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ORIGINAL

THE RELATIONSHIP BETWEEN ANXIETY STATE, SELF-CONFIDENCE AND PERFORMANCE IN BASKETBALL

RELACIÓN ENTRE ANSIEDAD ESTADO, AUTOCONFIANZA PERCIBIDA Y RENDIMIENTO EN BALONCESTO

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ABSTRACT

The main purpose of this study was to analyse the correlation between the intensity and direction of anxiety and self-confidence and competitive performance in two basketball teams of different gender and competitive level (G1: 1st National Women's, G2: Provincial Men's). We administered the Competitive State Anxiety Inventory 2 (CSAI-2) with a directionality scale 30 minutes prior to every match of the season, and analysed the results of each of these, which gave us an individual performance index (IP) of each player. The results revealed the existence of an inverted U shaped curvilinear relationship between somatic anxiety intensity and IP in G1 (11,4%), and a negative linear

relationship between cognitive anxiety intensity and IP in G2 (21,1%). No correlation was found between directional perceptions of anxiety and self-confidence and IP in either of the two groups.

KEY WORDS: anxiety, self-confidence, directional / directional perception, performance, basketball.

RESUMEN

El objetivo fue analizar la asociación entre intensidad y direccionalidad de la ansiedad y autoconfianza y el rendimiento competitivo en dos equipos de baloncesto de diferente sexo y nivel competitivo (G1: 1ª Nacional femenina; G2: Provincial masculino). Se administró el "Competitive State Anxiety Inventory 2" (CSAI-2) junto con una escala de direccionalidad 30 minutos antes de diferentes partidos de la temporada y se analizaron las grabaciones de los mismos, obteniéndose un índice de rendimiento individual (IR) de cada jugador. Los resultados revelaron la existencia de una relación en forma de "U" entre la intensidad de la ansiedad somática y el IR en el G1 (11,4%), y una relación lineal negativa entre la intensidad de la ansiedad cognitiva y el IR en el G2 (21,1%). No se ha encontrado relación alguna entre las percepciones direccionales de ansiedad y autoconfianza y el IR en ninguno de los dos grupos.

PALABRAS CLAVE: ansiedad, autoconfianza, direccionalidad/percepción direccional, rendimiento, baloncesto.

INTRODUCTION

Awareness of emotions, feelings, mood states, moods, etc, of sports people, as well as their own level of awareness as to their ability to successfully confront competitive challenges, helps them to improve their results in competition (Cogan and Petrie, 1995; Cheung & Lo, 1996; Mace & Carroll, 1989). To this end, numerous studies have been conducted into the effect of emotions on competitive performance, with anxiety a significant presence among these feelings. (Chamberlain & Hale, 2007; Jones, Hanton, & Swain, 1994; Kais & Raudsepp, 2004).

Competitive anxiety in sport is defined as an immediate emotional state characterised by feelings of apprehension and tension associated to the body's reactions in competitive situations (Martens, 1977).

Since the Multi-dimensional Anxiety Theory (MAT) (Burton, 1988; Martens, Vealey, & Burton, 1990), this variable has been considered a multi-dimensional construct in which both cognitive and somatic aspects, which have different influences on sporting performance, must be stressed (Burton, 1988; Krane, Joyce, and Rafeld, 1994; Martens, et al., 1990): and it specifically predicts a defined negative linear relationship between a cognitive anxiety state and performance, and less so, an inverted U relationship between somatic anxiety and performance.

A third variable suggested by the MAT and considered an influential factor in sporting performance is self-confidence, which in sports circles is defined as the belief or degree of certainty which individuals possess in their ability to succeed (Vealey, 1986). Several authors affirm that self belief in sportspeople has a positive effect on actual performance (Bejek & Hagtvvet, 1996; Jones, Swain, & Hardy, 1993) and is considered a greater predictor of task achievement than the actual degree of reaction or anxiety (Craft, et al. (2003); Woodman & Hardy (2003); Bandura, 1977; Weiss, Wiese, & Klint, 1989).

Studies carried out on golfers (Chamberlain & Hale, 2007) and swimmers (Burton, 1988) showed, in consonance with the MAT, that the level of cognitive anxiety seems to have a negative linear relationship, somatic anxiety a inverted-U relationship, and self-confidence a positive effect on performance. Other papers, however, do not totally concur with this, finding a moderate and positive relationship between cognitive anxiety and performance in basketball and volleyball players, and finding no relationship at all between somatic anxiety and self-confidence (Raudsepp & Kais, 2002; Kais & Raudsepp, 2004). Likewise, in a study carried out on university level basketball players, a positive linear relationship between somatic anxiety and performance, with both cognitive anxiety and self-confidence a curvilinear relationship (inverted-U) with performance (Swain & Jones, 1996) were found.

After a revision of the anxiety tests, the concept of “directionality” or “directional perception” of anxiety was introduced (Jones, 1991; Jones & Swain, 1992), which describes the interpretation each sportsperson makes of the symptoms of his experiences, and the consideration of these symptoms as helpful or hindering agents in his competitive performance. Several studies maintain that that interpretation and perception of the symptoms gives us a greater understanding of the response of pre-competitive anxiety state, than if only intensity were considered (Chamberlain & Hale, 2007; Grobbelaar & Coetzee, 2006; Hanton, Mellalieu, & Hall, 2004; Jones & Hanton, 2001; Jones & Swain, 1992; Jones, et al., 1993; and; Raudsepp & Kais, 2002). However, Lundqvist, Kenttä, & Raglin (2011) question the use of the directionality of anxiety as independent from intensity, which could have led to erroneous conclusions. Also, the stability of the symptoms of anxiety and directional perception seem to be affected by the distance from the moment of competition, in that the closer the moment of competition, the greater the level of anxiety and the lesser the positive directional perceptions (Thomas, Maynard and Hanton, 2004).

Studies carried out on badminton players (Eubank, Smith, & Smethurst, 1995) and gymnasts (Jones, et al., 1993) estimated that maintaining low anxiety levels with a positive directional perception could be the most appropriate response towards an optimal performance in competition. In collective sports, Raudsepp & Kais (2002) found that in beach volleyball, directionality, and not the intensity of cognitive and somatic anxiety, had a positive relationship with performance and sporting level. Along the same lines, in field hockey, Butt, Weinberg, & Horn (2003) highlighted the role of directionality of cognitive anxiety and of self-confidence as powerful predictors of performance in both halves of the match. Finally, with regard to the sport in question here, basketball, Swain & Jones (1996) found a positive linear relationship between the directional perception of the symptoms of anxiety, both somatic and cognitive, and performance, said variables explained by a percentage of shared variance greater than their respective levels of intensity. These findings underline the importance of interpreting the symptoms experienced by sportspeople when the moment comes to explain their actual performance.

One important aspect to consider when examining the relationship between anxiety and self-confidence and sporting performance, is how to evaluate the latter. In individual sports, performance is usually measured very precisely, since in most cases it coincides with the score obtained in terms of time, distance or points. In team sports, however, the performance of each player is usually measured in a more superficial and imprecise way, which does not accurately reflect the true performance of the individual within the collective (Kais & Raudsepp, 2004).

In basketball, despite the fact that a system has been developed which gives one combined performance measurement of some of the most important actions of the match: “*composite of overall playing performance*” or “*PERF*” (Sonstroem & Bernardo, 1982), there are studies which use subjective ways of measuring performance, based on players’ own self-evaluation (“I played much

better/worse than I normally do”) (Edwards & Hardy, 1996), or on evaluations made by the first and second coach (Kais & Raudsepp, 2004), giving greater importance to these due to the “expert status” of the figure of the coach.

Despite the fact that the PERF is a step forward in the study of the relationship between anxiety and sports performance, in the face of the subjective systems of evaluation mentioned above, and of those based purely on statistics of just one specific action (for example, the total number of points scored), we feel it necessary to develop systems of performance evaluation which take into account the player’s actual playing time, since this is of vital importance to be able to evaluate his true performance or efficacy as an individual.

The above consideration, along with the diverse results obtained from studies analysing the correlation between anxiety state and performance, suggests the need to develop new studies which would give the MAT greater empirical support to enable it to effect more precise and consistent predictions.

The aim of the current study is to analyse the relationship established between the level of intensity and directionality of anxiety and perceived self-confidence and competitive performance in basketball, when the latter is expressed as Individual Performance Index (IP), which measures the most decisive actions or indicators of this sport, as well as the real participation time of each player, in the hope that this will lead to a more valid analysis of these correlations.

We also aim to evaluate the differences in the relationships established when performance is measured in two different ways (IP and total points scored), with the objective of evaluating if the scores obtained through IP reflect a greater percentage of the variance of the performance than when the total points scored is used.

MATERIAL AND METHODOLOGY

Taking into account aspects such as the application of variables, the nature of the data, chronology, objective and focus, temporalization and number of subjects, the design selected for this study was non experimental, quantitative, descriptive, explanatory, longitudinal and intragroup focused. In order to achieve our aims and to clarify our objectives, we selected 18 subjects who belong to two basketball teams of different sex, age and competitive level (Table 1).

The explanatory variables used in the study were intensity of cognitive anxiety (CA), somatic anxiety (SA), self-confidence (SC), and their respective directional perceptions (dCA, dSA and dSC, respectively). For their part, the criteria variables refer to the player’s competitive performance via the Individual Performance Index (IP) and through Total Points Scored.

The scores for anxiety, perceived self-confidence and sports performance were taken during the 2010-2011 season: for G1, a total of 6 matches were recorded;

four from the regular league and two from the play-offs for promotion to Feminine League 2. In group 2, the scores were taken from a total of four matches from the regular league.

Table 1. Average (A), Typical Deviation (TD) and variation coefficient (VC) of the most representative data from the sample.

	G1 (female; n=9) 1st National Women's			G2 (male; n=9) Provincial Children's A		
	A	TD	VC(%)	A	TD	VC(%)
Age (years)	22	2,45	11,14	13	0	0
Experience at current competitive level (years)	3,22	0,67	20,81	1,89	0,33	17,46
Total competitive experience (years)	7,44	0,73	9,81	3,89	0,33	8,48

All the players completed the Competitive State Anxiety Inventory 2, CSAI-2 (Martens, et al., 1990), as well as a directionality scale (Jones & Swain, 1992) 30 minutes before each match and in the presence of the researcher. The matches were filmed and later analysed to obtain the Individual Performance Index for the players in each match.

The Competitive State Anxiety Inventory 2, CSAI-2 (Martens, et al., 1990) along with a directionality scale (Jones & Swain, 1992)

This consists of 27 items, 9 corresponding to each subscale: cognitive anxiety, somatic anxiety and perceived self-confidence. The responses to the items were reflected on a Likert type scale with a response range from 1 to 4, (1 “nothing”, 2 “something”, 3 “moderately” and 4 “a lot”). Therefore, the possible scores for intensity for each subscale go from 9 to 36.

The participants also completed a directionality scale for each subscale of the CSAI-2, where they indicated to what degree they felt that the symptoms experienced helped or hindered their performance on a scale of -3 (“very hindering”) to +3 (“very helpful”), so the possible scores for directionality in each subscale go from -27 to +27.

Observation instrument of Techniques and Individual Efficacy in Basketball

This is a of template of systematic observation which records the indicators considered relevant for assessing a basketball player's individual performance, giving a single, global and objective result, which can present positive scores, with 0 the lowest score. This figure is the result of the sum of the other partial

measurements of the player's performance in each of the four quarters of the match: Individual Performance Index of the quarter (IPQ). Therefore, IP is obtained through the following sum:

$$IP = IPQ1+IPQ2+IPQ3+IPQ4$$

The Individual Performance Index (IPQ) for the quarter is calculated with the following formula:

$$IPQ = (\sum \text{actions } Q \times COEF_Q \times CoeDQ \times \% \text{ Accuracy_}Q) / TQ$$

Where \sum actions Q = the sum of the results of the actions or performance indicators during the quarter; COEF_Q = the coefficient which assesses the importance of each quarter; CoeDQ= the coefficient resulting from the points difference between each team at the end of the quarter; % Accuracy_Q = the percentage of accurate moves of the quarter; and TQ = the actual playing time of the player in the quarter (minutes).

The performance indicators used were the following: Free Throw (T+/T-), Field throw 2 points (T2+/T2-), Field throw 3 points (T3+/T3-), Cover (T+/T-), Assist (A), Recovery (R), Offensive Rebound (OR), Defensive Rebound (DR), Rebound Block (RB) and Loss (L). Accurate or positive actions were given a score of 1, with the exception of 2 or 3 point throws which were given 2 or 3, respectively. Failed or negative actions were given 0.

The quarter coefficient (COEF_Q) is a qualitative factor which allows us the possibility of giving greater or lesser importance to an action depending on the quarter in which it happens. Scoring three consecutive baskets when the scores are equal can have very different consequences in Q1 and Q4, and so the importance of these actions can differ, and with this the evaluation of the performance of the player who scores. The instrument allows us to assess the importance of actions from a technical-tactical standpoint, with regard to the quarter in which they happen, but in this study it was decided to give each quarter equal importance, multiplying the coefficient of each of them by the same value:1.

The coefficient of the difference in points of the quarter (CoeDQ) is a qualitative factor which allows us to assign the same action more or fewer points on the IP. The importance of scoring a basket and getting 1,2 or 3 points diminishes the greater the points difference between the teams, since generally the player who scores the points is under less pressure. Therefore, this coefficient is calculated according to the difference in points between the two teams in each quarter (DIF_PQ):the lower the points difference, the greater the coefficient (and the actions have greater influence on the IP) and viceversa.

To evaluate the accuracy and validity of the CSAI-2, we studied the internal consistency of the results (Cronbach Alpha), each time we used the questionnaire (Table2). We studied the existing correlation between each

explanatory variable and each criteria variable via the Pearson coefficient correlation for variables whose scores reflected a normal pattern, and Spearman correlation in those results which presented a distribution which was not normal. All with statistical significance level of $\alpha=0,05$

RESULTS

Table 2 shows the high internal consistency on the different subscales evaluated at each moment when the questionnaire was self-administered.

Table 2. Analysis of the internal consistency of intensity on each subscale of the CSAI-2 in each of the competitions.

Competitions (C)	n=18 (G1)				n=9 (G2)	
	1	2	3	4	5	6
CA	0,696	0,730	0,639	0,857	0,909	0,939
SA	0,448	0,581	0,744	0,843	0,815	0,757
SC	0,880	0,860	0,885	0,930	0,909	0,905

Below are the results obtained between intensity and directionality of the anxiety state and perceived self-confidence and the sports performance measured via the Individual Performance Index (IP).

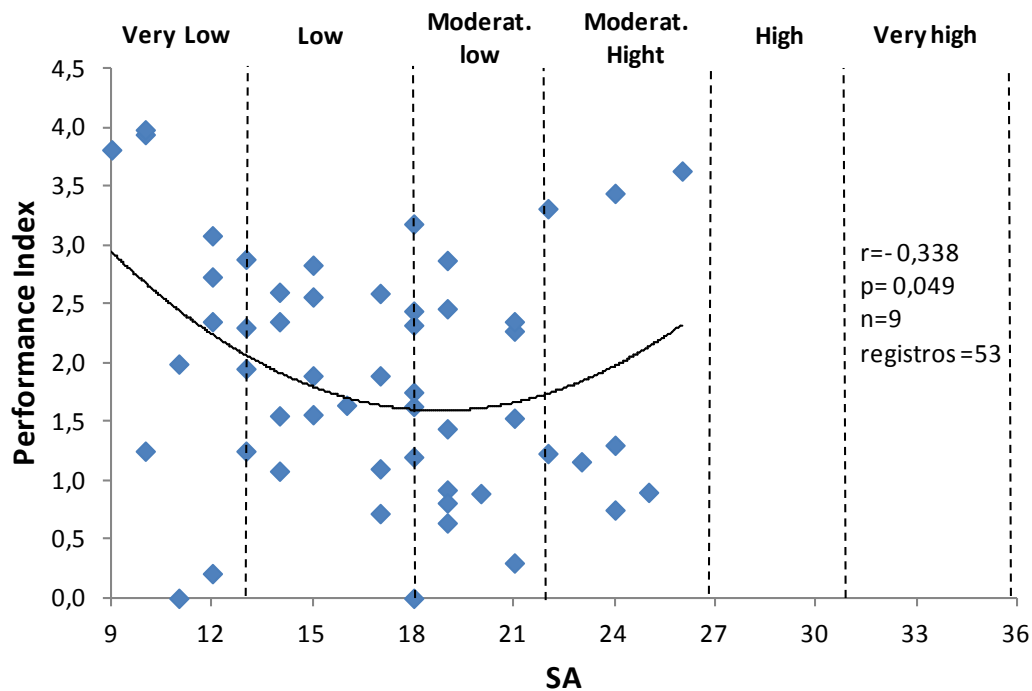


Figure 1. Correlation between SA and IP in G1.

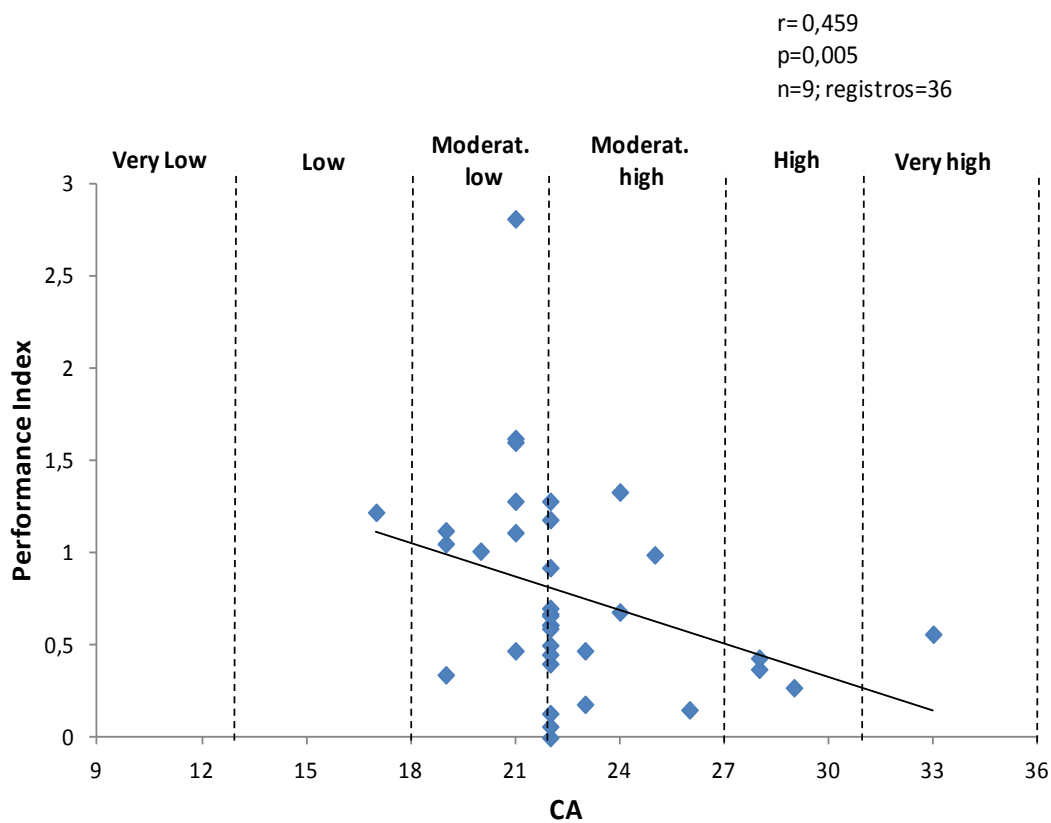


Figure 2. Correlation between Intensity of CA and IP in G2.

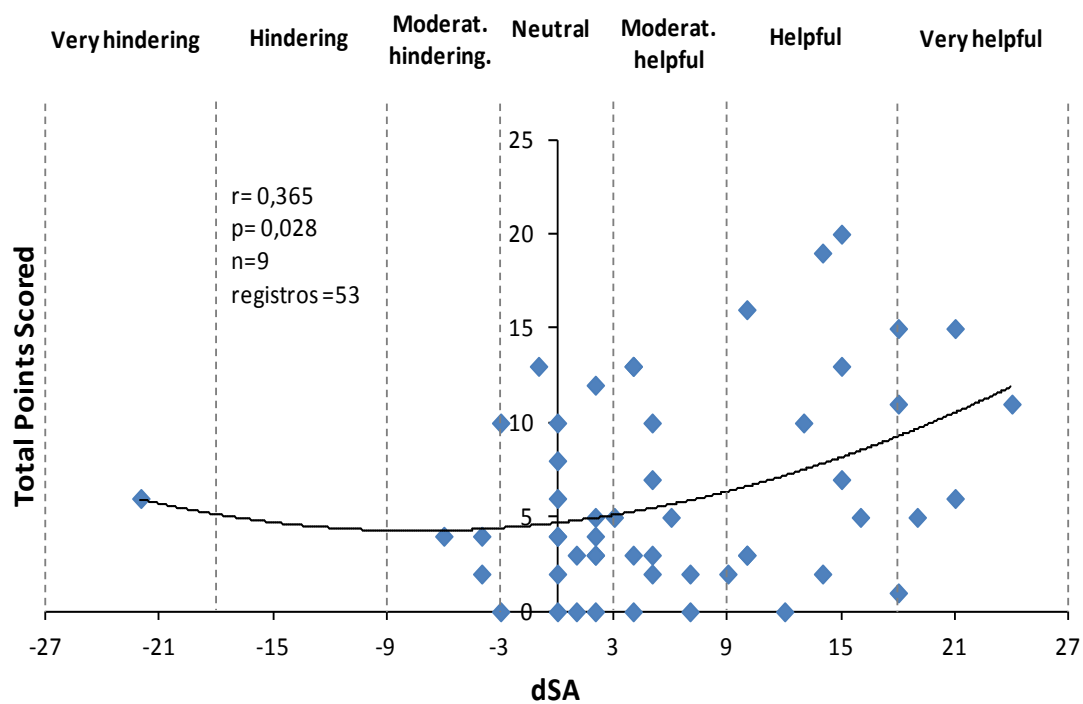


Figure 3. Correlation between dSA and the Total Points Scored in G1.

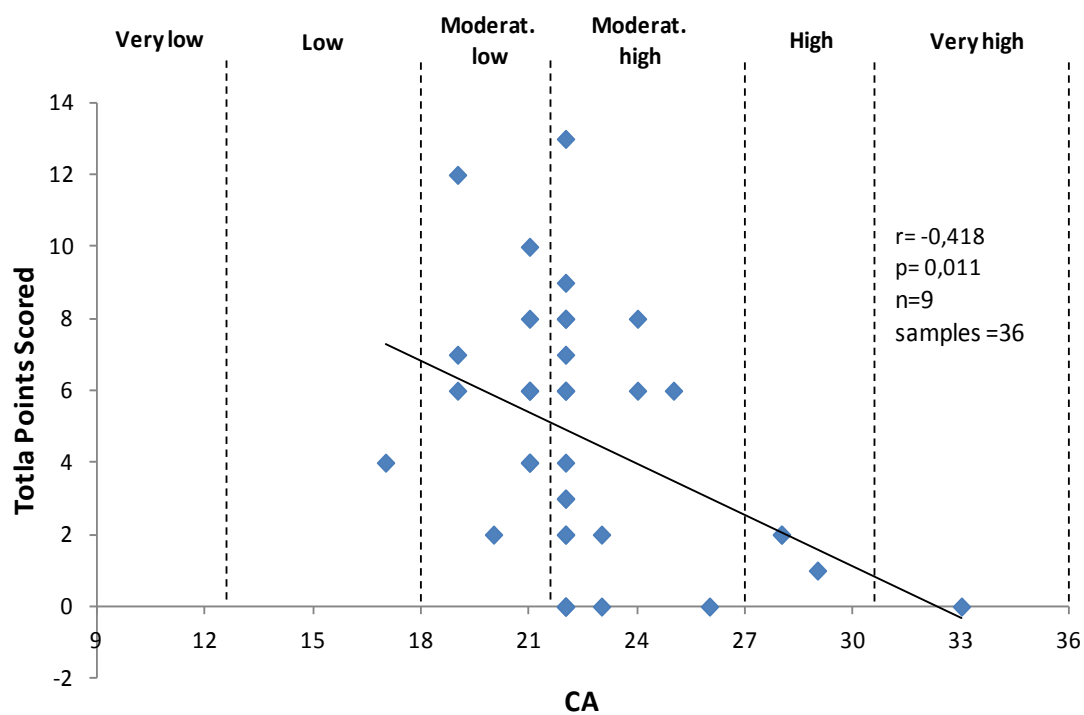


Figure 4. Correlation between CA and Total Points Scored in G2.

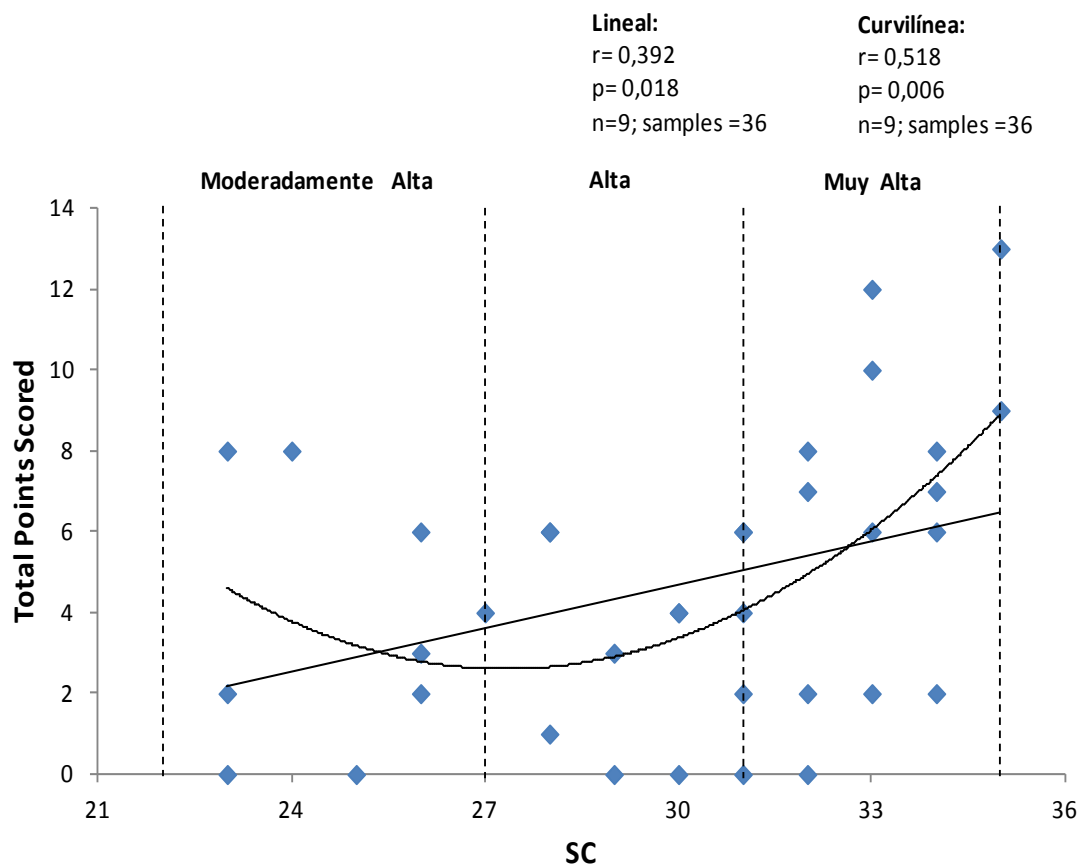


Figure 5. Correlation between SC and Total Points Scored in G2.

DISCUSSION

In G1 (Figure 1) we found a “U” shaped curvilinear correlation between SA and IP, which explains the 11.4% variance, indicating players with moderate levels of SA were those who performed least well, as opposed to those with low or high levels, who performed better. These results do not concur with research which states that moderate levels of SA are optimally disposed towards performance, having established inverted “U” correlations (Burton, 1988; Chamberlain & Hale, 2007; Gould, Petlichkoff, Simona, & Vevera, 1987).

The fact that these results do not concur with the results of Burton (1988) & Gould (1987), may be due to the fact that those studies were conducted out in sports with motor tasks of short duration and with very specific characteristics (swimming and pistol shooting, both individual sports), which could make them particularly sensitive to variations in SA levels. In basketball, however, since it is a team sport, as described by Craft et al. (2003), it may be the case that when a sportsperson competes together with others or as part of a team, the pressure is less than when competing alone, and as it is also a sport with a greater timespan of involvement than those mentioned, the potential influence of the physiological response may diminish as the anxiety symptoms dissipate once the match has begun and the players “get into the game”. In G2 (Figure 2), we

found a negative linear correlation between CA and IP, which indicates that the players with lower levels of CA were those who performed better in competition. These results, in addition to being in line with the MAT, concur with several studies carried out in collective sports such as football (Rodrigo, Lusiardo, & Pereira, 1990) and hockey (Davids & Gill, 1995), and other individual sports, such as golf (Chamberlain & Hale, 2007), swimming (Burton, 1988) and triathlon (Hammermeister & Burton, 1995). However, they are not in line with other studies into basketball which have found positive correlations (Kais & Raudsepp, 2004) and inverted "U" curvilinear correlations (Swain & Jones, 1996) between CA and performance. These differences could be due to methodology, since the method used to monitor a player's individual performance in our study differs from that used in the works cited, which opted for subjective self-evaluation and the composite of overall playing performance, or PERF.

It would appear that the correlations between anxiety and performance in sports which use 'open' skills or which are in constantly changing situations are higher than those in sports with more defined skills or in fixed situations Craft et al., 2003). This study has not proved this to be conclusive.

With regard to self-confidence, we found no correlation between the intensity of this variable and IP in any of the groups; in these subjects, moderately high and high levels of SC were not linked with greater performance. These results are not in line with studies which found that the SC which sports people have in themselves has a positive effect on actual performance (Bejek & Hagtvét, 1996; Chamberlain & Hale, 2007; Jones, et al., 1993), nor on those who consider it a better predictor of task execution than the degree of self-motivation or anxiety (Bandura, 1977; Weiss, et al., 1989; Craft et al., 2003). Likewise, the absence of a correlation between self-confidence and performance could be due to the global nature of the questionnaire or, put another way, the lack of specificity of the items included (Craft et al., 2003).

Finally, and with regard to the directional perception of anxiety and self-confidence, it must be stated that perceptions facilitated by both male and female players concerning anxiety and self-confidence, did not correlate with their competitive performance expressed via IP. This does not concur with studies which state that the total intensity in emotional or physical reactions is not as important as the way in which they are perceived and interpreted, suggesting that the perceived individual anxiety symptoms may give a greater understanding of the response of a pre-competitive anxiety state, than if we only evaluate its intensity (Chamberlain & Hale, 2007; Jones & Hanton, 2001; Jones, et al., 1994; Jones, et al., 1993; Lundqvist, et al., 2011; Mellalieu, Hanton, & O'Brien, 2004; O'Brien, Hanton, & Mellalieu, 2005).

The results obtained in the search for a correlation between the different explanatory variables and IP to determine the relative contribution of anxiety and self-confidence in the explanation of the performance in each one of the

groups, support only weakly and partially what is established by the multidimensional anxiety theory

With the aim of testing if the correlations found when performance is expressed through IP throw up a different percentage from the variance of performance found when using the total points scored, we analysed the correlation between intensity and directionality of anxiety state and perceived self-confidence with competitive performance expressed as total points scored.

Figure 3 shows a “U shaped curvilinear correlation between dSA and total points scored in G1, which explains the 13.3% of the variance in performance. These results are not in line with those studies which found a positive linear correlation between dSA and performance (Raudsepp & Kais, 2002; Swain & Jones, 1996). Taking into account the distribution of the cloud point, if we eliminate the results of a female player who has a much lower dSA score than the rest, there appears to be a tendency towards a significant positive linear correlation which would explain the 7.8% variance and it would be more in line with the studies we have mentioned. In spite of this, given this low percentage, the predictive or explanatory factor of this correlation is very low and should be interpreted carefully.

In G2 (Figure 4) we found a negative linear correlation between CA and total points scored, which represents 17.5% of the given variance. This correlation coincides with the one found for CA when performance is expressed through IP, but explains the somewhat lower percentage variance. In this same group (Figure 5) we also found a “U” shaped curvilinear correlation between SC and the total points scored, which represents 26.8% of the variance. Also significant, however, although to a lesser degree ($p=0.018$), was a positive linear correlation between these two variables representing 14.5% of the variance. These results indicate that there is no clearly defined tendency in the correlation between SC and performance when expressed as total points scored

In general terms, we can say that the correlations found between intensity and directionality of anxiety and self-confidence with performance, when the latter is expressed through IP and the total points scored, are different. The only coincidence we found was in the case of CA in G2, where there was a negative linear correlation, which explains a greater variance percentage when performance is expressed through IP. This may indicate that measuring a basketball player’s performance through IP could be a more precise and appropriate system than total points scored. However, given the fact that the differences in terms of explained variance percentage are small, further studies on larger sample groups would be necessary to back up this suggestion.

Finally, with regard to studies which have found correlations between anxiety state and performance expressed through specific actions in play (Abenza, Alarcon, Pinar, & Ureña, 2009; Parfitt & Pates, 1999; Sonstroem & Bernardo, 1982), we consider that these correlations could have been established in a more precise way. From our point of view, the way to determine performance

does not really reflect the player's individual efficacy since it does not take into account the player's participation time, or because it relies solely on the points scored by the player. The total points scored by a player in a match may be influenced by his position in the team and by the play developed by his teammates, in addition to the fact that this is only one of the many skills or actions of which basketball is comprised. Therefore, these considerations point towards a possible future line of research in the study of anxiety in sport, developing more precise and specific systems of performance evaluation for each sport, which could help to clarify the correlation between pre-competitive anxiety state, self-confidence and performance.

CONCLUSIONS

We found a negative linear correlation between the intensity of cognitive anxiety and IP in G2, which represents 21.1% of the variance, a "U" shaped curvilinear correlation between intensity of SA and IP in G1 (11.4%); and no correlation at all between intensity of SC and IP in either of the two groups.

With regard to individual interpretation of the symptoms of anxiety and self-confidence as helpers or hinderers of sporting performance, no correlation was found between the directional perception of these and IP in either of the two groups.

Finally, only in G2 did we find a negative linear correlation between CA and performance, both when determined through IP and when expressed as total points scored, explaining a variance percentage greater when performance is expressed through IP.

New studies are needed to reinforce the psychometric qualities of the instrument.

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