

# A cluster analysis of high-performance handball players' perceived motivational climate: Implications on motivation, implicit beliefs of ability and intention to be physically active

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## Abstract

The aims of this study were to uncover the different motivational climate profiles to compare differences on their implicit beliefs of sports ability, motivational orientation, and intention to be physically active, and finally to analyse the relationship of the gender with motivational climate profiles, in a large sample of high-performance handball players in Spain. A total of 444 (233 males, 211 females) high-performance handball players agreed to participate. They completed a questionnaire that included the Spanish validated versions of Perceived Motivational Climate in Sport Questionnaire, Conceptions of the Nature of Athletic Ability Questionnaire-2, Sport Motivation Scale and Intention to be Physically Active Questionnaire. A hierarchical cluster analysis uncovered two independent motivational climate profiles that were confirmed by a K-Means cluster analysis: “mastery climate” and “performance climate”. The results revealed that the mastery climate profile comprised players with less amotivation and higher scores in both incremental ability belief and greater intention to be physically active, and more women than men. By contrast, the performance climate profile comprised players with higher scores in extrinsic motivation and amotivation, both entity ability belief, lower intention to be physically active and primarily men. The importance of the coach in creating a mastery climate that fosters athletes' engagement was confirmed.

## Keywords

Athlete engagement, Self-Determination theory, youth sport

## Introduction

Throughout a player's sport development process, competition becomes a context where demonstrating your ability and achieving the goal of overcoming the opponent are the most important and where various psychological variables are involved. The knowledge and management of such variables may help athletes optimise their performance, increasing the possibilities of improving their results, on one side, and reducing the influence of variables that may affect their long-term continuity in sport and psychosocial development, on the other.<sup>1–5</sup> Thus, sport is an environment where socialising influences also affect player's development and their intention to continue to practice sport.<sup>6–8</sup> Training and competition can be ideal contexts to encourage the adolescent's sporting commitment, as

long as the young athlete achieves positive motivation, as this is key to achieving adherence to physical-sports practice.<sup>9</sup> Therefore, it is of paramount importance to study all these variables in the adolescence in order to promote sport practice and engagement to it,<sup>10</sup>

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for research has revealed a large decrease in interest and sport participation primarily during this period.<sup>11</sup>

In this regard, since motivation is one of these factors, the two main motivational paradigms in sport that researchers have used to analyse motivation must be considered: the achievement goal theory (AGT)<sup>12,13</sup> and the self-determination theory (SDT)<sup>14-16</sup> and, more specifically, the organismic integration sub-theory.<sup>17</sup> Motivation in its relationship with self-determination is understood as a continuum in which the behaviour of the subject is ordered from the highest to the lowest degree of self-determination. This theory establishes the existence of three manifestations of intrinsic motivation: the intrinsic motivation for knowledge, for achievement and for stimulating experiences.<sup>18</sup> Intrinsically, motivated behaviours represent the prototype of self-determined activities.<sup>19</sup> On the other hand, extrinsic motivation is the motivation to perform an activity to either earn a reward or avoid punishment. In it (within this theory), according to Deci and Ryan,<sup>14,20</sup> self-determination can be distinguished from a greater to lesser degree: integrated regulation, identified regulation, introjected regulation and external regulation. Finally, there is the amotivation or relative absence of motivation, in which the subject is not motivated, neither intrinsically nor extrinsically.<sup>21</sup>

The results of several studies supported by one theory or the other have yielded a positive relationship between intrinsic motivation<sup>22</sup> or task involvement<sup>23</sup> and the intention to be physically active in the future, which has proved to be a predictor of physical activity practice.<sup>24</sup> Persistence in physical activity can be generated by a high level of self-determined motivation, and on the contrary, frustration can lead to demotivation of the athlete and lead to abandonment.

Another important factor related to the motivation of adolescents in sports is implicit beliefs about sports ability.<sup>25</sup> According to the literature, in a sport context, athletes' beliefs about their ability influence their behaviour as well as their motivation towards sport practice.<sup>25</sup> Furthermore, studies have shown that athletes' beliefs about their ability are a predictor of motivation.<sup>26</sup> Thus, athletes may regard their ability as something open to improvement through learning, effort and training (incremental belief), or as something stable and innate and, therefore, independent from practice and effort (entity belief).<sup>26</sup> Moreover, the incremental ability belief is positively related to the most self-determined motivation types, fun and satisfaction, effort and persistence, task involvement or mastery and the intention to be physically active. By contrast, athletes with entity belief experience frustration and a motivation decrease when not achieving the satisfactory results they hoped for.<sup>11,26,27</sup>

Besides, Ommundsen<sup>28</sup> and Cury et al.<sup>29</sup> considered that the motivational climate is one of the factors that may affect the development of these ability beliefs. In addition, the two aforementioned theories sustain that the motivational climate created by other social agents affects athletes' type of motivation and physical and psychological wellness.<sup>12,13</sup>

According to the AGT,<sup>12,13</sup> an athlete's perception of the context determines whether there will be an ego-involving climate and task-involving climate<sup>30-32</sup> also referring to a performance climate or mastery climate.<sup>12,13,33</sup> In this regard, if victory and showing good skills and performance are the most important aspects for the people in the players' environment, they will be creating an ego-involving climate, while if they see effort, personal improvement and skills development as central aspects, they will create a task-involving climate.

In particular, in a team sport like handball and during the introduction and development phases the sample belongs to, the coach is one of the main social agents within the sport team and plays an essential role for the optimal course of the game.<sup>34</sup> Depending on the coach's behaviour, satisfaction with and continuity in sport practice will be either fostered or hindered, as well as the athlete's level of motivation, involvement and commitment.<sup>35</sup>

The study of the association between perceived motivational climate and self-determined motivation has empirically connected AGT and SDT theories. In general, the literature has shown that athletes present more adaptive motivational patterns when they perceive that coaches create a task-involving climate.<sup>36-38</sup>

The perception of a motivational climate of task involvement tends to be associated with adaptive motivational responses such as self-determined motivation.<sup>39-41</sup> On the contrary, it has been found that the perception of a climate of ego involvement leads to poorly adaptive motivational consequences, since such perception is associated with externally regulated behaviours.<sup>42</sup>

In this regard, a perceived mastery motivational climate has empirically proved to be positively associated with intrinsic motivation<sup>43</sup> and to positively predict incremental ability belief.<sup>28,29</sup> On the contrary, a performance climate negatively predicts intrinsic motivation<sup>43</sup> and positively predicts entity belief.<sup>28,29</sup>

As for the gender of the athletes and the different variables analysed in this study, the literature on the relationship between the motivational climate generated by the coach and the gender of the players, the results reflect statistically significant differences in which the perceived performance climate is greater in boys and the mastery climate is greater in girls.<sup>4,44-47</sup> However, there are also other studies that do not reveal

significant differences and where only differences were obtained in terms of competition climate, with a higher result for boys.<sup>48</sup> In relation to the implicit beliefs about sports ability and this sociodemographic variable, few studies have been found, with contradictory conclusions<sup>49–51</sup> and even in some of the cases no statistically significant differences were found.<sup>52</sup> Gómez-López et al.<sup>53</sup> showed that boys had a greater belief in ability as an entity based on talent, as opposed to girls who perceived a greater belief in ability as incremental. Regarding the analysis of self-determined motivation based on the gender variable, Pelletier et al.<sup>21</sup> found that girls scored higher on intrinsic motivation and lower on extrinsic motivation than boys. On the other hand, Moreno et al.,<sup>54</sup> Fortier et al.<sup>55</sup> and Granero-Gallegos et al.<sup>3</sup> conclude that boys show a greater lack of motivation than girls, contrary to what Wang and Biddle<sup>52</sup> found where the motivational profile “unmotivated” was composed primarily of girls. On the other hand, other works that support the statement that girls are more intrinsically motivated than boys are those by Chantal et al.,<sup>56</sup> Duda et al.<sup>57</sup> and Petherick and Weigand.<sup>58</sup>

Therefore, as it has been shown, there are studies that have analysed some of the relationships examined in this study (motivational climate with self-determined motivation, motivational climate with sport ability beliefs, motivational climate with the intention to be physically active in the future and self-determined motivation with the intention to be physically active in the future). Nevertheless, up to now, none has tested all these relationships along with the gender variable, including the intention to be physically active and exclusively in handball players. In fact, previous studies have revealed that the sport modality may be a determining factor in the motivation type, commitment to sport and the intention to be physically active.<sup>59</sup> Thus, the analysis of the factors that predict young handball players' intention to continue to practice sport will help go into detail in the motivational mechanism that governs engagement to sport practice.

Based on the aforementioned, the purposes of this study were to uncover the different motivational climate profiles to compare the differences on their implicit beliefs of sports ability, motivational orientation and intention to be physically active, and finally to analyse the relationship of the gender with motivational climate profiles, in a large sample of high-performance handball players in Spain.

Our hypothesis was that mastery motivational climate profile comprised players with less extrinsic motivation and amotivation, higher scores in intrinsic motivation, incremental ability belief, intention to be physically active, and more women than men, and performance motivational climate profile comprised

players with the higher scores in extrinsic motivation and amotivation, lower scores in intrinsic motivation, entity ability belief, lower intention to be physically active and primarily men.

## Method

### Participants

Participants were 444 high-performance handball players aged between 16 (40.1%) and 17 years (59.9%) ( $M=16.60$ ;  $SD=.50$ ) from all the youth teams participating in the Spanish handball championships by region (233 males and 211 females;  $M=16.70$ ;  $SD=.49$ ).

### Instruments

*Perceived Motivational Climate in Sport Questionnaire (PMCSQ-2)*<sup>33,60</sup>. The Spanish version of this scale, developed by Balaguer et al.,<sup>61</sup> was used. The inventory includes 29 items grouped in two dimensions measuring the ego-involving climate or performance climate (14 items, e.g. “On this team, the coach gives most of his or her attention to the stars”) with three subscales, unequal recognition (it is perceived that the coach offers more attention and reinforcement to the most talented athletes), punishment for mistakes (it is perceived that the coach responds negatively to mistakes) and intrateam rivalry and competition (the coach is perceived to promote social comparison and competition between athletes in the same group/team); and the task-involving climate or mastery climate dimension (15 items, e.g. “On this team, the coach emphasizes always trying to do your best”) with another three subscales, emphasis on effort and improvement (it is perceived that the coach reinforces hard work, doing the best one can, as well as the development of skills and personal improvement), perceived important role (everyone is perceived to be making a contribution, as well as the role each plays in the success routines) and cooperative learning (the coach is perceived to value collaboration between athletes and wants athletes to help each other in learning and improving skills). Each item was headed with the phrase “In my training group or team. . .” Answers were collected on a Likert-type scale ranging from strongly disagree (1) to strongly agree (5). Using the data collected in this study, a confirmatory factor analysis was conducted to assess the two-factor structure. The corresponding fit indices were  $\chi^2$  (73,  $N=444$ ) = 520.90,  $p < .01$ ;  $\chi^2/df = 2.56$ ; Comparative Fit Index (CFI) = .89; Incremental Fit Index (IFI) = .89; Tucker Lewis Index (TLI) = .86; Root Mean Square Error Approximation (RMSEA) = .06; Standardized Root Mean Square

Residual (SRMR) = .06. Internal consistency analysis yielded satisfactory results for both *mastery* ( $\alpha = .86$ ) and *performance* dimensions ( $\alpha = .85$ ) and their mastery subscales cooperative learning ( $\alpha = .87$ ), effort/improvement ( $\alpha = .87$ ), and perceived important role ( $\alpha = .85$ ), and performance subscales intrateam rivalry and competition ( $\alpha = .87$ ), punishment for mistakes ( $\alpha = .88$ ), and unequal recognition ( $\alpha = .84$ ).

*Conceptions of the Nature of Athletic Ability Questionnaire-2 (CNAAQ-2)*<sup>26</sup>. The Spanish version of this scale, developed by Moreno et al.,<sup>62</sup> was applied. This scale includes 12 items divided into two higher order subscales called incremental belief and entity belief. The subscale of entity beliefs consists of six items of which three correspond to the first-order variable of stable and the others to the variable of talent. Meanwhile, the incremental subscale consists of six items of which three correspond to the first-order variable of improvement and the others to the variable of learning. In the questionnaire instructions, the players were asked: "Your beliefs about your ability in sports are..." The answer was meant to be given on a five-point Likert scale, from (1) I completely disagree to (5) I strongly agree. The goodness of fit indices of the corresponding confirmatory factor analysis were  $\chi^2$  (49,  $N = 444$ ) = 85.24,  $p < .01$ ;  $\chi^2/df = 2.07$ ; CFI = .97; IFI = .97; TLI = .95; RMSEA = .05; SRMR = .04. Internal consistency analysis of the different subscales yielded the following Cronbach's alpha ( $\alpha$ ) values: *entity-stable* ( $\alpha = .76$ ), *entity-gift* ( $\alpha = .86$ ), *incremental-improvement* ( $\alpha = .68$ ) and *incremental-learning* ( $\alpha = .73$ ). The complete scale yielded a value of  $\alpha = .79$ .

*Sport Motivation Scale (SMS)*<sup>63</sup>. The Spanish version of this scale, developed by Nuñez et al.<sup>64</sup> and Balaguer et al.,<sup>65</sup> was used. The scale has 28 items which assesses the construction of different motivation degrees established by the SDT<sup>16</sup> suggesting a multidimensional explanation for motivation: amotivation (e.g. "I don't know anymore; I have the impression that I am incapable of succeeding in this sport"), External Regulation (e.g. "because it allows me to be well regarded by people whom I know"), Introjected Regulation (e.g. "because it is absolutely necessary to do sports if one wants to be in shape"), Identified Regulation (e.g. "because, in my opinion, it is one of the best ways to meet people"), Intrinsic Motivation to Know (e.g. "for the pleasure it gives me to know more about the sport that I practice"), Intrinsic Motivation to Accomplishment (e.g. "for the pleasure I feel while improving some of my weak points"), and Intrinsic Motivation to Experience Stimulation (e.g. "for the pleasure I feel in living exciting experiences"). Following Balaguer et al.,<sup>65</sup> it was decided to use a

scale structure composed of three subscales that measure three motivational constructs of the SDT<sup>17</sup>: intrinsic motivation, extrinsic motivation and amotivation. Each item was headed with the phrase "Why do you practice sport..." Answers were collected on a Likert-type scale where options ranged from (1) does not correspond at all to (7) corresponds exactly; being the average (4), corresponds moderately. Indices of goodness of fit were  $\chi^2$  (146,  $N = 444$ ) = 664.96,  $p < .01$   $\chi^2/df = 2.30$ ; CFI = .90; IFI = .90; TLI = .88; RMSEA = .05; SRMR = .05. Internal consistency analysis showed the following Cronbach's alpha ( $\alpha$ ) values for each subscale: *intrinsic motivation* ( $\alpha = .87$ ), *extrinsic motivation* ( $\alpha = .82$ ) and *amotivation* ( $\alpha = .70$ ). The complete scale yielded a value of  $\alpha = .87$ .

*Intention to be Physically Active Questionnaire*<sup>24</sup>. The Spanish version of this scale "MIFA", developed by Moreno-Murcia et al.,<sup>66</sup> was used. This scale consists of five items for measuring participants' intention to be physically active after leaving school (e.g. "Outside physical education classes, I like doing sport"). The items are preceded by the phrase "With respect to your intention to do a physical activity..." Responses correspond to a Likert scale ranging from (1) corresponds to totally disagree to (5) corresponds to totally agree. Indices of goodness of fit were  $\chi^2$  (15,  $N = 444$ ) = 9.84,  $p < .01$   $\chi^2/df = 1.97$ ; CFI = .98; IFI = .98; TLI = .97; RMSEA = .04; SRMR = .02. The complete scale yielded a value of  $\alpha = .67$ .

## Procedure

In order to collect the data, the organising federations and the participating youth regional teams were informed and the necessary consent forms were obtained. Prior to answering the questionnaire, the instructions were explained and the doubts solved. The questionnaire was answered voluntarily and anonymously during players' resting time at their accommodating facilities, taking approximately 30 min.

## Statistical analysis

Descriptive and correlation analysis of all variables included in the study was conducted. The different player profiles were identified based on the coach-created motivational climate using Ward's hierarchical clustering method. Previous studies carried out in the sporting and educational context have been considered as references.<sup>67</sup> Each profile's features were examined through a multivariate analysis of variance (MANOVA) of the complete sample. The magnitude of the differences between the groups analysed was obtained through the size effect, which shows a typical

measure of deviation between group means, allowing for real quantification of the difference between them. Cohen<sup>68</sup> described size effect as small ( $\eta^2 = .01$ ), medium ( $\eta^2 = .06$ ) or large ( $\eta^2 = .13$ ). Additionally, the clusters obtained were analysed based on gender through bivariate analysis, using Pearson's chi-squared with 2 x 2 contingency tables and setting statistical significance at  $p < .05$ . All the analyses were conducted with the statistical package SPSS 19.0 and AMOS 19.0.

## Results

### Descriptive and correlation analysis

Descriptive statistics, Cronbach's alpha values for the subscales and bivariate correlations for all the study variables are presented (see Table 1). The data reveal higher scoring of mastery climate compared with performance climate ( $M = 4.01, 2.69$ , respectively), as well as high levels of intrinsic motivation ( $M = 5.36$ ), improvement incremental belief ( $M = 4.37$ ) and intention to be physically active ( $M = 4.51$ ). Bivariate correlation analysis showed significant correlations among all variables at  $p < .01$ , except: intrinsic motivation with performance climate; extrinsic motivation with mastery climate, incremental-improvement, incremental-learning and intention to be physically active; and, finally, intention to be physically active with performance climate and entity-gift belief.

### Cluster analysis

The cluster analysis was conducted including the six subscales of the motivational climate variable, following the phases proposed by Hair et al.<sup>69</sup> The values of the variables were standardised using Z-scores, none of them being higher than 3 and, therefore, no outliers existing in the whole sample. The dendrogram obtained

suggested the existence of two groups or profiles (see Figure 1). To decide about its adequacy, the number of clustering coefficients was increased by changing from two to three groups. It was concluded that there existed two different groups of players who perceived different motivational climates. Firstly, a "performance climate" profile (cluster 1), composed of 186 players (41.90%) with the highest scores, sorted by order of score, in unequal recognition ( $Z = .85$ ) punishment for mistakes ( $Z = .62$ ), and intrateam rivalry and competition ( $Z = .48$ ). And secondly, a "mastery climate" profile (cluster 2), including 258 players (58.10%) with higher scores in, sorted by order of score, perceived important role ( $Z = .47$ ), cooperative learning ( $Z = .46$ ) and emphasis on effort and improvement ( $Z = .41$ ).

### Differences based on ability beliefs, motivation and intention to practice

An MANOVA was conducted to identify its characteristics of each one based on the other variables. Clusters were used as independent variables, and implicit beliefs of sports ability, motivation and intention to be physically active as dependent variables. Box's test was applied to check the homogeneity of covariance. The results (see Table 2) revealed that the groups did differ in the set of variables (Pillai's trace = .161,  $F_{(433,00)} = 10.40, p < .01$ ). Furthermore, follow-up ANOVAs revealed no significant difference in the intrinsic motivation measure but significant differences in all the remaining variables with performance cluster scoring higher on extrinsic motivation, amotivation, and both entity beliefs, and mastery cluster scoring higher on both incremental beliefs and intention to be physically active, amotivation being the one with highest size effect between groups.

Table 3 shows the association of gender with each profile. Men did not show any differences about the

**Table 1.** Descriptive statistics and bivariate correlations.

	Range	M	SD	A	K	$\alpha$	1	2	3	4	5	6	7	8	9	10
1 Mastery climate	1-5	4.01	.58	-.65	.28	.86	-	-.384*	.341*	.063	-.235*	-.126*	-.178*	.283*	.300*	.193*
2 Performance climate	1-5	2.69	.71	.35	-.22	.85	-	-	-.046	.273*	.339*	.148*	.242*	-.242*	-.185*	-.044
3 Intrinsic motivation	1-7	5.36	.93	-.49	-.00	.87	-	-	-	.513*	-.133*	-.126*	-.159*	.253*	.369*	.295*
4 Extrinsic motivation	1-7	4.48	1.01	-.26	-.13	.82	-	-	-	-	.211*	.188*	.133*	-.029	.028	.076
5 Amotivation	1-7	2.08	1.19	1.29	1.27	.70	-	-	-	-	-	-.33.8*	.166*	-.308*	-.253*	-.294*
6 Entity-Stable	1-5	2.21	.81	.40	-.18	.76	-	-	-	-	-	-	.339*	-.257*	-.336*	-.178*
7 Entity-Gift	1-5	2.70	1.03	.06	-.68	.86	-	-	-	-	-	-	-	-.192*	-.155*	.035
8 Incremental-Improvement	1-5	4.37	.64	-.98	.46	.68	-	-	-	-	-	-	-	-	.606*	.294*
9 Incremental-Learning	1-5	4.32	.67	-.99	.37	.73	-	-	-	-	-	-	-	-	-	.401*
10 Intention	1-5	4.51	.52	-1.13	.76	.67	-	-	-	-	-	-	-	-	-	-

Note. \*  $p < .01$ ; M = Mean; SD = Standard deviation; A = Asymmetry; K = Kurtosis;  $\alpha$  = Cronbach's alpha

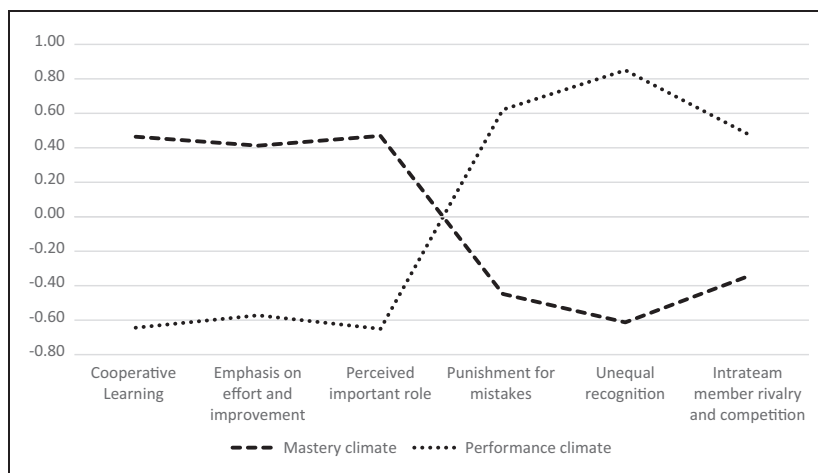


Figure 1. Ward's hierarchical clustering method applied to handball players.

Table 2. Multivariate analysis according to cluster based on the subscales of CNAAQ-2, SMS and MIFA.

Subscales	Performance climate (n = 186)			Mastery climate (n = 258)			F	p	μ
	M	SD	Z	M	SD	Z			
1. Intrinsic motivation	5.25	.85	-.12	5.45	.98	.08	2.79	.09	.00
2. Extrinsic motivation	4.66	.94	.21	4.27	1.01	-.16	13.56	.01**	.03
3. Amotivation	2.55	1.37	.40	1.74	.89	-.28	50.94	.01**	.10
4. Incremental-Improvement	4.19	.71	-.30	4.52	.54	.21	23.63	.01**	.05
5. Incremental-learning	4.15	.72	-.25	4.45	.60	.18	15.39	.01**	.04
6. Entity-stable	2.35	.85	.17	2.11	.78	-.12	7.88	.01**	.02
7. Entity-gift	2.97	.98	.27	2.51	1.02	-.19	18.40	.01**	.04
8. Intention	4.42	.61	-.16	4.57	.43	.18	7.63	.01**	.02

Cluster 1: performance climate; Cluster 2: mastery climate; M: mean; SD: standard deviation; Z: standardised mean, μ: partial eta squared; \*\*p < .01.

Table 3. Profiles' characteristics based on gender.

		Gender	
		Men (n = 233)	Women (n = 211)
Total		(52.47%)	(47.53%)
	N = 186	116	70
Performance climate	41.90%	49.80%	33.20%
	Residuals	-3.6	3.6
	n = 258	117	141
Mastery climate	58.10%	50.20%	66.80%
	Residuals	3.6	-3.6

Note: Chi-squared = 12.55 (df = 1); p < .0.

motivational climate with similar proportion in each profile. On the other hand, women were associated with mastery climate (66.80%). Finally, the cluster "mastery climate" was positively associated with

women, while the cluster "performance climate" was associated positively with men (49.80%). Thus, women perceive a mastery climate to the detriment of men who do not perceive any differences regarding to climate promoted by the coach.

## Discussion

The main purpose of this study was to uncover the different motivational climate profiles to compare the differences on their implicit beliefs of sports ability, motivation and intention to be physically active, and secondly, to analyse the relationship of the gender with motivational climate profiles in a large sample of high-performance handball players in Spain. Following the AGT,<sup>13</sup> the cluster analysis results yielded two different profiles for youth handball players depending on perceived motivational climate: a mastery climate profile with higher scores in cooperative learning and perceived important role, and a performance climate

profile with the highest scores in unequal recognition. The results showed that most athletes perceived a mastery climate because the coach normally valued collaboration between athletes and helping each other in learning and improving skills, reinforced the role each plays in the group and encouraged everyone to be perceived as contributing to the team's success, and the performance climate because their coach offered more attention and reinforcement to the most talented teammates. These results do not entirely coincide with those provided by Castro-Sánchez et al.<sup>70</sup>; in their study with schoolchildren in which the effort/improvement category was the most highly scored in the mastery climate profile. On the other hand, in the performance profile, it was found that boys scored higher especially in the category punishment for mistakes and girls in the category unequal recognition. Recently, the study by Castro-Sánchez et al.<sup>71</sup> with semi-professional Spanish athletes, showed that the most influential indicator in ego-oriented climate was intragroup rivalry, exerting greater influence in individual sports. For task-oriented climate the strongest indicator was having an important role in individual sports, while in team sports it was cooperative learning.

The results were not statistically significant in relation to intrinsic motivation but they were significant in extrinsic motivation and amotivation. These results may be due to the specificity of the sample studied because the level of demand for training and competition, number of weekly hours of training, competitive objectives of the coaches of the selections and the degree of responsibility of the players in this category of game and in regional selections are similar.<sup>46</sup> These selections are made up of the best players from each of the regions that make up Spain.<sup>45</sup>

The results showed that the performance climate profile comprised players with higher levels of extrinsic motivation and amotivation, higher scores on belief in ability as an entity, lower intention to be physically active in the future and more men than women. On the other hand, the mastery climate profile comprised players with less amotivation and extrinsic motivation, the highest scores in incremental ability belief, higher intention to be physically active in the future, and more women than men.

Although the results in relation to intrinsic motivation were not statistically significant, it is true that this type of motivation was superior to the rest in both profiles. Therefore, the results are positive since, according to the SDT, intrinsic motivation is the most characteristic type of self-determined motivation.<sup>14</sup> As stated by its postulates, this majority group of players perceive that their coaches appreciate effort and improvement, and consider that every player has an important role within the team. These results are partially in line with

previous studies regarding handball<sup>4,34</sup> and other sport modalities, where the mastery climate has empirically proved to be positively associated with intrinsic motivation.<sup>23,43</sup>

Literature reveals that those athletes who perceive a climate of mastery are often interested and involved in physical activity and sport, seek personal satisfaction and enjoyment with their practice, and sport becomes a purpose in itself.<sup>72</sup> Besides, this pleasure obtained from playing fosters, according to other studies, commitment and engagement to sport.<sup>35</sup> This explains that the results obtained show higher intention to continue to be physically active in the future, in line with other studies where positive relationships were found between the coach-created mastery climate<sup>23,73,74</sup> and engagement to sport, as well as between intrinsic motivation and sport engagement.<sup>6,22,24,59</sup>

Furthermore, according to the results and the revised literature, these players consider that their sport ability is subject to improvement through learning, effort and, of course, training.<sup>26,75</sup> For this reason, they enjoy playing much more, for they know that if they push themselves during training, they will achieve positive effects on their ability. Thus, we agree with the results of previous studies conducted in a sport environment, where a mastery climate positively predicted an incremental belief<sup>76</sup> and self-determined motivation was positively related with incremental beliefs.<sup>25</sup> Therefore, the results revealed that, given a coach-created mastery motivational climate, self-determined motivation is positively related to incremental ability belief and the intention to be physically active.

In contrast, the performance climate profile comprises those players with higher scores in extrinsic motivation and amotivation, stable and gift entity ability belief, lower intention to be physically active and mostly men. Following Ryan and Deci,<sup>15</sup> it can be stated that the majority of these players feel motivated by instrumental reasons or reasons coming from external, non-task-related sources, such as receiving prizes or awards. Some of them even claimed not to be motivated so, following the postulates of the SDT,<sup>17</sup> we can think that these players may not know the reasons why they participate and they may not have interest or intention to participate, i.e. they may regard playing handball as a waste of time. Consequently, this group of players also reports to have little intention to be physically active in the future. These results agree with previous studies that confirmed that performance climate perception is higher in men<sup>73</sup> and it is negatively associated with intrinsic motivation.<sup>23,43</sup>

In light of the results, these players believe that their sport ability level cannot be improved since it is innate and stable, in compliance with previous studies that

confirmed that a performance climate positively predicts entity belief.<sup>28,29</sup>

Therefore, this performance climate profile is not as positive as the previous one, even literature has proved that, when players do not achieve satisfactory results, they feel frustrated, this leading to a decrease in their motivation level and even withdrawal from sport in some cases.<sup>11,26,27,50</sup>

On the other hand, with regard to gender analysis, the results reflected that the men did not show any differences about the motivational climate with similar proportion in each profile. The cluster “mastery climate” was positively associated with women, while the cluster “performance climate” was associated positively with men. Thus, women perceived a mastery climate to the detriment of men who did not perceived any differences regarding to climate promoted by the coach. Therefore, the results were in line with other studies where women’s perception of a mastery climate was higher than men’s and the performance climate is higher in men.<sup>44,47,54,73,77–79</sup> In contrast, in the study conducted by Møllerlækken et al.<sup>48</sup> with similarly aged football players, the results reflected that both genders perceived that the motivational climate was significantly more performance-oriented and much less master-oriented.

It should be noted that there are also studies that did not find significant differences in the perceived motivational climate and the gender variable,<sup>80</sup> or even between gender and ability beliefs,<sup>27</sup> and others in which only significant differences were obtained in relation to the performance climate, with a higher result for men.<sup>48</sup>

Also, the results found by Galván et al.<sup>80</sup> in terms of the relationship between the motivational climate of the coach and gender depending are highlighted on the type of sport practiced. The results revealed that men, compared to women, had the highest scores in the perception of both the motivational climate of mastery and performance in team sports. These results showed that men practicing team sports perceived both motivational climates generated by the trainer in a similar way. On the other hand, the results found with the sample of handball players are in line with those found by these authors in relation to the practitioners of team sports, since men were those who showed the highest scores in the perception in both types of motivational climate, compared to women.

Furthermore, it must be noted that these differences regarding players’ gender have been previously explained by several authors and they correspond to social factors that affect sport socialisation processes. It is suspected that women regard sport as a cooperative, recreational, leisure-oriented activity, while the competitive factor associated to sport prevails among men.<sup>47</sup>

### Limitations and future recommendations

A limitation of this research is that no observation or recording of the participants’ behaviour has been performed when measuring perceived motivational climate, and this has not been verified with the information provided by coaches.<sup>48</sup>

As the motivational climate transmitted by the coach may probably have an influence on peers’ climate, future studies could analyse the effect of the motivational climate transmitted by the coach on peer-created climate and how this climate determines players’ sport ability beliefs.

### Conclusions

The results show that the hypothesis of the study is partially fulfilled, due to the fact that no statistically significant differences were obtained in relation to the intrinsic motivation between the different profiles.

It is noteworthy that the findings revealed once again the great relevance that coach-created motivational climate may have for players’ enhanced wellness and performance and, above all, for sport practice promotion. Coaches must be able to transmit a mastery climate through specific training programmes,<sup>23,81</sup> working mostly with men and making sport practice a pleasant and positive experience focused on players’ ability beliefs, thus increasing the probability that they stay committed in the future. To do so, coaches must focus primarily on aspects relative to self-improvement and the effort made by players.<sup>82</sup> They must consider players’ mistakes as part of their learning process and provide them with an environment where cooperative learning among team mates and task selection prevail to make them feel involved in their own learning process.<sup>33,72</sup>

It is essential for the coach to create a mastery climate in order to make players believe that they can improve their sport ability through learning and effort during practice. In doing so, coaches will foster greater commitment of players. Besides, coaches must focus mostly on men, since they showed a less self-determined profile.

### Acknowledgements

We are grateful for the support received from the Royal Spanish Handball Federation (RFEBM).

### Declaration of conflicting interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

### Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.



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## References

1. Cronin LD and Allen J. Examining the relationships among the coaching climate, life skills development and well-being in sport. *Int J Sports Sci Coa* 2018; 13: 815–827.
2. Da Silva EJ, Sánchez-Oliva D, Mallett CJ, et al. Preliminary development of the Portuguese Coach Motivation Questionnaire. *Int J Sports Sci Coa* 2018; 13: 649–657.
3. Granero-Gallegos A, Gómez-López M, Baena-Extremera A, et al. The self-determination motivation in amateur handball. *Rev Iberoam Diagn Ev* 2012; 1: 47–171.
4. Granero-Gallegos A, Gómez-López M, Rodríguez-Suárez N, et al. Importance of the motivational climate in goal, enjoyment, and the causes of success in handball players. *Front Psychol* 2017; 8: 2081.
5. Nicholls AR, Morley D and Perry JL. Mentally tough athletes are more aware of unsupportive coaching behaviours: perceptions of coach behaviour, motivational climate, and mental toughness in sport. *Int J Sports Sci Coa* 2016; 11: 172–181.
6. Atkins MR, Johnson DM, Force EC, et al. Peers, parents, and coaches, oh my! The relation of the motivational climate to boys' intention to continue in sport. *Psychol Sport Exerc* 2015; 16: 170–180.
7. Kolayış H, Sarı İ and Çelik N. Parent-initiated motivational climate and self-determined motivation in youth sport: how should parents behave to keep their child in sport? *Kinesiology* 2017; 49: 217–224.
8. Leo FM, Sánchez-Miguel PA, Sánchez-Oliva D, et al. Motivational climate created by other significant actors and antisocial behaviors in youth sport. *Kinesiology* 2015; 47: 3–10.
9. Ullrich-French S and Smith AL. Social and motivational predictors of continued youth sport participation. *Psychol Sport Exerc* 2009; 10: 87–95.
10. Telama R and Yang X. Decline of physical activity from youth to Young adulthood in Finland. *Med Sci Sport Exer* 2000; 32: 1617–1622.
11. Wang CKJ and Biddle SJH. Young people's motivational profiles in physical activity: a cluster analysis. *J Sport Exercise Psy* 2001; 23: 1–22.
12. Ames C. Achievement goals, motivational climate, and motivational processes. In: Roberts GC (ed.) *Motivation in sport and exercise*. Champaign, IL: Human Kinetics, 1992, pp.161–176.
13. Nicholls JG. *The competitive ethos and democratic education*. Cambridge, MA: Harvard University Press, 1989.
14. Deci EL and Ryan RM. The “what” and “why” of goal pursuits: Human needs and the self-determination of behaviour. *Psychol Inq* 2000; 11: 227–268.
15. Ryan RM and Deci EL. Self-determination theory and the facilitation of intrinsic motivation, social development and well-being. *Am Psychol* 2000; 55: 68–78.
16. Ryan RM and Deci EL. *Self-determination theory: basic psychological needs in motivation development and wellness*. New York, NY, USA: Guilford Publishing, 2017.
17. Deci EL and Ryan RM. *Intrinsic motivation and self-determination in human behaviour*. New York, NY: Plenum, 1985.
18. Vallerand RJ, Blais MR, Brière NM, et al. Construction et validation de l'E'chelle de Motivation en E'ducation (EME). *Can J Behav Sci* 1989; 21: 323–349.
19. Deci EL. *Intrinsic motivation*. New York: Plenum, 1975.
20. Deci EL and Ryan RM. The general causality orientations scale: Self-determination in personality. *J Res Pers* 1985; 19: 109–134.
21. Pelletier LG, Vallerand RJ, Green-Demers I, et al. Leisure and mental health: relationship between leisure involvement and psychological well-being. *Can J Behav Sci* 1995; 27: 214–225.
22. Almagro BJ, Sáenz-López P and Moreno JA. Prediction of sport adherence through the influence of autonomy-supportive coaching among Spanish adolescent athletes. *J Sport Sci Med* 2010; 9: 8–14.
23. Almagro BJ, Sáenz-López P, González-Cutre D, et al. Perceived motivational climate, psychological needs and intrinsic motivation as predictors of sports commitment in adolescents. *Rev Int Cien Deporte* 2011; 25: 250–265.
24. Hein V, Mür M and Koka A. Intention to be physically active after school graduation and its relationship to three types of intrinsic motivation. *Eur Phys Educ Rev* 2004; 10: 5–19.
25. Li W and Lee A. A review of conceptions of ability and related motivational constructs in achievement motivation. *Quest* 2004; 56: 439–461.
26. Biddle SJH, Wang CKJ, Chatzisarantis NLD, et al. Motivation for physical activity in young people: entity and incremental beliefs about athletic ability. *J Sport Sci* 2003; 21: 973–989.
27. Wang CKJ and Biddle SJH. Intrinsic motivation towards sports in Singaporean students: the role of sport ability beliefs. *J Health Psychol* 2003; 8: 515–523.
28. Ommundsen Y. Students' implicit theories of ability in physical education classes: the influence of the motivational aspects of the learning environment. *Learn Environ Res* 2001; 4: 139–158.
29. Cury F, Da Fonseca D, Rufo M, et al. Perceptions of competence, implicit theory of ability, perception of motivational climate, and achievement goals: a test of the trichotomous conceptualization of endorsement of achievement motivation in the physical education setting. *Percept Motor Skill* 2002; 95: 233–244.
30. Duda JL and Hall HK. Achievement goal theory in sport: Recent extensions and future directions. In: Singer RN, Hausenblas HA and Janelle CM (eds) *Handbook of*

- research in sport psychology, 2nd ed. New York: John Wiley & Sons, Inc., 2001, pp.417–434.
31. Escartí A, Roberts GC, Cervelló EM, et al. Adolescent goal orientations and the perceptions of criteria of success used by significant others. *Int J Sport Psychol* 1999; 30: 309–324.
  32. Kavussanu M and Roberts GC. Sport Psychology moral functioning in sport: an achievement goal perspective. *J Sport Exercise Psy* 2001; 23: 37–54.
  33. Newton M, Duda JL and Yin Z. Examination of the psychometric properties of the Perceived Motivational Climate in Sport Questionnaire-2 in a sample of female athletes. *J Sport Sci* 2000; 18: 275–290.
  34. Gómez-López M, Granero-Gallegos A, Baena-Extremera A, et al. Goal orientation effects on elite handball players motivation and motivational climate. *Procedia Soc Behav Sci* 2014; 132: 434–440.
  35. Curran T, Hill AP, Hall HK, et al. Relationships between the coach-created motivational climate and athlete engagement in youth sport. *J Sport Exercise Psy* 2015; 37: 193–198.
  36. Duda JL and Balaguer I. Coach-created motivational climate. In: Jowett S and Lavallee D (eds) *Social psychology in sport*. Champaign, IL: Human Kinetics, 2007, pp.117–130.
  37. Duda JL and Whitehead J. Measurement of goal perspectives in the physical domain. In: Duda JL (ed.) *Advances in sport and exercise psychology measurement*. Morgantown, WV: Fitness Information Technology Inc., 1998, pp.21–48.
  38. Ntoumanis N and Biddle SJH. A review of motivational climate in physical activity. *J Sports Sci* 1999; 17: 643–665.
  39. Cox A and Williams L. The roles of perceived teacher support, motivational climate, and psychological need satisfaction in students' physical education motivation. *J Sport Exercise Psy* 2008; 30: 222–239.
  40. Standage M, Duda JL and Ntoumanis N. Predicting motivational regulations in physical education: the interplay between dispositional goal orientation, motivational climate and perceived competence. *J Sports Sci* 2003; 21: 631–647.
  41. Standage M, Duda JL and Ntoumanis N. A model of contextual motivation in physical education: using constructs from self-determination and achievement goal theories to predict physical activity intentions. *J Educ Psychol* 2003; 95: 97–111.
  42. Petherick CM and Weigand DA. The relationship of dispositional goal orientations and perceived motivational climates on indices of motivation in male and female swimmers. *Int J Sport Psychol* 2002; 33: 218–237.
  43. López-Walle J, Balaguer I, Castillo I, et al. Perceived motivational climate: Self-determined motivation and self-esteem in Young Mexican athletes. *Rev Psicol Deporte* 2011; 20: 209–222.
  44. Gábor G, Géza V, Miklós K, et al. Elite young team players' coping, motivation and perceived climate measures. *Phys Cult Sport Stud Res* 2009; 46: 229–242.
  45. Gómez-López M, Ruiz-Sánchez V and Granero-Gallegos A. Analysis of the prediction of motivational climate in handball players' fear of failure. *Int J Environ Res Public Health* 2019; 16: 344.
  46. Ruiz-Sánchez V, Gómez-López M, Granero-Gallegos A, et al. Relationship of motivational climate and fear of failure in high performance players in handball. *CPD* 2017; 17: 55–64.
  47. Vazou S, Ntoumanis N and Duda JL. Predicting young athletes' motivational indices as a function of their perceptions of the coach- and peer-created climate. *Psychol Sport Exerc* 2006; 7: 215–233.
  48. Møllerlökken NE, Lorås H and Pedersen AV. A comparison of players' and coaches' perceptions of the coach-created motivational climate within youth soccer teams. *Front Psychol* 2017; 8: 109.
  49. Li W, Harrison LJR and Solmon M. College students implicit theories of ability in sports: race and gender differences. *J Sport Behav* 2004; 27: 291–304.
  50. Li W, Lee AM and Solmon MA. Gender differences in beliefs about the influence of ability and effort in sport and physical activity. *Sex Roles* 2006; 54: 147–156.
  51. Wang CKJ, Chatzisarantis NLD, Spray CM, et al. Achievement goal profiles in school physical education: differences in self-determination, sport ability beliefs, and physical activity. *Brit J Educ Psychol* 2002; 72: 433–445.
  52. Wang CKJ and Biddle SJH. Intrinsic motivation towards sports in Singaporean students: the role of sport ability beliefs. *J Health Psychol* 2003; 8: 515–523.
  53. Gómez-López M, Manzano Sánchez D, Merino-Barrero JA, et al. Beliefs about ability in handball. Differences according to the gender and the specific position of the player. *Journal of Sport and Health Research*. In Press.
  54. Moreno JA, Cervelló E and González-Cutre D. Relationships among goal orientations, motivational climate and flow in adolescent athletes: differences by gender. *Span J Psychol* 2008; 11: 181–191.
  55. Fortier MS, Vallerand RJ, Brière NM, et al. Competitive and recreational sport structures and gender: a test of their relationship with sport motivation. *Int J Sport Psychol* 1995; 26: 24–39.
  56. Chantal Y, Guay F, Dobрева-Martinova T, et al. Motivation and elite performance: an exploratory investigation with Bulgarian athletes. *Int J Sport Psychol* 1996; 27: 173–182.
  57. Duda JL, Chi L, Newton M, et al. Task and ego orientation and intrinsic motivation in sport. *Int J Sport Psychol* 1995; 26: 40–63.
  58. Petherick C and Weigand D. The relationship of dispositional goal orientations and perceived motivational climates on indices of motivation in male and female swimmers. *Int J Sport Psychol* 2002; 33: 218–237.
  59. Almagro BJ, Conde C, Sáenz-López P, et al. Analysis and comparison of adolescent athletes' motivation: basketball players vs. football players. *Rev Psicol Deporte* 2009; 18: 353–356.
  60. Walling MD, Duda JL and Chi L. The Perceived Motivational Climate in Sport Questionnaire: construct and predictive validity. *J Sport Exercise Psy* 1993; 15: 172–183.
  61. Balaguer I, Mayo C, Atienza FL, et al. Factorial validity of the Perceived Motivational Climate in Sport

- Questionnaire-2 in the case of Spanish elite female handball teams (abstract). *J Sport Exercise Psy* 1997; 19: 27.
62. Moreno JA, Cervelló EM, Martínez MC, et al. Validation of the scale of implicit beliefs os skill (CNAAQ-2) to the Spanish context. Differences according to the physical-sporting practice. *Rev Int Cienc Deporte* 2013; 9: 100–113.
  63. Pelletier LG, Tuson DM, Fortier MS, et al. Toward a new measure of intrinsic motivation, extrinsic motivation and amotivation in sports: the Sport Motivation Scale. *J Sport Exercise Psy* 1995; 17: 35–53.
  64. Nuñez JL, Martín-Albo J, Navarro JG, et al. Preliminary validation of a Spanish version of the Sport Motivation Scale. *Percept Motor Skill* 2006; 102: 919–930.
  65. Balaguer I, Castillo I and Duda JL. Psychometric properties of the sports motivation scale in Spanish athletes. *Rev Mex Psicol* 2007; 24: 197–207.
  66. Moreno-Murcia JA, Moreno R and Cervelló E. They physical self-concept as a predictor of the intention to be physically active. *Psicol Salud* 2007; 17: 261–267.
  67. Fernández-Río J, Méndez-Giménez A and Cecchini Estrada JA. A cluster analysis on students' perceived motivational climate. Implications on psycho-social variables. *Span J Psychol* 2014; 17: 1–13.
  68. Cohen J. *Statistical power analysis in the social sciences*. New York, NY: Academic Press, 1977.
  69. Hair JF, Anderson RE, Tatham RL, et al. *Multivariate data analysis*. Upper Saddle River, NJ: Prentice-Hall, 1999.
  70. Castro-Sánchez M, Zurita-Ortega F, Ubago-Jiménez JL, et al. Motivational climate in youth football players. *Behav Sci* 2018; 8: 83.
  71. Castro-Sánchez M, Zurita-Ortega F, Chacón-Cuberos R, et al. Emotional intelligence, motivational climate and levels of anxiety in athletes from different categories of sports: analysis through structural equations. *Int J Environ Res Public Health* 2018; 15: 894.
  72. Balaguer I, Duda JL, Atienza FL, et al. Situational and dispositional goals as predictors of perceptions of individual and team improvement, satisfaction and coach ratings among elite female handball teams. *Psychol Sport Exerc* 2002; 3: 293–308.
  73. Torregrosa M, Viladrich C, Ramis Y, et al. Effects on the perception of motivational climate generated by coaches and colleagues about fun and commitment. Differences according to gender. *Rev Psicol Deporte* 2011; 20: 243–255.
  74. Wang JCK, Morin AJS, Liu WC, et al. Predicting physical activity intention and behaviour using achievement goal theory: a person-centred analysis. *Psychol Sport Exerc* 2016; 23: 13–20.
  75. Moreno JA, Sicilia A, González-Cutre D, et al. Implicit beliefs on ability in physical activity and sports. *Motricidad* 2006; 17: 55–68.
  76. Moreno JA, González-Cutre D, Sicilia A, et al. Motivation in the exercise setting: integrating constructs from the approach avoidance achievement goal framework and self-determination theory. *Psychol Sport Exerc* 2010; 11: 542–550.
  77. Kavussanu M and Roberts GC. Motivation in physical activity contexts: the relationship of perceived motivational climate to intrinsic motivation and self-efficacy. *J Sport Exercise Psy* 1996; 20: 264–280.
  78. Moreno JA, Cervelló E and González-Cutre D. Young athletes' motivational profiles. *J Sport Sci Med* 2007; 6: 172–179.
  79. Smith R, Cumming S and Smoll F. Development and validation of the motivational climate scale for youth sports. *J Appl Sport Psychol* 2008; 20: 116–136.
  80. Galván JF, López-Walle J, Pérez JA, et al. Motivational climate in individual sports and set in Mexican youth athletes. *RIPED* 2013; 8: 393–410.
  81. Modolo F, Gonçalves M, Romário W, et al. School handball coaches' learning contexts and situations. *Movimento* 2017; 23: 1203–1216.
  82. Guzmán JF and García-Ferriol Á. Goal orientation of coaches and training methodology: motivational implications. *Motricidad. Eur J Hum Mov* 2002; 9: 65–82.