ACHIEVEMENT GOALS AND SELF-DETERMINATION IN ADULT FOOTBALL PLAYERS – A CLUSTER ANALYSIS

Abstract

To better understand the relationship between aspects of motivation and performance level of adult football players, this study aimed to identify differences in motivation in different motivational profiles created through hierarchical cluster analysis. The participants consisted of 304 adult football players (90 professionals, 144 semi-professionals, 70 amateurs, age: 25.4 ± 4.6 y). Participants completed the Task and Ego Orientation in Sports Questionnaire and the Self-Regulation Questionnaire. Based on the constructs of the questionnaires cluster analyses were performed. Chi-square was used to determine any relationships between players and clusters. Four different clusters were identified. There was no typical motivational profile for football players from different competitive levels. However, the differences in all four clusters represented specific characteristics in football players from the different levels of competition most represented in each cluster. Cluster 1, which was the most adaptive, was not related to competition level. On the other hand, professional athletes were significantly less represented in the least adaptive motivational profile (Cluster 4). The results highlight the complex relationship between competition and sporting motivation. Identifying the motivational profile characteristics of football players who can reach higher competitive levels presents itself as a future research opportunity.

Key words: motivation, soccer, adults, sport

Introduction

Motivation plays a fundamental role in sports as it influences why and how athletes engage in the activities they choose, affecting the quality of their engagement and ultimately their performance (Chin, Khoo, & Low, 2012; Olmedilla, Ortega, Andreu, & Ortín, 2010; Shah & Gardner, 2008). Self-determination theory (Deci & Ryan, 1985) and the achievement goal theory (Nicholls, 1989) are two of the most common theoretical approaches for studying achievement motivation in sport and physical activity (Fenton, Duda, & Barrett, 2016; Zuber, Zibung, & Conzelmann, 2015).

According to achievement goal theory, there are two different goal orientations: (1) Ego Orientation – focusing on displaying one's superiority to other people with the aim of demonstrating competence in relation to their peers, and (2) Task Orientation – the person is more likely to define success or competence in terms of mastery or task improvement (Nicholls, 1989). Since these are orthogonal concepts, it is possible for individuals to be oriented to both of them (Cumming, Hall, Harwood, & Gammage, 2002; Lochbaum, Çetinkalp, Graham, Wright & Zazo, 2016; Wang, Liu, Sun, Lim, & Chatzisarantis, 2010). An extensive quantitative review in competitive sport (including football) of the Task and Ego Orientations in Sport Questionnaire (TEOSQ) and Perceptions of Success Questionnaire (POSQ) has been published by Lochbaum et al. (2016). Analyses using different moderator variables (e.g., sex, sport level, sport type and collective/individualistic countries) provided important results and different research/practical directions that allow researchers to advance the study of this specific area. However, the synthesis of the 260 studies that met the inclusion criteria highlighted that the two questionnaires did not agree across a number of tested hypotheses. Thus, a second quantitative review (Louchbaum, Zazo, Çetinkalp, Wright,

Graham & Konttinen, 2016) has been published in order to examine whether correlates of the two achievement goal orientations were moderated by the two measures.

In self-determination theory (Deci & Ryan, 1985), the reasons for motivated actions are distinguished according to where a person's perceived locus of causality is, or to what extent they are self-determined. Deci and Ryan (1985) proposed a multidimensional concept of a motivational *continuum* with three main dimensions: (1) intrinsic motivation; (2) extrinsic motivation, and; (3) amotivation. Additionally, extrinsic motivation has four different levels: external regulation, introjected regulation, identified regulation and integrated regulation. Conceptual links between the self-determination theory and the achievement goal theory have been observed in several studies (Chin et al., 2012; Ntoumanis, 2001; Zuber et al., 2015) demonstrating that task oriented individuals are more self-determined and more intrinsically motivated, whereas ego oriented individuals are less self-determined and more extrinsically motivated (Ntoumanis, 2001). Through an extensive quantitative review, Louchbaum, Zazo, et al. (2016) found a significant and small to moderate relationship in meaningfulness between the task goal orientation and amotivation (r_w=-0.13), extrinsic motivation (r_w=0.20), external regulations (r_w=0.12), internal regulations (r_w=0.34) and intrinsic motivation (r_w=0.47). On the other hand, the ego goal orientation was significantly small in meaningfulness related to amotivation (r_w=0.16), extrinsic motivation (r_w=0.28), external regulation (r_w=0.21), and intrinsic motivation (r_w=0.14).

Nevertheless, based in the orthogonality of the two achievement goals, examining task and ego goals separately may not yield the true picture, therefore it is important to analyze goal profiles where possible (Fox, Goudas, Biddle, Duda, & Armstrong, 1994). In order to approach motivation from a multidimensional perspective, investigations have used profile analysis to examine the dynamics of the

motivational constructs, such as goal orientation and self-determination (Chian & Wang, 2008; Etnier, Sidman, & Hancock, 2004; Gillet, Vallerand, & Paty, 2013; Hodge & Petlichkoff, 2000; Wang et al., 2010). Results may differ when analyzing goals separately compared to profiles of goals combinations. Previous studies in this area (i.e., Fox, et al., 1994; Hodge & Petlichkoff, 2000) have used mean or median split to create four groups: high-task/high-ego (hi/hi), high-task/low-ego (hi-T/lo-E), high-ego/low-task (hi-E/lo-T), and low-task/low-ego (lo/lo). Although these two procedures are efficient, they enforce a structure on the data that might not reflect reality. One problem related with this technique is that scores close to the median or mean are classified arbitrarily as either high or low when they might actually represent average scores on task and/or ego orientations. In recent years cluster analysis has increased in popularity as an analytical procedure to examine varying goal profiles in sport psychology as it goes beyond the crude procedures of median and mean split through the generation of subgroups that fit the data satisfactorily by maximizing between-cluster differences and minimizing within-cluster differences (Hodge & Petlichkoff, 2000)

Through cluster analysis, several authors have analysed constructs from different theories (e.g., self-determination theory and achievement goal theory) in order to identify subgroups with different motivational profiles in physical activity and sports (Almagro, Sáenz-López, & Moreno-Murcia, 2012; Etnier et al., 2004; Hodge & Petlichkoff, 2000; Wang et al., 2010). These studies have shown that cluster analysis is a valid method that can identify homogeneous motivational profiles.

Although little is known on which types of motivation positively contribute to performance, it is generally believed that motivation is conducive to performance. In this sense, it is important to adopt a person-oriented approach (e.g., using cluster analysis) rather than a variable-oriented approach (e.g., using self-determination index)

to examine how the different forms of motivation combine to generate different motivational profiles (Gillet, Vallerand, & Paty, 2013).

Despite several studies using this type of analysis, most of them have focused on school-aged children (Castillo, Balaguer, & Duda, 2000; Chian & Wang, 2008; Wang et al., 2010). Studies focusing on adult athletes (Balaguer, Castillo, & Duda, 2008; Etnier et al., 2004; Fonseca & Paula-Brito, 2000) and particularly elite adult athletes are scarce (Gillet et al., 2013; Mallet & Hanrahan, 2004), as stated in two recently published extensive reviews (Lochbaum, Çetinkalp, et al., 2016; Louchbaum, Zazo, et al. 2016).

Different authors have identified a diverse number of profiles in their samples due to the different purposes of their investigations and techniques used for establishing the profiles. In a sporting context, Hodge and Petlichkoff (2000) were not able to locate any extreme goal profiles (using a mean-split procedure) in adolescent and adult rugby players. However, the authors identified four profiles through cluster analysis. Perceived rugby ability/competence discriminated the high-ego/moderate-task and low-ego/moderate-task groups, with the former reporting greater perceived ability/competence. In a sample of youth football players, Smith, Balaguer and Duda (2006) observed four profiles that closely matched those observed by Hodge and Petlichkoff (2000). Achievement goal profile differences were found for almost all variables (task and ego involvement climate, peer acceptance, friendship ability and satisfaction), with a general trend for those reporting relatively lower task goal orientation to exhibit less adaptive responses. Almagro et al. (2012) found two profiles in Spanish adolescent athletes: i) highly motivated profile, with high scores in both forms of motivation, self-determined (intrinsic motivation and identified regulation) and non-self-determined motivation (introjected and external regulation), and; ii) a moderately motivated profile, with moderate scores (around 3 and 4) in forms of self-

123 determined and non-determined motivation. Although the authors highlighted the
124 importance of cluster-analysis to determine whether similar goal-orientation profiles can
125 be identified in specific groups (e.g., elite vs. recreational; elite vs. novice) of athletes in
126 different sports (e.g., football), there exist very few studies that have investigated top
127 level athletes, namely, top level football players.

128 In a study of adult tennis athletes, Gillet et al. (2013) investigated the situational
129 motivational profiles corresponding to high and low levels of performance in a real-life
130 setting and found the presence of three clusters (moderate-autonomous/high-controlled;
131 high-autonomous/high-controlled; high-autonomous/low-controlled). The authors
132 concluded that the least self-determined profile predicted the lowest levels of
133 performance.

134 Despite football being the most popular sport worldwide (Sarmento et al., 2014),
135 it is surprising that motivational aspects commonly related to sports performance have
136 not been studied in-depth; particularly in elite players (for a review, see Lochbaum,
137 Çetinkalp, et al., 2016; Louchbaum, Zazo, et al. 2016). Modern football provides an
138 environment where athletes may be more extrinsically motivated (due to finances) than
139 intrinsically motivated, for enjoyment or personal achievement (Horn, 2001). Naturally,
140 all athletes have high intrinsic motivation (enjoyment; passion for the game). However,
141 the professional football environment may decrease this type of motivation.

142 Cognitive evaluation theory suggests that the elite sports environment predominantly
143 focuses on winning and with large financial considerations, which leads to lower levels
144 of self-determination and, consequently, lower levels of intrinsic motivation (Mallet &
145 Hanrahan, 2004). Laboratory and field research has demonstrated that elite competitions
146 have a negative influence on intrinsic motivation. Furthermore, perceived performance
147 climate attenuates the positive relationship between a mastery climate and increased

intrinsic motivation (Buch, Nerstad, & Safvenbom, 2017). Nevertheless, in an investigation by Mallet and Hanrahan (2004), the authors identified that elite athletes view financial compensation as more related to their self-competence than as behaviour modifiers.

Elite sports, which are largely focused on winning and financial rewards associated with victories may potentially decrease self-determined types of motivation and may move the causality locus from internal to external. Nevertheless, there are some aspects of elite sports that promote self-determination, and perception of competence and bonding, which, in return, may promote an internal causality locus and self-determined types of motivation (Deci & Ryan, 1985). Mallet and Hanrahan (2004) suggest that the causality locus may move from external to internal as athletes mature; and, as a result, financial compensation and rewards lose motivational strength. The perception of competence and being accepted by others represents a more powerful motivational strength. Additionally, Gillet et al. (2013) suggested that cluster analysis with different samples of top performers (tennis players) reveals somewhat different profiles because the nature of the social context could have an impact on the development of motivational profiles characterized by high levels of controlled motivation.

To better understand the relationship between aspects of motivation and the performance level of adult footballers, the aim of this study was to identify differences in motivation using different motivational profiles established through hierarchical cluster analysis. Additionally, the relationship between achievement goals and different types of motivation proposed by the self-determination theory were analyzed.

Methods

Participants and Procedures

Data was collected from a total of 21 football teams competing in the first and second division of the Portuguese professional football league (n=6), second division B and third division of the national championships (n=9), and regional championships (n=6). The sample consisted of 304 football players ranging in age from 17 to 39 years old (M_{age} = 25.4 ± 4.6 y). Consent from the coaches and players was obtained before data collection. Protocol and procedures for this study were approved by the Research Ethics Committee of the University of the authors.

Measures

Achievement Goal Orientations

The Portuguese version (Fonseca & Biddle, 1995; Fonseca & Paula-Brito, 2000) of Task and Ego Orientation in Sport Questionnaire (TEOSQ; Duda and Nicholls (1992) was used to assess athletes´ dispositional goal orientations. The stem for the 13 items was "I feel most successful in the sport when…" and assessed ego (e.g. "... I am the only one capable of doing this", N_{items} = 6), and task orientation (e.g. "... I do my best", N_{items} = 7). The replies were rated on a Likert scale, in which each item had a response range from 1 (completely disagree) to 5 (completely agree). An adequate internal consistency was obtained for each subscale, with Cronbach alpha coefficients of .80 identified for both task and ego orientation subscales.

Perceived autonomy - Self-Regulation Questionnaire (SRQ)

To measure players perceived autonomy, the Portuguese version (Fonseca & Biddle, 1997) of the Self-regulation Questionnaire (Ryan & Connell, 1989) was used. The SRQ is composed of 17 items, grouped into five dimensions: (1) amotivation (e.g. "I do not have any reason to do sports", N_{items} = 3); (2) external regulation (e.g. "I do

sports because other people tell me I should do it", N_{items} = 4); (3) introjected regulation (e.g., "I feel guilty when I do not practice sports", N_{items} = 4); (4) identified regulation (e.g. "I valorise the benefits of practicing sports", N_{items} = 3); and (5) intrinsic regulation (e.g. "I practice sports because it is fun", N_{items} = 3). Answers were given on a five-point Likert scale, and adequate internal consistency were obtained for each subscale, with Cronbach's alpha coefficients for the different dimensions ranging between 0.70 and 0.80.

The questionnaires were given to each athlete in a quiet place, without distractions. Each participant took 15-20 minutes to complete the questionnaires and responses were kept anonymous. Participants were informed about the general purpose of the study and told that their identities would be kept strictly confidential and that all the items in the questionnaires should be answered as honestly as possible. The participants encountered no problems when completing either of the questionnaires.

Data analysis

Frequencies, means, and standard deviations were calculated to characterize the participants. Normality for the dimensions of the Portuguese versions of the TEOSQ and SRQ was tested by Kolmogorov-Smirnov's test of normality. All missing data and outliers were eliminated. Pearson's r coefficient was used to calculate the correlations between the mean values of the variables.

Variables were standardized using z-score (M = 0, SD = 1). Athletes were grouped/classified through hierarchical and non-hierarchical cluster analysis. Firstly, the nearest neighbour hierarchical cluster analysis was conducted, using the squared Euclidian distance as a measure of dissimilarity. The R-square was used as criteria for the retention of the number of clusters. From this analysis, four clusters were retained.

For validation and classification of the athletes in the four clusters retained, a k-Means non-hierarchical cluster analysis was conducted. Differences between clusters, for the dimensions of the Portuguese versions of the TEOSQ and SRQ, were tested by the one-way ANOVA test, followed by the Tukey's HSD post hoc test. Chi-square test was used to determine if the competitive level of the athletes was independent of the clusters. All analyses were performed using IBM SPSS v.23.

Results

Descriptive statistics and inter correlations

Table 1 presents the participant's characteristics as mean age (25.5 ± 4.5 y), mean years of experience as a footballer (7.7 ± 4.8 y), competitive level, playing position, and nationality.

*****Table 1 near here*****

Internal consistency and mean values for all dimensions of goal orientation and perceived autonomy are presented in Table 2. In general, the athletes reported high scores in task orientation, and in the self-determined components of motivation (intrinsic motivation and identified regulation). Task and ego orientations were weakly related, supporting the orthogonal nature of the two goals. Task orientation was significantly correlated with intrinsic motivation (r=0.4, $p<0.001$) and identified regulation (r=0.5, $p<0.001$), while ego orientation was significantly correlated (although weakly) with introjected regulation (r=0.15, $p<0.01$).

*****Table 2 near here*****

Cluster analysis

Table 3 shows the mean values, standard deviations and z-score used to create the clusters. Clusters profiles are presented in Figure 1. To determine if the profiles were classified as high or low when comparing clusters, z-scores values near ±0.5 were used. Z-scores near ±0.3 were considered moderate. Athletes from Cluster 1 (n=113) had high scores for task orientation, intrinsic motivation, identified regulation and introjected regulation, and high negative scores for amotivation. Cluster 2 (n=80) was characterized as presenting moderate scores in most of the analysed variables, shifting between positive scores (ego orientation, introjected regulation) and negative scores (task orientation, intrinsic motivation, identified regulation). External regulation and amotivation were the only high scores for this cluster. Cluster 3 (n=96) presented negative scores in all variables. This group of athletes had moderate negative scores for task orientation, intrinsic motivation, and amotivation, and high negative scores for ego orientation, identified regulation, introjected regulation, and external regulation. Athletes from Cluster 4 (n=25) obtained high scores for external regulation and amotivation while having high negative scores for task orientation, intrinsic motivation, and identified regulation, suggesting this group was the most amotivated.

To examine the characteristics of each profile an ANOVA analysis was performed (Table 3). Significant differences were found between clusters for all the analysed variables.

*****Table 3 near here*****

*****Figure 1 near here*****

Significant differences between clusters regarding competitive level were verified ($\chi 2(6)=19.130$, $p=0.004$) (Table 4). Amateurs were less represented in Cluster 2 and more represented in Cluster 3 than professional and semi-professionals. Professional athletes were more represented in Cluster 4 than amateur and semi-professional athletes.

*****Table 4 near here*****

Discussion

The aim of this study was to identify the motivational profiles of Portuguese football players from different competitive levels, based on self-determination theory (Deci & Ryan, 1985) and achievement goal theory (Nicholls, 1989). To the best of our knowledge, this is the first study to analyze these variables in professional football players.

Similar to other studies (Chian & Wang, 2008; Etnier et al., 2004; Hodge & Petlichkoff, 2000; Wang et al., 2010), our results showed that athletes seem to be more oriented to demonstrating competence about themselves than to demonstrate competence about their peers. This can be construed as a positive result, as higher task orientation levels are associated with persistence and commitment in sports (Roberts, 2001). Lochbaum, Çetinkalp, et al. (2016), found estimated mean values of 4.15 ± 0.30 and 3.04 ± 0.51 for task and ego orientations, respectively. The results from this group

of Portuguese footballers are very similar for task orientation, but they diplayed lower mean levels for ego orientation, when looking at the overall results of the reviewed studies, including POSQ and TEOQ. Nevertheless, the analyses of Lochbaum, Çetinkalp, et al. (2016), using the TEOQ reveal very similar results with those found in our study (4.09 ± 0.28; 2.92 ± 0.48, for task and ego orientations, respectively). Additionally, other similar scores can be found in this review of literature, when assessing the specific analysis performed according the sex, sport level, sport type and collective/individualistic countries (West Europe Countries in our specific case).

Task goal was significantly related with intrinsic motivation, identified regulation and amotivation. The ego goal orientation was significantly related to introjected regulation. The relationships between both task and ego goal orientations with the different components of motivation are consistent with previous results (e.g., Biddle, S., Wang, C., Kavussanu, M., & Spray, C., 2003; Lochbaum, Zazo, et al., 2016, Wang & Biddle, 2001) and suggest that task orientation is more motivationally adaptive, regardless of the level of ego orientation.

Athletes attributed higher scores to higher levels of perceived autonomy. In fact, our results demonstrated a gradual increase of the scores from the most extrinsic to the most intrinsic components of motivation (external regulation, introjected regulation, identified regulation, intrinsic motivation), except for identified regulation, which had higher scores than the intrinsic motivation. The higher levels of identified regulation observed may be related to the fact that most of the participants were professional or semi-professional athletes and were exposed to an elite sports environment. Therefore, more than being involved in football for intrinsic nature reasons (e.g. enjoyment), it is possible that these athletes were involved mostly for the importance, prestige, and value attributed to football. Similar findings were obtained in a study investigating regular

sports participation among university students (Wilson, Rodgers, Fraser, & Murray, 2004). The authors suggested that, in the context of sport, intrinsic motives and participating in the activities by itself are not sufficiently interesting or gratifying to regulate peoples' participation. The authors concluded that identified regulation, intrinsic motivation, and persistence are key predictors of motivational adaptive consequences for practicing sports.

Congruent with previous studies (Gillet et al., 2013; Hodge and Petlichkoff, 2000; Smith, Balaguer and Duda, 2006), the present study demonstrates that cluster analysis is able to identify subgroups of athletes with differentiated motivational patterns. As stated by Chian and Wang (2008), the present findings and previous research provides ample evidence that motivation is multi-dimensional and cannot simply classified as "high" versus "low" based on a single variable (e.g. Hodge & Petlichkoff, 2000). In line with previous research (e.g., Chian & Wang, 2008; Hodge & Petlichkoff, 2000), we found no extreme group profiles (hig-ego/high-task or low-ego/low-task) when cluster analysis was used.

Nevertheless, the analysis of the different motivational profiles presented some interesting results. There was no difference in the competitive level of the athletes in Cluster 1; which was characterized as containing higher task orientation levels. Considering that Cluster 1 is composed of predominately professional and semi-professional athletes this result was expected. Indeed, according to previous findings, professional and semi-professional athletes are significantly more represented in this type of cluster and also have higher ego orientation levels. Furthermore, higher task orientation levels associated with higher levels of ego orientation are the most adaptive motivational pattern for these athletes (Biddle, 1999; Cumming et al., 2002; Georgiadis, Biddle, & Auweele, 2000; Mallet & Hanrahan, 2004; Roberts, 2001). However, the

previous studies of Etnier et al. (2004) have not observed this profile. The profile from Cluster 1 can be considered as the most "motivationally adaptive profile" as it presents high scores for task orientation, is associated with moderate ego orientation scores, and demonstrates higher scores in the most self-determined types of motivation (intrinsic, identified, and introjected), as well as low scores in external motivation and amotivation, when compared to other clusters' profiles. This suggestion is supported, amongst others, by the results of Gillet et al. (2013), who found that tennis players who had profiles with higher levels of self-determination were more likely to have higher levels of performance.

The profile of Cluster 2 is the most common among high competitive level athletes, presenting higher scores for the ego orientation, and combining high scores in the more self-determined components of motivation with relatively high scores in the less self-determined components. Furthermore, amotivation scores were slightly higher in this cluster.

Cluster 1 and Cluster 2 presented the highest scores in introjected regulation. In a study using female athletes, Wilson et al. (2004) concluded that introjected regulation is an important motivational strength, as it seems to be a strong predictor of behaviours like persistence and effort in physical activity. However, although we suggested that introjected regulation or even external regulation could be related to higher levels of performance in football players, we should take into consideration that less self-determined levels of motivation potentially affect athletes' emotional component related to performance. Athletes with lower self-determined levels of motivation are less likely to have positive feelings towards competition and will generally be more anxious before and after competition (Perreault & Vallerand, 1998). Therefore, less self-determined levels of motivation are a "double-edged sword", as it relates to better performance but

has high emotional setbacks. Furthermore, emotional self-regulation resource impairment influences sport performance (Wagstaff, 2014).

Cluster 4 presents the less adaptive characteristics for motivation in physical activity and sports. Professional athletes were less represented in this cluster than semi-professional and amateur athletes. This suggests that athletes from lower competitive levels have lower levels of intrinsic motivation and identified regulation, and are more amotivated and susceptible to external types of motivation. However, when interpreting this finding, it must be taken into consideration that only 25 athletes were part of this cluster and thus characterised by this profile. Nevertheless, it is important to highlight that this group of athletes is one that is at higher risk of dropout from sporting activities (Etnier et al., 2004). Most of the athletes in Cluster 4 were semi-professional, and it is possible that the high amotivation scores are related to this. Being at a middle stage between professional and amateur sports on the one hand can give access to professionalization, but on the other hand, it is where many athletes finish their careers. Thus, athletes who expect to reach professionalization and fail, and athletes who once were professional athletes and now are at the end of their careers are possibly more externally motivated and amotivated.

The analyses of Cluster 4 cannot be dissociated from the analyses of Cluster 3, where amateurs were the most represented group and the profile was characterized by low levels of amotivation and external motivation. It is plausible that amateur athletes, who practice in harsh conditions after working hours and without financial compensations, are involved in football mostly because of intrinsic motives, such as enjoyment or pleasure for the game.

A few limitations should be noted in the current study. The variables measured were self-reported which may lead to a common method variance bias. However, as

stated by Li, Wang, Pyun, and Kee (2013) self-reported data may be the most valid measurement method in this type of study. Participants were deemed to be in the best position to report on their levels of motivation. Additionally, the data were collected in different phases of the sporting season, before or after the training sessions, and the different situational variables may have influenced the findings. Future research should also analyze relationships between achievement goals theory and Self-determination theory and other variables, such as emotions, behaviours, achievements strategies, personality traits, etc., in order to more objectively identify which clusters lead to more adaptive/maladaptive outcomes.

Conclusion

The findings from this study suggest that there is no typical motivational profile for football players from different competitive levels. However, athletes from higher competitive levels were more represented in clusters characterized by high task orientation scores associated with moderate ego orientation scores and relatively high scores in the most self-determined types of motivation. Athletes from Cluster 4 were the least motivationally adaptive and presented the greatest risk of dropout from football. Therefore, this group of athletes should be the target of specific interventions that aim to prevent dropouts.

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Tables

Table 1. Participant characteristics (n=315).

	n or M±SD	%
Age	25.4±4.5	
Football experience (years)	7.8±4.8	
Competitive level		
Amateur	70	23.0
Semi-professional	144	47.4
Professional	90	29.6
Position		
Goalkeeper	31	10.2
Defender	113	37.2
Midfielder	104	34.2
Forwards	56	18.4
Nationality		
Portuguese	267	87.8
Other from Europe	3	1.0
Brazilian	25	8.2
African	9	3.0

532 Table 2. Internal consistency and mean values for all dimensions of goal orientation and

533 perceived autonomy.

	α	M±SD	1	2	3	4	5	6	7
1. Task	0.87	4.16±0.53	1.00	-0.03	0.42***	0.51***	0.26***	-0.07	-0.26***
2. Ego	0.89	2.60±0.86		1.00	0.04	0.04	0.15**	0.08	-0.03
3. Intrinsic	0.73	4.19±0.63			1.00	0.57***	0.25***	-0.07	-0.29***
4. Identified	0.75	4.33±0.60				1.00	0.52***	0.06	-0.27***
5. Introjected	0.70	3.42±0.97					1.00	0.37***	0.02
6. External	0.75	1.81±0.66						1.00	0.45***
7. Amotivation	0.78	1.41±0.62							1.00

* $p<0.05$, ** $p<0.01$, ***$p<0.001$

534

535 Table 3. Mean values, standard deviation and z-scores of the four clusters.

	Cluster 1		Cluster 2		Cluster 3		Cluster 4		*p*
	M±SD	*z*	M±SD	*z*	M±SD	*z*	M±SD	*z*	
Task	4.56±0.40	0.76	4.07±0.41	-0.17	3.90±0.44	-0.49	3.53±0.44	-1.18	<0.001[b]
Ego	2.57±0.96	-0.04	2.82±0.82	0.26	2.46±0.75	-0.16	2.49±0.67	-0.12	0.045[c]
Intrinsic	4.65±0.46	0.74	4.00±0.45	-0.30	3.96±0.56	-0.36	3.40±0.50	-1.26	<0.001[d]
Identified	4.84±0.26	0.86	4.28±0.37	-0.08	3.90±0.55	-0.72	3.57±0.45	-1.28	<0.001[b]
Introjected	3.99±0.84	0.58	3.75±0.53	0.33	2.50±0.79	-0.94	3.03±0.57	-0.40	<0.001[e]
External	1.71±0.64	-0.14	2.30±0.48	0.74	1.29±0.38	-0.77	2.43±0.50	0.94	<0.001[f]
Amotivation	1.09±0.24	-0.53	1.81±0.62	0.64	1.14±0.28	-0.44	2.55±0.58	1.84	<0.001[g]

[a] Tested by ANOVA, followed by *post hoc* Tukey's HSD.
[b] All clusters are statistically different.
[c] Clusters 2 and 3 are statistically different from each other.
[d] Clusters 1 and 4 are statistically different from each other and statistically different from all the other clusters.
[e] Clusters 3 and 4 are statistically different from each other and statistically different from all the other clusters.
[f] Clusters 1 and 3 are statistically different from each other and statistically different from all the other clusters.
[g] Clusters 2 and 4 are statistically different from each other and statistically different from all the other clusters.
536

537 Table 4. Athletes cluster distribution accordingly to competitive levels.

	Cluster 1		Cluster 2		Cluster 3		Cluster 4		p^a
	n	%	n	%	n	%	n	%	
Competitive level									0.004
Amateur	22	31.4	10	14.3[b]	29	41.4[c]	9	12.9	
Semi-professional	58	40.3	39	27.1	33	22.9	14	9.7	
Professional	33	36.7	31	34.4	24	26.7	2	2.2[d]	
Total	113	37.2	80	26.3	86	28.3	25	8.2	

[a] Tested by chi-square.
[b] Standardized residuals = -2.0
[c] Standardized residuals = 2.1
[d] Standardized residuals = -2.0

538

Figures

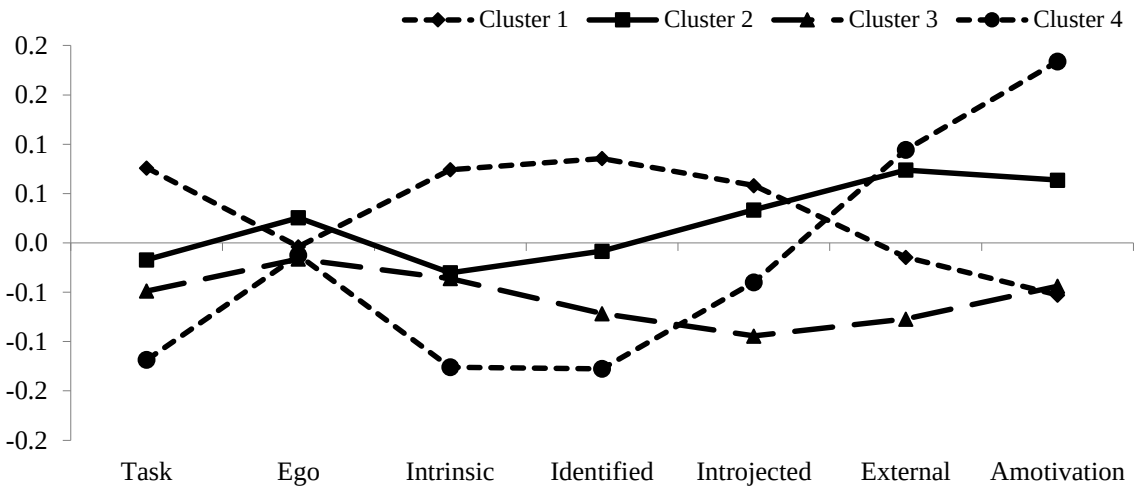

Figure 1. Clusters profiles for the four clusters solution.