practicing various sports when I was five years old. I did swimming, judo, jiu-jitsu, handball, volleyball, soccer, and it turned out that basketball was the last sport I wanted to learn [...]" (Athlete 59).*

*"My first contact with the sport was soccer, but I was never very attached to soccer; I never liked it; I never played with the other boys until I was a certain age" (Athlete 88).*

*"When I was little, I loved soccer, and my brothers loved it too. It's every child's dream to start playing, and I started very early, too. I enrolled for training but can't remember the place's name now. It took a while, and then I got to know athletics; I started practicing, and my event was the high jump. Then, there was a little space behind the stadium where people were playing basketball, and I used to walk down that street almost every day, passing by and watching from afar. As time passed, I liked it, I asked to play with them, I liked it and I never stopped" (Athlete 46).*

#### *Influence of school sports involvement on basketball practice*

The evidence showed that the practices within the school significantly influenced the athletes' involvement with basketball in elementary school (Table 3). For younger people, this influence was considerably less or non-existent.

**Table 3.** Influence of school sports involvement on basketball practice.

<b>Influence</b>	<b>&lt; 10 years</b>	<b>11 to 14 years</b>	<b>15 to 17 years</b>	<b>Chi<sup>2</sup></b>
Not applicable	29,2%	18,5%	18,5%	
Very little	25,6%	22%	11,3%	
Little	10,7%	10,7%	9,5%	x <sup>2</sup> =21,03 p=0,020
Moderate	16,7%	16,1%	17,3%	
High	7,7%	13,7%	13,7%	
Very high	10,1%	19%	29,8%	

Note: <sup>x2</sup> - Chi-square.

Participation in physical and sporting activities in the school environment proved essential for the athletes seeking greater involvement in sports.

*"Before that, I was doing sport at school. I didn't train seriously, but I practiced all the other sports at school: basketball, volleyball, futsal, handball. I also did swimming, and when I was very young, I played tennis for two or three years before starting basketball" (Athlete 16).*

*"I started at the Club, but I won a scholarship at a school [...] because I played basketball and did many sports. Ever since I was little, I did athletics, handball, and futsal. I got a scholarship at school, so it was a school that had a lot of sports. I played basketball there, and I also played basketball at a club" (Athlete 59).*

*"I think the first thing I had contact with was soccer, back in my town, at school [...], in Physical Education I always liked playing all kinds of sports [...]" (Athlete 32).*

## **Discussion**

This study aimed to ascertain basketball players' perceptions about their engagement in physical and sporting practices, considering their level of motivation, weekly frequency of involvement, and participation in complementary physical activities during their sports training. As far as we know, this study is among the first to use MM to analyze the personal engagement of athletes against the backdrop of PAF.

The possibility of integrating the results of two study methods allows us to provide a more complete picture of the subject and thus broaden our knowledge of theory and practice (Brierley, 2017). The results showed that, from age 11, the athletes began to dedicate themselves more to training in the sport and were highly motivated to practice. Participation in other activities decreased, and the influence of Physical Education on their involvement in the sport increased, remaining high until the age of 17.

The results revealed that until age 10, the athletes were moderately motivated to play basketball, given that most had initial contact with the sport only after that age. However, they were already taking part in other activities outside of school, which may have sparked their desire to take part in sports later on, as the influence of school practice seems to have contributed very little at that time. This evidence is consistent with several



studies that have indicated the importance of involvement in other sporting activities before specializing in a single sport (Galatti et al., 2021; Côté et al., 2022; Güllich et al., 2022).

Similar results were found by Cunha et al. (2017) when they discovered that most athletes competing in the Novo Basquete Brasil (NBB) had their first contact with basketball at around the age of 11. Beneli et al. (2017) showed that the players on the Brazilian basketball team started getting involved with the sport at around the age of 10, similar to the former Olympic athletes investigated by Galatti et al. (2019), who had initial contact with a basketball between the ages of nine and 12.

These findings reinforce the evidence presented by Lima et al. (2022) that the initiation of young people into sports in Brazil seems to occur around the time they enter elementary school. A positive factor in the Brazilian sports structure is that the first competitive category in basketball is U12, which helps to prevent competitive models for children who are too young and inappropriate (CBB, 2016). This is also the prerogative of the Brazilian Olympic Committee's Sports Development Model (COB, 2022) and international basketball models (Güllich et al., 2022). However, future studies could try to understand why younger children have not experienced the sport.

From 11, the athletes investigated had their first contact with basketball. They began to seek specialization, at which point the motivation to practice and school sports involvement became highly influential. This result differs from what is proposed by the Developmental Model of Sport Participation (DMSP), which suggests that the specialization stage occurs between the ages of 13 and 15 (Côté et al., 2014; Côté, 1999). However, this agrees with Lima et al. (2022) and Galatti et al. (2019), who investigated female athletes in Brazil and identified that the small number of young women entering the youth ranks seems to result in the rapid specialization of players.

The results reaffirm the trend observed by Beneli et al. (2017) and Galatti et al. (2021; 2019) that basketball players in Brazil have a short initiation into the sport, as they are already inserted into competitive environments within a short period. To achieve positive results in the long term, the characteristics of youth competitions must be studied to understand the training objectives of each federation in the different Brazilian regions and states. This is a clear gap that future studies should address.

From age 15, the athletes who took part saw a significant increase in weekly training volume. According to Ferreira (2021, p. 91), “[...] esta é a etapa onde a expressão da motivação individual assume uma particular importância e da qual resulta a sua fixação numa determinada modalidade (this is the stage where the expression of individual motivation takes on particular importance and which results in its fixation on a particular sport)”. This finding converges with the DMSP and shows that, at 15, athletes begin to focus on a single sport to become professional.

Although it is not possible to generalize these results, especially from studies carried out exclusively with female athletes, it is possible to see evidence that demonstrates the differences in the training process concerning the gender of the athletes. Lima et al. (2022) observed that Brazilian world champion handball players had a brief passage through the specialization stage and were soon inserted into more intense contexts. Galatti et al. (2019) found that former Olympic basketball athletes had a shorter passage through the specialization stage than the literature suggests, as some athletes were already competing in more than one category by age 12. On the other hand, in futsal, Mascarin et al. (2019) showed that the athletes who reached the elite level started competing at an average age of 13.

This evidence seems to corroborate the idea that there are some specificities linked to gender and sports that expose young people to a scenario of early specialization, characterized by systematic training in a single sport before the age of 13 (Côté et al., 2020). Among the possible implications of this situation are the abandonment of the sport due to lack of enjoyment and pressure for performance, burnout associated with the social environment, and difficulty dealing with conditions related to the ego and motivational climate (McLaren, Shanmugaratnam & Bruner, 2014), as well as the risk of injuries due to physical and psychological stress before the natural experience of the sport.

It is very difficult to apply and understand all the aspects that guide sport and its influence on young people, both in terms of science and their actual daily practice (Plakias et al., 2024). At the broadest level, cultural issues can shape how practice is interpreted and applied in different youth sports contexts around the world (Reverdito, Galatti, Strachan, Scaglia & Paes, 2020; Ryba et al., 2022). When considering this point, certain aspects may be more salient in societies or communities where competitive sport is more widely practiced. In contrast, others are more consistent when sports are practiced in less organized or highly competitive environments.

A limitation of the study is focusing on just one aspect of the PAF: personal engagement in activities, which is influenced by quality social dynamics and appropriate contexts when considering DPJ (Côté et al., 2022; Côté et al., 2014; Côté et al., 2020). In this way, other potentially important people and more specific characteristics of the context were not considered. However, the results presented here, from the research with MM, proved effective in offering a deeper understanding of the personal engagement of athletes and, consequently, of the youth sports system and the DPJ.

Other limitations must be addressed. Firstly, non-probability-intentional sampling was used. Therefore, there may be participation bias. Secondly, the participants answered the questions retrospectively, so recall bias may exist. Thirdly, due to the research's cross-sectional design, it is impossible to identify causal relationships. Finally, the fact that the interview topics were defined a priori can also be considered a limitation. However, similar studies can gather evidence for the proposition of sports training models based on theoretical and empirical studies for the Brazilian reality (Lima et al., 2022).

### Conclusions

The sports training process for Brazilian athletes was identified based on the specific stages through which this population of athletes evolved over the formative years. The results showed that until age 10, few athletes practiced basketball, and those who did were doing it for leisure. From the age of 11, most of them were already training systematically, and at 13, they started participating in competitions. At 15, the weekly training frequency increased significantly, as did the motivation to practice and the influence of school sports involvement on basketball, remaining high until the ages of 18 and 19. Following the logic of the DMSP, the results show that the athletes diversify their sports up to the age of 10; from about 11 to 14, they experience the specialization stage, and at 15, they dedicate themselves specifically to basketball.

The choice of PAF as theoretical support for carrying out this study contributed to the structuring and understanding of the athletes' development process from a pragmatic perspective. With this support, we understand that the elements that influenced the personal engagement of athletes in physical and sporting activities were related to the set of experiences constructed and felt from their insertion into sport until adulthood and how these experiences encouraged their continuity throughout the years. Involvement in complementary activities and the school sports context also proved to be fundamental for development.

Promoting positive engagement in physical and sporting activities is a complex process shaped by many factors. However, by examining research across multiple sports science sources, this article has attempted to highlight and connect the mechanisms that affect the athlete's initial experience and the factors associated with short—and long-term sports involvement. Future research is needed to delve into this topic.

### Conflicts of interest

The authors declared no potential conflicts of interest regarding this article's research, authorship, and/or publication.

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