

## Attitude vs. Aptitude.

### Effect of psychological responses on soccer Referees

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*The objective of this study was to analyze the effect of certain psychological variables (self-esteem, anxiety, self-confidence, and motivation) on the physical performance of soccer referees in two environments, training (TE) and competition (CE). To this end, forty-two participants (age M = 27.0; SD = 3.9; years of experience M = 10.9; SD = 5.4) completed the Competitive State Anxiety Inventory-2, the Sport Motivation Scale and Rosenberg tests, and also performed different validated physical tests for soccer referees. The results demonstrate that during CE, referees obtained higher levels of physical performance, anxiety, and self-confidence ( $p < .001$ ) and the more experienced referees show lower levels of anxiety and higher levels of self-esteem. Furthermore, self-esteem and category predict with a 44% and 33%, respectively, of the explained variance, the physical performance carry out in CE. As a general conclusion, soccer referees show higher levels of anxiety during competition, but also better physical performance. In addition, the experience and category influences of the referee the interpretation of the psychological responses carried out in pressure situations in CE.*

KEY WORDS: Anxiety, Competition. Motivation, SSelf-esteem.

## Introduction

A major concern for a researcher, trainer, or sports psychologist is how the athlete feels on the day of competition, in other words, how various factors (e.g., technical, tactical, physical, physiological, nutritional, psychological, among others) can affect his performance. Clearly, this question is not new and has been the subject of investigation for decades, and consequently many researchers have observed how psychological variables affect sports

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performance (Jones, 1995; Kais & Raudsepp, 2005; Mellalieu, Neil, & Hanton, 2006). These observations have given rise to the question of how the assessment, study, and management of these psychological variables could guarantee success for the athlete (García, Estrany, & Cruz, 2004).

One of the most studied psychological variables is anxiety. A distinction is made between cognitive anxiety (CA) and somatic anxiety (SA) (Martens, Vealey, & Burton, 1990; Endler & Kocovski, 2001; Wadey & Hanton, 2008; Cheng, Hardy, & Markland, 2009; Grossbard, Smith, Smoll, & Cumming, 2009). It has been found that each type of anxiety affects physical performance (PP) in different ways: a negative linear relationship between CA and PP and an inverted-U relationship between SA and optimal PP (Martens et al., 1990; Craft et al., 2003; Woodman & Hardy, 2003). For their part, other studies found a direct relationship between anxiety and PP (Mellalieu, Hanton, & O'Brien, 2004). In this sense, different sports lend themselves to different interpretations of the psychological responses. In the case of golf, the relation of CA to PP was negative linear, SA to PP curvilinear, and self-confidence (SC) to PP positive linear (Chamberlain & Hale, 2007). However, in tennis (Santos-Rosa, 2003), athletics (Jaenes & Caracuel, 2005), basketball and volleyball (Kais & Raudsepp, 2005), CA did not affect the PP.

On the other hand, the competitive experience of the athlete positively affects psychological capabilities, such as managing stress or anxiety in competitive situations. More experienced athletes have higher levels of concentration, thus controlling their emotions in pressure situations, such as competition, and at the same time, have higher levels of self-confidence (SC) and lower levels of SA (Hanton, Neil, Mellalieu, & Fletcher, 2008). In addition, it appears that the athlete's category or level of competition affects their sense of responsibility, with those at lower levels being more prone to emotional disturbances, e.g., stress, anxiety, low self-esteem (SE), depression (Guillén & Feltz, 2011).

The continuous and multiple stimuli in the sport of soccer provoke intense physiological and psychological activation. This environment demands heightened concentration and attention on the part of the referee in order to make quick and accurate decisions. Added to the difficulty of making a decision and the urgency of the moment is crowd pressure, which only serves to intensify the anxiety level in the moment. The ability of the referee to control his emotions in stressful situations will impact his decision making and his own performance (Weinberg & Richardson, 1990). Other investigators consider that higher levels of competition correspond with greater levels of anxiety and lower levels of PP (Taylor, 1990). In light of this situation, a

starting hypothesis would be that there exist differences in CA and SA between the training environment (TE) and competitive environment (CE), but these differences may not affect the PP.

Thus, the first objective of this study is to analyze the influence of psychological variables (SE, SA, CA, SC and motivation) on PP of the soccer referee, in TE and CE. The second objective is to analyze the influence of experience and category in the CE on the psychological variables, and also on PP.

## **Material and Method**

### **PARTICIPANTS**

The sample selected are 42 soccer referees, all males (age  $M=27.0$ ;  $SD= 3.9$ . experience  $M=10.9$ ;  $SD=5.4$ ) and members of the Andalusian Technical Committee of Referees (CTAAF). These subjects were chosen at random from the list of referees for the categories: assistant referee for second division B (C1), referee for third division (C2), assistant referee for third division (C3), referee for honor division (C4), and referee for provincial division (C5). However, these categories were classified into national (C1, C2, and C3) and non-national referees (C4 and C5).

### **INSTRUMENTS**

Firstly, an ad hoc test was administered to collect socio-demographic data, e.g., age, years of experience, injuries, category, and years in the category. Experience was classified in two groups (García, Cepero, & Rojas, 2010): experienced with 10 or more years, and not experienced with less than 10 years.

The Competitive State Anxiety Inventory-2 (CSAI-2; Martens et al., 1990) measures the level of CA, SA, and SC in both the training and competitive environments. It is comprised of three 9-item subscales. Each of the 27 items is rated on a 4-point Likert format ranging from (1) not at all to (4) very much so, yielding subscale scores that range from 9 to 36. These values were adapted to the percent in order to obtain relative values in order to avoid approximation errors when working with larger values, as well as offering a clearer reading. Alpha coefficients for each subscale were calculated, obtaining high values in all of them (.79 to .90).

The Sports Motivation Scale Questionnaire (SMS; Pelletier et al., 1995), validated for Spanish athletes by Balaguer, Castillo, & Duda, (2007), measures motivation using three subscales: intrinsic motivation (IM), extrinsic motivation (EM), and no motivation (NM). It is composed of 28 items, with responses given according to a Likert scale of 1-7 (1 and 2 not at all; 3, 4 and 5 this describes me a little; 6 and 7, I identify with this description, it fits me). Alpha coefficients were medium-high in IM, EM and NM from .68 to .87 (Balaguer, Castillo, & Duda, 2007).

The Rosenberg test, designed to measure the SE level (Rosenberg, 1965; Atienza, Balaguer, & Moreno, 2000), is composed of 10 items (5 positives and 5 negatives). The subject chooses from four possible answers ranging from total agreement (4 points) to total disagree-

ment (1 point). The alpha coefficient obtained for the indicators of this factor is 0.84, so this which suggests a very good internal consistency.

The time spent in the sprints (6x40m test) was measured with 6 photoelectric cells connected to a telemetry power system using a stopwatch with a precision up to the millisecond (Byomedic®, Spain) and Global Positioning System (GPS) particularly, SPI10 devices (GPSports, Australia), and the Team AMS 1.2 software, were used for 2000m test.

## PROCEDURE

In order to carry out this study, permission was granted and obtained from CTAAF to collect data from the participating referees. The questionnaires were administered respecting the protocols established by the Helsinki Declaration (2013) for human research. Furthermore, this study was approved by the Ethics Committee of Granada (471/CEIH/2018). These questionnaires were conducted moments before the training session or competition. In TE, this test was administered at least 48 hours before and after an official competition (Castillo-Rodríguez, Madinabeitia-Cabrera, Castillo-Díaz, Cárdenas, & Alarcón-López, 2018). In the second case, the physical tests conducted demonstrate capabilities necessary for promotion to the next referee category. The training sessions and administration of the corresponding questionnaires took place in November 2017. Ten days later, the subjects completed the other questionnaires, moments before the competition.

The physical tests conducted followed a set order: 6x40m, 2000m and the field test (Figure 1). The CTAAF has established weightings for each of the tests based on scores the referee achieved in these tests (maximum of 20 points). In this way, the Committee strives to assure that the referees are well prepared for situations occurring on the playing field.

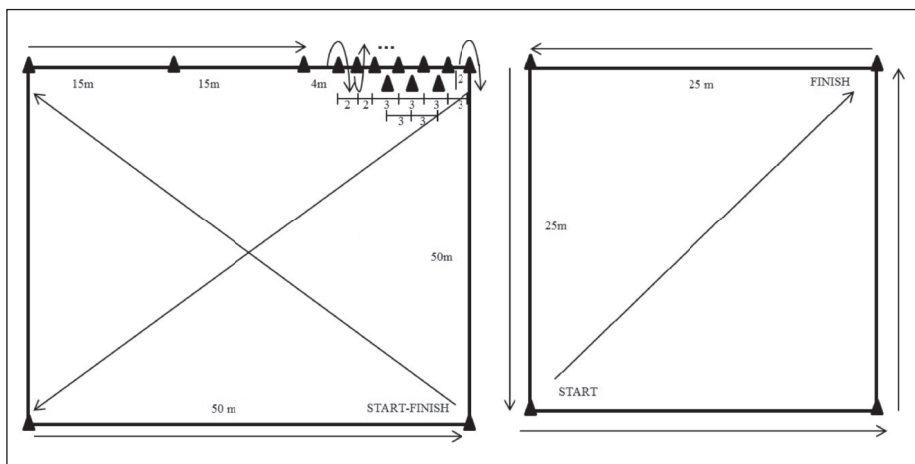


Fig. 1. - Referee Field test (on the left) and Assistant Referee Field test (on the right).

The 6x40m test is for speed. The referee runs 40 meters, 6 times, at his maximum pace with a 1 minute recovery period between each run. The test is done at a running track and measured using the photocells. After a 10 minute pause, the referee runs 2000m, measured using a GPS devices. The weightings established by the Committee for both tests are shown in Table I.

Lastly, the referee performs the field test, a simulation of a competition situation. Photocells are used for measurement and the test is different for referees and referee assistants. Both the field tests of the referees and the assistants were conducted on a natural grass soccer field, in good condition and freshly watered for subsequent practice.

The field test for referees takes place within a 50m x 50m square, and consists of different movements (starting from lower left cone). The first is a 70m linear sprint (arriving at upper left cone). Then, a turn and 30m sprint changing orientation at 15m. Next, a 20m of slalom, zigzagging through cones placed with a 2m to 4m separation (arriving at upper right cone). Next, another 70m sprint forward but in the opposite direction from the first sprint (arriving at lower left cone). Finally, the test ends with a 50m backward run to arrive at the starting point.

The test for the assistant referees is executed in a 25x25m square (starting from lower left cone). First the referees run a 25m linear sprint (arriving at lower right cone). Next, they moved laterally facing one direction (arriving at upper right cone), then faces the other direction and moves laterally again (arriving at upper left cone). After that he runs backwards to arrive at the starting cone, from where he makes a linear sprint of 35m (arriving at upper right cone). The weightings established by the CTAAF are given in Table 1.

## STATISTICAL ANALYSIS

The criteria used to form groups were double. First, the referee category, which produced two groups (national and non-national): Second Division B assistant referee, Third Division referee, and Third Division assistant referee, as national referees; and Honor Division

TABLE I  
6x40m, 2000m Test Scores, and Field Test Scores Established By CTAAF

6x40m		2000m		Field test Referee		Field test Assistant Referee	
Time (in seconds)	Score	Time (in minutes)	Score	Time (in seconds)	Score	Time (in seconds)	Score
5:80-5:60	1	7:30-7:25	1	54:00-53:01	1	28:00-27:50	1
5:59-5:50	1.5	7:24-7:20	1.5	53:00-52:50	1.5	27:49-27:00	2
5:49-5:40	2	7:19-7:15	2	52:49-52:00	2	26:99-26:50	3
5:39-5:35	2.5	7:14-7:10	2.5	51:99-51:50	2.5	26,49-26,00	4
5:34-5:30	3	7:09-7:05	3	51:49-51:00	3	25:99-25:50	5
5:29-5:25	3.5	7:04-7:00	3.5	50:99-50:50	3.5	25:49-25:00	6
5:24-5:20	4	6:59-6:55	4	50:49-50:00	4	< 25	7
5:19-5:15	5	6:54-6:50	5	49:99-49:50	5		
5:14-5:10	6	< 6:50	6	49:49-49:00	6		
< 5:10	7			< 49	7		

referee, and Provincial referee as non-national referees. Second, years of experience as a referee (less than 10 years and 10 years or more) which produced two groups: experienced and not experienced.

First, a normality test was performed and it was found that CA and NM in the TE and also CA and IM in the CE did not have a normal distribution. Statistical analysis was carried out using descriptive statistics and contrast of comparison of means, with the *t*-test and Wilcoxon test for related samples, and the *t*-test and Mann-Whitney U test for independent samples (experience levels and categories). Furthermore, the Pearson (*r*) and Spearman (*r<sub>bo</sub>*) correlation coefficients were calculated to measure the relationship between different variables, and a linear regression analysis (stepwise) was used to find the independent variables (psychological states) which influence PP. The threshold values for size of effect were: fort-test, small, .20; moderate, .50; large, .80. Level of significance was established at  $p < .05$  and all analysis was realized using SPSS version 22 for Windows.

## Results

Table II shows the results of psychological variables and PP in TE and CE ( $M \pm SD$ ). The referees show differences statistically significant for the results obtained in the two environments (TE and CE), in CA, SA, SC, and PP ( $p < .001$ ). No significant differences were found in SE ( $p = .267$ ), IM ( $p = .095$ ), EM ( $p = .695$ ), and NM ( $p = .367$ ). The PP scores of the referees increased from 10.14 points in TE to 13.02 points in CE (average difference = 2.88), and in a situation with very high levels of CA (76.0).

The average scores of the psychological variables based on the referee category as a function of competitive experience has been showed in Table III. The results show that referees with 10 or more years of experience have excellent psychological capacities in CE, characterized by high average levels

TABLE II  
Paired T-Test For Psychological Responses And PP

	TE (N = 42)	CE (N = 42)	<i>p</i>	<i>d</i>
SE	33.14±1.08	33.43±1.83	.267	.25
CA	26.89±16.6	76.02±26.7	<.001	.98
SA	21.01±13.5	58.35±22.9	<.001	.93
SC	60.88±15.7	73.83±17.3	<.001	.89
IM	5.81±.69	5.89±.66	.095	.36
EM	5.74±.64	5.72±.69	.695	.09
NM	3.14±1.06	3.07±1.19	.367	.20
PP	10.14±2.95	13.02±3.65	<.001	.91

TE: Training environment; CE: competitive environment; SE: Self-esteem; CA: Cognitive Anxiety; SA: Somatic Anxiety; SC: Self-confidence; IM: Intrinsic Motivation; EM: Extrinsic Motivation; NM: Non-motivation; PP: Physical Performance.

TABLE III  
T-Test Of Psychological Responses According To The Experience Level

	High-experience (N = 20)	Low-experience (N = 22)	p	d
SE	33.60±1.43	33.08±2.19	.530	.14
CA	59.20±6.76	90.03±4.55	<.001	.94
SA	36.97±10.9	76.16±11.8	<.001	.87
SC	57.35±10.4	87.57±5.54	<.001	.89
IM	5.85±.70	5.94±.66	.762	.07
EM	5.07±.31	6.26±.37	<.001	.88
NM	4.08±.83	2.23±.68	<.001	.79

SE: Self-esteem; CA: Cognitive Anxiety; SA: Somatic Anxiety; SC: Self-confidence; IM: Intrinsic Motivation; EM: Extrinsic Motivation; NM: Non-motivation.

of SE (33.6) and control of CA (59.3) and SA (37.0). In this division, statistically significant differences in CA, SA, SC, EM, and NM ( $p < .001$ ) were noted.

In addition, figure 2 shows the values of the psychological variables and PP found in CE with the sample divided as a function of referee category. This category has been classified in national and non-national referees. It can be seen that the national referees (the largest category of this study) achieved

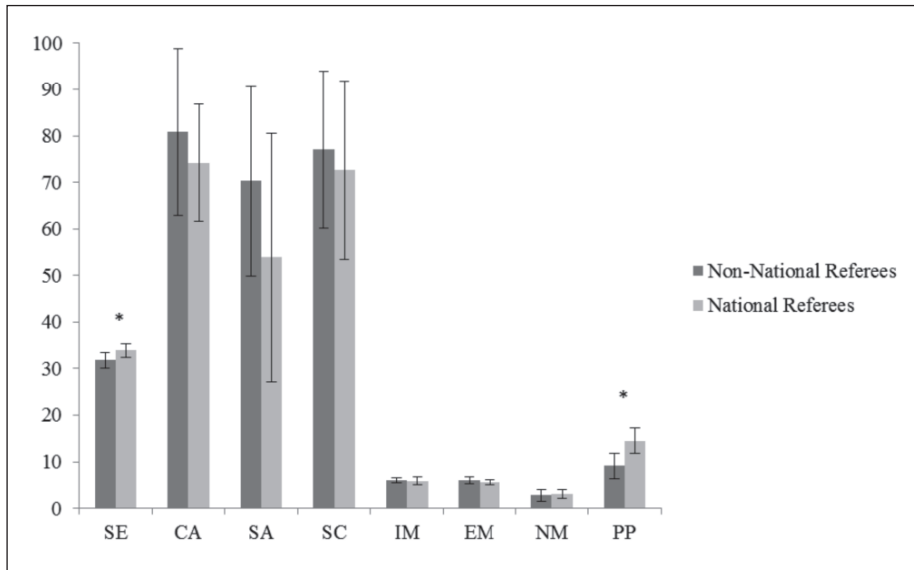


Fig. 2. T-test of psychological responses and PP according to the category.

higher average values on PP and SE in CE than in non-national referee category ( $d = 1.26$  and  $1.97$ , respectively;  $p < .05$ ). On the other hand, the non-national referees attained higher scores in CA and SA whereas the national referees ( $d = .40$  and  $.72$ , respectively;  $p > .05$ ).

SE: Self-esteem; CA: Cognitive Anxiety; SA: Somatic Anxiety; SC: Self-confidence; IM: Intrinsic Motivation; EM: Extrinsic Motivation; NM: Non-motivation; PP: Physical Performance.

Lastly, positive correlations were found between PP and SE ( $r = .67$ ;  $p < .01$ ), and category ( $r = -.57$ ;  $p < .01$ ), as well as negative correlation were found between age and experience with CA ( $r_{bo} = -.77$  and  $-.84$ ;  $p < .01$ ; respectively), and SA ( $r = -.63$  and  $-.67$ ;  $p < .01$ ; respectively). In addition, SA correlates negatively with PP in CE ( $r = -.42$ ;  $p = .05$ ). For this reason, we have calculated linear regression (stepwise) resulting that PP is explained by the SE ( $R^2 = .44$ ;  $SEE = 2.79$ ;  $p = .001$ ) and category factors ( $R^2 = .33$ ;  $SEE = 3.06$ ;  $p = .005$ ).

## Discussion

In regard to the first objective of this studio, which was to analyze the influence of psychological variables on the PP of the soccer referee, in two different environments, TE and CE, the working hypothesis proposed was the existence of varied psychological responses due to the impact caused by competition (Cottyn, De Clercq, Pannier, Crombez, & Lenoir, 2006). For example, the study of Mellalieu, Hanton, & O'Brien (2004) demonstrated higher levels of anxiety, specifically CA (76 points), associated with higher levels of PP in the CE than in the TE. In contrast, the results of our study show a significant inverse correlation between SA and PP in the CE, more in agreement with other studies of different athletes in the CE (Martens, 1990; Craft et al., 2003; Woodman & Hardy, 2003). Then again, other studies indicate no link between these psychological responses and PP (Santos-Rosa, 2003; Jaenes & Caracuel, 2005; Kais & Raudsepp, 2005), as was found in the present study in regard to CA. A possible explanation of these findings may be that the higher levels of SE, motivation and SC of the soccer referees analyzed may have mitigated the relationship between CA and PP.

We found a high positive correlation between PP and SE, and negative correlations between both age and experience with CA and SA ( $p < .001$ ). These associations between the different psychological responses, e.g., SE, CA, SA with PP, age and experience were confirmed by studies of Jones (1995), Kais & Raudsepp (2005), Mellalieu, Neil, & Hanton (2006), with the



exception that no relationship was found between SC and PP, as was found in the study done by Chamberlain & Hale (2007).

Our second objective was to analyze the influence of experience and referee category on psychological responses and on PP in the CE. It was expected that the more experienced referees would have better psychological responses, given the study of Rosnet (2000). It was observed that, indeed, these more experienced referees had better responses to CA and SA, as occurred in the study of Hanton, Neil, Mellalieu, & Fletcher (2008), while the less experienced referees (less than ten years of experience) showed better responses in EM, NM and SC, which, as far as SC is concerned, differs from the study of Hanton, Neil, Mellalieu, & Fletcher (2008), who found higher SC in more experienced athletes.

Similarly, the category or level of the athlete should be related to the psychological responses and PP in CE, as indicated in the study of Rosnet (2000). We found that referees in the higher categories have better PP, but no differences were found in psychological responses in reference to category, except SE, like the findings of Guillén & Feltz (2011), who showed that athletes of lower categories have lower SE. In addition, Dunning (1992) confirms a direct relation between motivation (IM and EM) and the category of athlete, and Mohr, Krustup, & Bangsbo (2003) sustain that athletes of higher category or level have higher PP, as was found in our study ( $r = -.57$ ;  $p < .01$ ).

From a psychological point of view, these findings can serve as a basis of important information for professionals in the sport of soccer. They suggest the inclusion of intervention programs in the TE to develop and improve the psychological capacities studied, which capacities can affect PP in the CE. This could be achieved by incorporating at least one psychologist in the training staff employed by the CAATF. According to Loghmani, Taylor, & Ramzanejad (2018), implementing programs to improve the psychological capacities of the referees could increase the rate of correct decisions (Medina, 2017), even though the rate is already high, between 90 and 95%.

As a major constraint of this study, it is important to note that, although soccer is the most practiced and followed sport at a worldwide level (Wong & Hong, 2005), it is not the same for refereeing. At the national level, and in particular, in lower categories, the referees are scarcely acknowledged by the players and the followers of this sport. This results in a high level of ignorance, and consequently, limits the development of the referees at this level. The data obtained suggest the inclusion of psychological intervention programs, which could be considered for future research, but it is understood that it may be difficult to implement such programs due to the lack of economic resources, among other problems.

## Conclusions

The main findings of this study indicated that referees showed a significant increase in the activation of psychological responses such as CA and SA, but also PP in the CE was improved. In addition, PP is predicted by the 44% and 33% of the explained variance for SE and category variables. These data confirm that psychological responses and physical characteristics could affect the PP of the competition in professional referees, although this affirmation should be in caution.

As a practical application, at present, the different territorial and national committees are working on the anxiety of the referee, carrying out different programs on the control of stress and anxiety in demanding situations, as well as relaxation techniques, which affect the development and optimization of self-confidence and, therefore, the increase of motivation. This study has offered real information in two different contexts and allows knowing the current situation in these professionals.

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