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**PSYCHOLOGICAL ANALYSIS IN
RUGBY UNION CONSIDERING
THE SEX AND POSITION ON THE
FIELD**

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ABSTRACT

Rugby is a sport which combines a unique mix of speed, strength and power. It is an intermittent, high intensity evasion game with static strength situations, collisions, running and rest but there is not too much studied about it. The primary aim of this study was to investigate the effect of anxiety, motivation and mood state in rugby union players considering the sex and position on the field and for this purpose we examined 30 athletes (15 female mean age 28.66 SD= 4.0; and 18 males with mean age= 25.33, SD= 2.52) from Leinster Division 1. The results showed that is a significant difference between sex in Somatic and Cognitive Anxiety, Depression, Fatigue, Vigor, and Confusion but not significant difference in Anger and Tension. There was no significant difference between sex in any motivation scale. The position the field between forwards and backs analysis showed that the only significant difference was found in women in the Concentration disruption but not significant differences were found in any other variable. Results suggest that all these variables can differ between sex but is needed more investigation to know the effect that these variables have on the position on the field between rugby players.

DESCRIPTORS: Rugby, Sex, Competition, Psychological responses

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PSYCHOLOGICAL ANALYSIS IN RUGBY UNION PLAYERS CONSIDERING THE SEX AND POSITION ON THE FIELD.

The purpose of this study was to investigate and analyze data collected on competitive anxiety, mood state and sporting motivation in rugby union players before a Leinster Division 1.

Rugby was created by William Webb Ellis in the first half of the 19th century, 1823, in Warwickshire, England. Webb Ellis was playing football when he decided to take the ball into his arms, run away with it and place it behind the goal line. That was the day when rugby was differentiated from football. In 1871 the sport's first governing body, "The Rugby Football Union", was founded by 22 teams from around England. In 1883 the first international tournament was held and was known as "The Four Nations". This tournament at first consisted of England, Scotland, Wales and Ireland but the additions of Italy and France have made it what we know today as "The Six Nations". This year, 2016, the Olympic Games are to take place in Rio de Janeiro, Brazil, and rugby 7s will for the first time in its history be a part of the Olympic program. Rugby union is only the fourth most popular sport in Ireland behind other sports such as GAA, hurling or soccer but, as it stands at this moment, is the most exciting and competitive full-contact sport. This extraordinary game is made up of two teams with 15 players each who are trying to attack and defend the try lines using various different skills. The distinguishing feature of this contact sport is that the ball is passed with the hands and must always be passed laterally or backwards, never forward. The ball can be moved forward only by kicking it or carrying it. In each rugby team there are 8 forward players and 7 backline players where each player has its own very clearly defined role.

Rugby is a sport which combines a unique mix of speed, strength and power. It is an intermittent, high intensity evasion game with static strength situations, collisions,

running and rest but the important role of the psychology cannot be ignored. As Luke Fitzgerald (Irish international professional rugby player) said “sport psychology is one of the most important weapons in an athlete’s professional career because it allows him to be the best and not just a competitor”. To become a professional or high level athlete it is not just physical training that has an important role, the mind is also crucial to performance and improving skills.

Balish (2013) studied the importance of sport psychology and its relationship with sex, explaining differences between men and women in personality and motives to practise sport and competition. The results showed that males exhibit higher rates of sport participation with just 24% of females spending time practicing sport and only 20% participating in team sport. Males report higher competitive ego orientation than females (Balish, 2013; quoting Kavussanu and Ntoumanis, 2003). The males reason for not participating in sport was lack of time and meanwhile to females was lack of interest (Balish quoting Ifedi, 2008). Women are more individualistic and have less physical contact than males. (Balish quoting Dietz-Uhler, Henrick, End and Jacquematte, 2000). Females tend to be more selective of their mates than males (intersexual selection) and males tend to compete for access to mates (intrasexual selection) (Balish quoting Andersson, 1994).

Shaw, Govely and Corban (2005), explained that the athlete’s mood was a general feeling before or during a competition and the response after the competition was affected by it. The most used measurement to analyse these moods in athletes is the Profile of Mood State (POMS), which is the first test to use for the assessment of mood in athletes and was developed by McNair, Lorr and Dropplemen (1971). This test measures the athlete’s mood using 6 different dimensions or scales: tension, depression, anger, vigorous, fatigue and confusion. The first time that this questionnaire was used in a

sporting environment was in 1975 by Morgan and his associates (Morgan and Johnson, 1978; Morgan, Hellickson, Serfass and Alexander, 1975), they found that mood and performance were not related to each other. In some cases, just a small relationship was found between them. Morgan (1970) was analysing this questionnaire and finally called it “the test of champions” because according to him and his results, he was able to predict which athletes were selected to form part of the US Olympic Team that year. This investigation was the pioneer for the “Iceberg profile” concept, concluding that the athletes with high vigour and all the other subscales low were the best prepared to competition. West et al. (2014) compared mood with the neuromuscular and hormonal function before and after a rugby game finding that mood disturbance increase at 12 hours and it returns to baseline 36-60 hours after the match. However, they didn't find any relationship between the variables studied in the investigation (peak power output, testosterone, cortisol, T/C ratio and mood). Mood was compared with the outcome and game location in rugby but the authors of this investigation didn't find any difference in self-reported mood state except the feeling that the athletes were more tired during their away games. The only finding was a positive outcome, a decrease in negative mood (Polman et al., 2007). Suzuki et al. (2004) showed that the POMS scores decreased significantly in athletes who had additional low exercise in their post-match rest and lower mental fatigue. Lavalee and Flint (1996) compared stress, competitive anxiety, mood state and social support in athletes who sustained injuries. The results were that the injury frequency depends on competitive anxiety and mood state and the severity depends on tension, anger and negative mood state. In rugby, according to this investigation, injury frequency was related to tension/anxiety and depression/ dejection.

The relationship between mood and sex has also been studied. McNair (1971) found that there could be differences between males and females of at least 1% but these

results disagree with later ones (Craighead ,Privette, Vallicanos and Byrkit, 1986; Fuchs and Zarchowsky , 1983; Goss, 1994 and Stratton, 1996) which didn't find any difference in this relationship. Further study is needed to answer this question. Raglin, Morgan and O'Connor showed that POMS scores were similar between sex during training with the exception of tension which was higher in the female group and these subscales increase and decrease when the training change with the exception of tension which does not decrease when the training is lower. Horvat, French and Henschen (1986) found that elite male and female athletes had higher mental health scores than non-elite players and that wheelchair male track athletes and wheelchair female basketball players had the Iceberg Profile in their POMS analysis, indicative of a good profile of mood states. Also the results showed that for the optimal performance and optimal intensity it is necessary to have low depression and low anxiety as well as high vigour.

Another important variable in team sports is the position on the field. In the context of rugby, Reardon et al. (2015) and Cunningham et al. (2016) in their studies about aerobic demands in rugby union have found great differences between positions on the field in their physical demands, such as distance on the field, Vmax or speed). Concretely they found that the front row (numbers 1, 2, 3) showed lower high speed running distance than the back row three (6, 7, 8) $211\text{€}112.7\text{m}$ vs $728.4\text{€}150.2\text{m}$. Besides, backs' sprints were almost double the forwards' sprints $26.44\text{€}7.47\text{m}$ vs $11.15\text{€}5.06\text{m}$. In addition, Mashiko et al. (2004) compared the physical and mental fatigue in rugby players and their results were that forwards have changed in their POMS scores, showing a positive correlation with changes in the levels of enzymes of skeletal muscle origin, and the backs showed a positive correlation in POMS scores in their levels of lipids, in this case cholesterol, and negative correlation between the scores and blood glucose. In sum, these results point out

the existence of a difference between physical and mental fatigue considering the position in the field.

Weinberg and Gould (2015) explained quoting Spielberg (1966) that anxiety is a negative emotional state that is associated with a jittery and concerned feeling, and is related to the activation of the organism or the perceived activation degree. It is divided into two categories: state anxiety (the arousal or responsivity is in constant change of the autonomic nervous system which makes the athlete have feel nervous and tense in a concrete situation) and the trait anxiety (a relatively stable element of the personality and how it affects the athlete's behaviour). There is a significant relationship between both types of anxiety (Jones, 1996). The state anxiety response is divided into two categories: cognitive and somatic anxiety (Jones, 1996). Another category divided anxiety between a negative feeling that the athlete feels unable to perform with (debilitative anxiety) and a change which improves his/her performance (facilitative anxiety). Jones, (1996) found that nearly 50% of 91 swimmers experienced anxiety as facilitative, therefore improving their performance, and that only 23% of them experienced it as debilitative. Complementarily, Hanton et al. (2002) explained in his study that analysing the skill level, the athletes were more facilitative in both types of anxiety and both ones increased before the competition.

Cunniffe, Morgan, Baker, Cardinale and Davies (2015) showed that elite rugby players have higher cortisol and testosterone levels before each rugby game than on a normal day and also the same results for somatic and cognitive anxiety. The relationship between home and away games and hormones was significantly associated with lower home testosterone and higher away cortisol in non-starting XV players. Rugby players who trained at a higher intensity and with a higher volume in their physical activity had better recovery-stress state than players with a moderate intensity and lower volume

training regime. Stress and under-recovery didn't increase with higher volume but did with the intensity (Hartwig, Naughton and Searl, 2009). Mellalieu, Hanton and Shearer (2003) analysed the precompetitive psychological response in elite rugby players and they showed that anxiety and tension were associated with affective responses and excitement, confidence and efficacy in team-mates just before the game were higher. The technical and physical preparation associated with the behavioural responses and strategies to control activation was higher before the game. Neil, Mellalieu and Hanton (2006) analysed the psychological factors between elite and non-elite rugby players and the results were that the elite players had higher level of facilitative anxiety, higher self-confidence, lower relaxation usage, higher imagery and self-task use than non-elite players. Greenless, Nunn, Graydon and Maynard (1999), testing Bandura's model of collective self-efficacy, showed that when the team was worried about their own ability to win the game, which was associated with high cognitive state anxiety, their doubts about the team's ability to perform well was associated with a low positive affect. Chiodo et al., (2011) in their study about hormonal and psychological changes in taekwondo competitors showed that the POMS scores for anger and depression were significantly higher post-match. Muraki et al., (1993) showed a correlation between VO2 max and the POMS scores for tension, depression, fatigue and TMD and anxiety scores, but there was no correlation in the female group. This study suggests that the mental health between males and females could differ at some stage.

Sport motivation can be explained using one of the most important theories in sport and educational area: the Self-Determination Theory (SDT) by Decy and Ryan (1985) and Deci et al. (1991). The athlete could have different reasons or motivations to start the sport career and it can be explained with Decy and Ryan's theory. The SDT give the chance to know about all the reasons by which the athlete is practicing his/ her sport

and is a comprehensive framework for understanding extrinsic and intrinsic motivations (Pelletier et al. 2013; quoting Vallerand, 2007; Standage and Ryan, 2012; Hagger and Chatzisarantis, 2007). The scale may not properly determine every aspect of motivation in athletes but at the moment is the only measure that is used in sports psychology (Mallet, Kawabata, Newcombe, Otero-Forero and Jackson, 2007) having different translations in Spanish, French or Portuguese.

Cook and Crewther (2012) concluded in their study that the motivational strategies before the game for the players can produce different outcomes on the hormonal indicators as higher levels of testosterone and lower levels of cortisol were associated with a better performance. Hodge, Lonsdale and Nq (2008) showed the relationship between self-determination theory and burnout in rugby players. The relationship was low to moderate predictor of burnout and players with high burnout symptoms had lower level of competence and autonomy. Another study done with rugby players showed that blocking could be the most commonly found coping strategy on game day and higher concentration was associated with training days. Coping effectiveness was higher during training days than games and was associated with higher levels of emotional effectiveness. (Nicholls, Jones, Polman and Borkoles, 2009).

The motivation's theory was also studied considering the relationship with burnout in other areas. This is a negative state of emotional and mental exhaustion caused by excessive stress and it affects to athlete's performance and results. This relationship was studied in rugby by Nicholls, Backhouse, Polman and McKenna (2009) who concluded that professional rugby players could experience negative affective states and is important to detect these early to prevent burnout and overtraining syndromes. Cresswell and Eklund (2005) examined the relationship between burnout and motivation in rugby players and the results were that amotivation has a significant correlation with burnout;

external regulation has a non-significant relationship and the intrinsic motivation has a significant negative relationship with the burnout. Another study by Creswell and Eklund (2005) analysing the same relationship but in professional rugby players showed that amotivation is associated with the burnout but is negatively associated with intrinsic motivation. This relationship was examined over the course of a league season and the extrinsic motivation was negatively associated with sport devaluation and reduced accomplishment but also was associated with physical and emotional exhaustion. (Creswell and Eklund, 2005).

The aim of this study was to assess the relationship between rugby union and different psychological variables (anxiety, mood and motivation) considering the sex and position on the field, to know much more about this contact sport and helping in the future to improve the performance and skills and helping athletes to identify and control thoughts they have that are contributing to poor performance.

At the beginning of this psychological study it was hypothesized that if the players have a high competitive anxiety, a negative mood and extrinsic motivation or amotivation, this will contribute to a negative feeling before the game and lower result in it. It was also hypothesized that there would be differences between gender in all the psychological variables analyzed in this study. There is currently a lack of information in rugby regarding the psychological variables such as anxiety, mood and motivation. It is necessary to answer important questions about these different variables as this can be a decisive step towards improving the performance, the physical condition and skills.

MATERIAL AND METHODS

SAMPLE

The athletes who participated in this study were 43 rugby players (25 females with mean age 28.66 SD= 4.0; and 18 males with mean age= 25.33, SD= 2.52) selected from two teams, Rathdrum Rugby Senior Women's Team and Wicklow Rugby Senior Men's Team (see table 1 for anthropometric variables). Both teams are based in Co. Wicklow, Leinster, Ireland and are playing in Leinster Division 1. Ultimately only 30 players had all the requirements necessary to participate in this study, 15 players from each squad.

All of the players selected for the study were healthy, in good physical condition, injury free and were in full time training at the time of the study. The majority of the participants were Irish (83.33%), with a smaller number of Hispanics (6.66%), Australians (3.33%) and New Zealanders (6.66%). All athletes had at least one and half years of competitive experience in this level.

	Age		IMC	Years of Experience	
	mean	SD		mean	SD
MALE	25.33	2.52	2.52	15.80	4.93
FEMALE	28.66	4.01	4.0	5.67	3.43

Table 1: mean and SD of age, IMC (kg/m²) and years of experience, for men and women.

PROCEDURE

This psychological study was completed during 2015-2016 season before two rugby matches: a cup quarter final and semi-final. All the questionnaires were completed 90 minutes before each game which were played in Mullingar and Carlow respectively.

The athletes received all the information about this study in one session before the game, before a training session and they accepted signing the consent form to participate in this study following the Helsinki Declaration. Prior to the informed consent form, they were given information by the investigator following the obtainment of signed consent from the players under anonymous conditions. They were informed about the confidentiality of the study and were said that they were free to withdraw from the study at any time, and the information that they provided to the investigator it would still remain confidential. They needed to certify that they have legal ability to give valid consent, understand the procedures to be used in the study, have had the chance to have their questions answered and they freely give their consent to participation. The same day before the training session a participant detail form was given to all the players involved in the study. This participant form gathered personal information such as name, age, address, telephone number, gender, weight, height, position on the field, rugby experience, primary and secondary events, injuries and best skills.

MEASURES

The athletes answered the Sport Anxiety Scale, the Profile of Mood State Questionnaire (POMS) and the Sport Motivation Scale.

PROFILE OF MOOD STATES

POMS created by McNair, Lorr and Droppleman (1971) for the purpose of a mood analysis in sport and exercise areas. This test measures athlete's mood with 65 statements and 6 different dimensions: tension, depression, anger, vigour, fatigue and confusion. The test takes 3 to 7 minutes. Also POMS has the shortened version (e.g. Grove and Prapavessis, 1992; McNair, Lorr and Droppleman, 1992). The players answered this questionnaire thinking about "how are they feeling at that moment, before the

competition". All responses are ranged from 1 (not at all) to 5 (extremely) on a 5 point Linkert Scale. The internal consistency of this questionnaire 's coefficients range from .63 to .95 (McNair et al., 1971). The correlation between the subscales and the total score was reported as .84 (Shacham, 1983; Terry, Lane, Lane and Keohane, 1999; quoted by Terry et al., 2003).

SPORT ANXIETY SCALE

This scale is a global and multidimensional self-report measure of trait anxiety where the athlete needs to describe his/ her feelings before or during the competition through 21 different items divided into three anxiety subscales: cognitive anxiety (worry or self-doubts), somatic anxiety (perceived physical symptoms) and concentration disruption. The scale's coefficients range from .83 and $r=.33$ for cognitive anxiety .78 and $r=.37$ for somatic anxiety, and .85 and $r=.41$ for concentration disruption .

SPORT MOTIVATION

The SMS scale is an English production by Pelletier et al. (1995) of the French version "Echelle de Motivation dans les Sport (EMS)" created by Briere et al. (1995). There is also a Spanish version translated by Balaguer et al. (2007) and Granero-Gallegos and Baena-Extremera (2013). The scale is made up of 28 different items which are ranged from 1 (totally disagree) to 7 (totally agree) on a 7-point Linkert Scale. The athletes need to explain the reasons for practicing their sport, reasons were assessed with 7 factors: three types of intrinsic motivation (to know, to accomplish and to experience), three types of extrinsic motivation (identification, introjection and external regulation) and amotivation as the last factor. The scale's coefficients are: intrinsic motivation to know .83, to accomplish .81, to experience .83, identified .82, introjected .73, external regulation .79 and amotivation .71.

DATA REDUCTION AND STATISTICAL ANALYSIS

First, descriptive analyses have been carried out for anthropometric measures, years of experience, anxiety, mood states and motivation.

Next, one-way ANOVAs of the anthropometric measures with “sex” (men/women) as between-subjects factor had been carried out in order to analyze possible differences between sexes in these dimensions.

In order to answer to the objectives, one-way ANOVAs were carried out with “sex” as between-subjects factor and anxiety (cognitive, somatic and concentration disruption), mood states (tension, anger, depression, confusion, vigor, fatigue) and motivation (amotivation, external regulation, extrinsic introjected, extrinsic identified, intrinsic to experience, to accomplish and to know).

Finally, univariate ANOVAs with “sex” (men/women) and position (forward/back) and mood states (tension, anger, depression, confusion, vigor, fatigue) were carried out to analyze the effect of sex and position on the field on the mood states. Exploratory analysis was used for the comparison between sex and position on the field on each variable.

All statistical analyses were performed by the Rstudio and SPSS. The alpha level was fixed at 0.05.

RESULTS

Preliminary analyses with anthropometric measures revealed, as expected, that men had higher IMC than women (see table 1 for descriptive statistics). On the other hand, the T-test revealed that the male group had much more rugby years of experience.

Mood States.

On table 2 the descriptive analysis revealed that the males group had higher scores in all POMS subscales than the females group which brings me to conclude that the males had much more negative mood feelings or thoughts than the females but also higher vigor, which is important for the athlete's performance. 33.3% of the total players, 53% of the men group and 20% of the women team, didn't have an Iceberg Profile. An interesting result to note from the POMS analysis is that the best players of the year from both teams had a perfect Iceberg profile. Women have a perfect iceberg profile which means that are adapting better than men to high level competition on an emotional level. (figure 2)

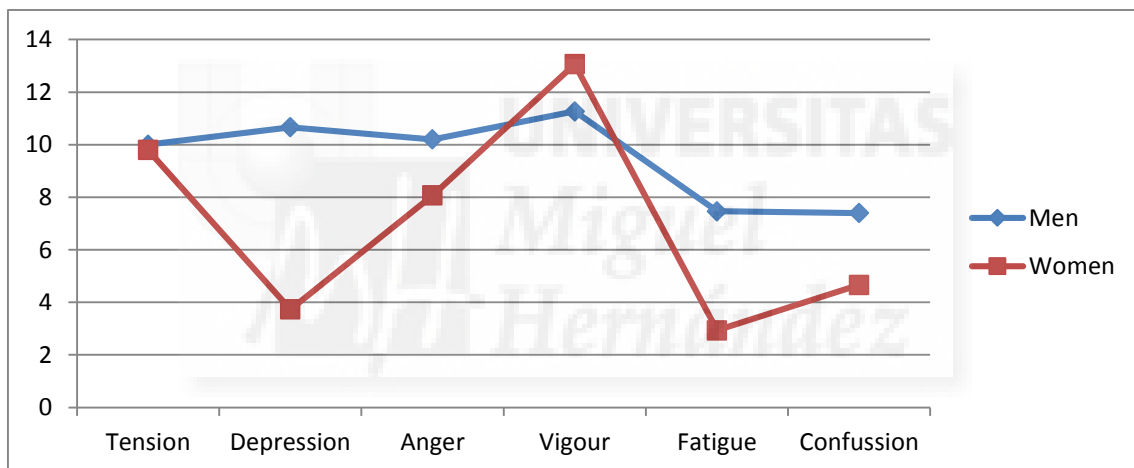


Figure 2: Profile of mood states, for men and women.

The ANOVA test was used to compare both groups. The results revealed the POMS scores comparing sex and mood was found a significant difference for confusion $F(1,26=5.3604, P<0.02875)$, depression $F(1,26= 3.299, P<0.0809)$, fatigue $F(1,26=8.397, P<0.00753)$ and vigor $F(1,26=8.397, P<0.00753)$ between sex. No significant difference was found for anger and tension scores. No significant difference between sex and position on the field.

Anxiety

For the sport anxiety scale, the results revealed that somatic and cognitive anxiety is higher in females than in males but concentration disruption is higher in males.

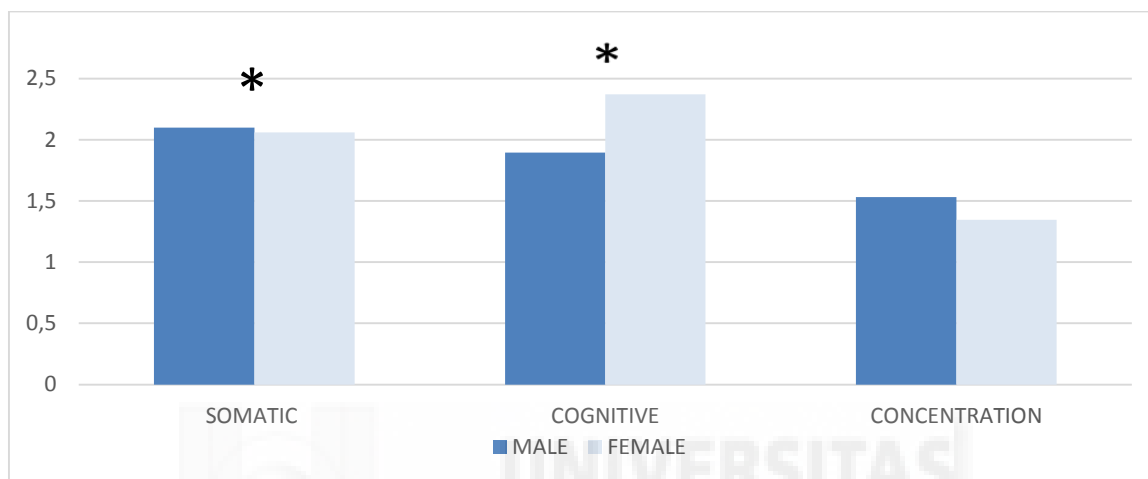


Figure 3: sport anxiety scale mean

This study revealed a significant difference for the cognitive $F(1,208=14.2, P<0.000214)$ and somatic anxiety $F(1,208=6.51, P<0.0113)$ considering the sex. There was no significant result for concentration disruption. The analysis between sex and position on the field showed that there is no significant difference in any but after an exploratory analysis was found that there is no significant difference in men but was found a significant difference in women for concentration disruption $F(1,14=8.099, P<0.014)$. The forwards had higher concentration level than backs.

Motivation

Sport motivation scale after the descriptive analysis showed that the male group had higher scores in all variables with exception of the intrinsic motivation, which was higher in females than in males. (figure 4).

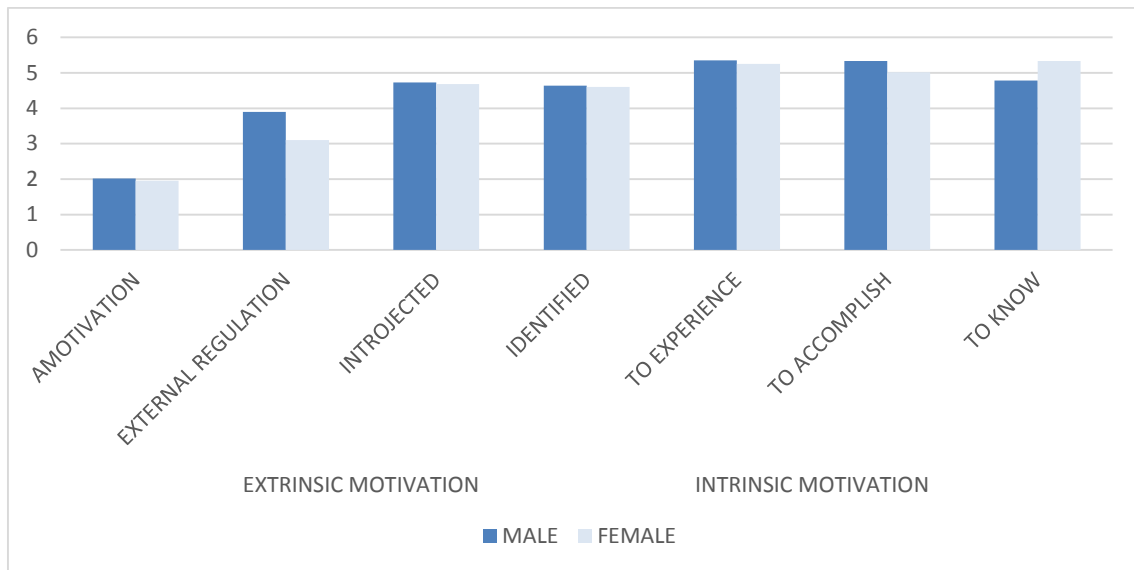


Figure 4: Sport Motivation Scale mean

There was also no significant result for motivation's subscales between sex in rugby players, amotivation $F(1,28)=0.06, P>0.808$; external regulation $F(1,28)=2.223, P>0.147$; introjected $F(1,28)=0.009, P>0.926$; identified $F(1,28)=0.006, P>0.937$; to experience $F(1,28)=0.048, P>0.829$; to accomplish $F(1,28)=0.437, P>0.514$ and finally to know $F(1,28)=1.143, P>0.294$ with the alpha level fixed at 0.05.

Position on the field

The results of the univariate ANOVA with "sex" and "position on the field" showed a tendency of the factor "sex" in depression ($F_{1,24}=3.1, p<0.09$) and a significant effect on Fatigue and Confusion ($F_{1,24}=8.64, p<0.007$; $F_{1,24}=5.115, p<0.033$, respectively) with higher levels in men, in comparison to women. For the factor "position on the field" and the interaction the analyses revealed no significant differences. Both of them have the iceberg profile but this could happen because of the women influence. (figure 5)

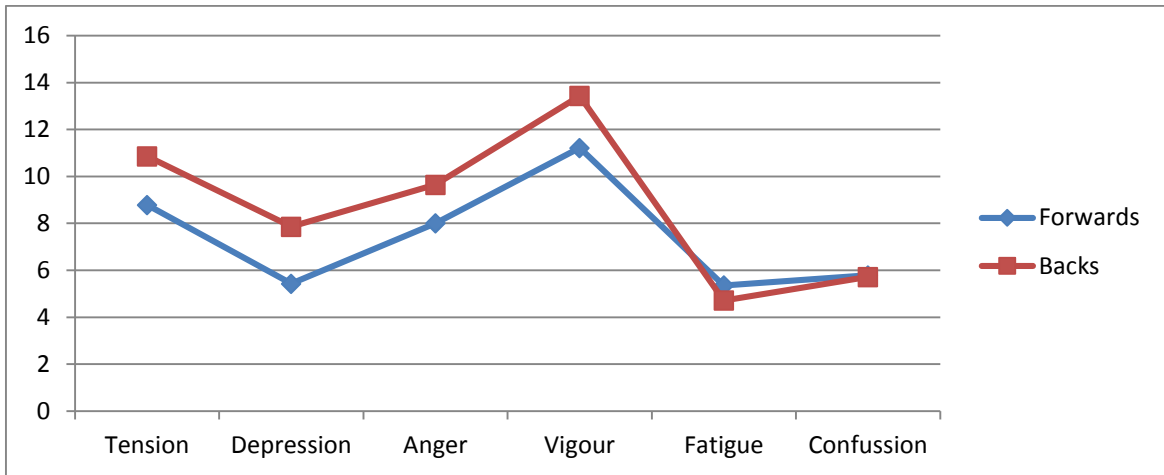


Figure 5: Profile of mood states, for athletes on Forwards and Back positions.

The univariate ANOVA with “sex” and “position on the field” showed no significant differences of the factors, neither of interaction. A subsequent ANOVA carried out separately for men and women, revealed a significant difference, for women, in “concentration” scale ($F_{1,14} = 8.099$, $p < 0.014$), with higher levels in women playing forwards, in comparison to women playing backs.

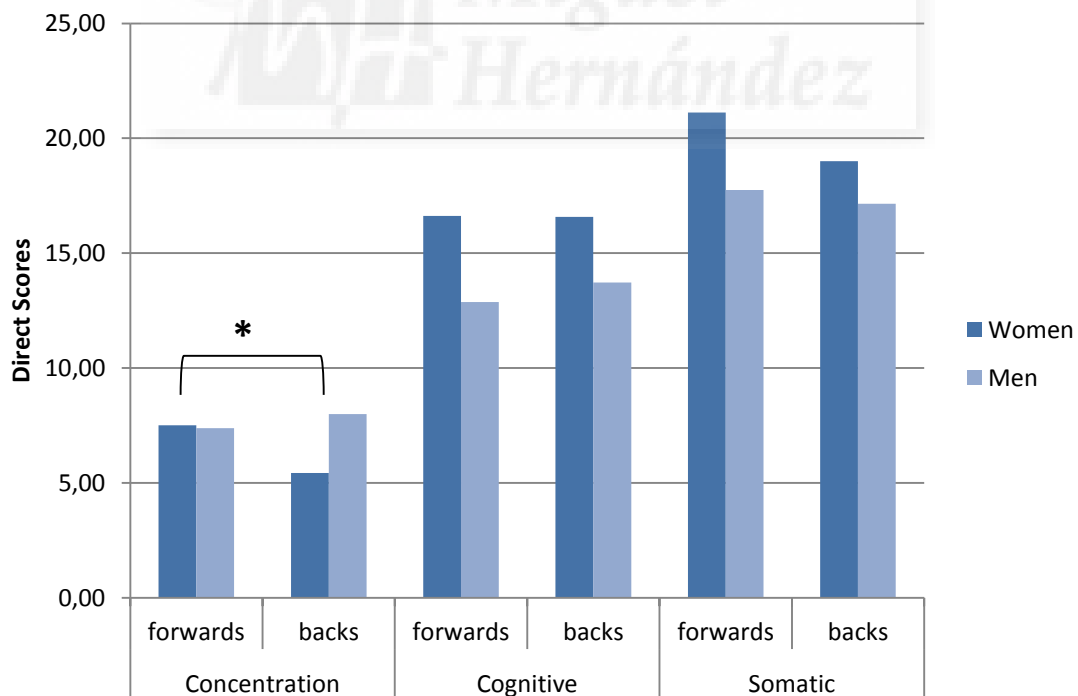
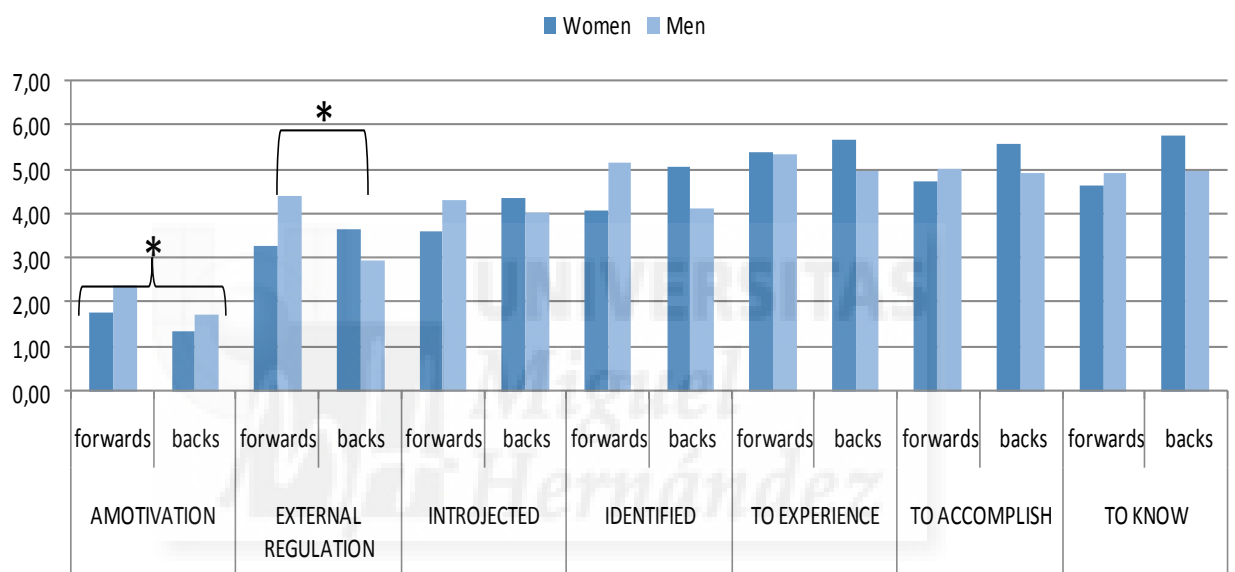


Figure 6: Sport anxiety scale means, for men and women playing forwards and backs.

Analyses for motivation revealed a significant effect for “Position on the field” factor for Amotivation scale ($F_{1,19}=3.999$, $p<0.05$), with higher levels in forward players than backs ones, A marginally significant effect was found in the interaction “gender*position” for External Regulation ($p=0.09$) and for Identified ($p=0.07$). Finally, analyses of position on the field separately for sexes revealed a significant difference in men on External Regulation ($F_{1,14}=5.294$, $p<0.039$) with higher levels in men playing forwards, respect to backs.



DISCUSSION

The aim of this study was to investigate the psychological differences between rugby players considering the sex and position on the field before a hard and intense competition. These variables are essential for optimal performance as low anxiety, high motivation and high vigor are crucial to high intensity performance in athletes. Considering all these variables could be considered that the men’s group has better results and better performance than the women’s group (lower anxiety and higher vigor than females). Although it has been suggested that is no difference between mood and sex or

low differences (24,18) there is limited studies in rugby to confirm this relationship. The findings of this study determined that there are differences between sex in rugby players and the Profile Mood States. It is needed to know much more about this relationship. The analysis made for this study showed that it is higher the difference between sex than position on the field.

Each psychological variable has its own role in an athlete's performance. Each athlete is unique and responds differently to stress and anxiety before a competition situation. The study was conducted on two groups of rugby-trained and experienced players. All of them were playing in the starting XV. According to their anthropometrical data, they were two heterogeneous groups with significant differences between them. The week before the competition, the players increased their training sessions and also the intensity, a fact which may greatly influence these results.

These results may support Williams (1980) quoted by Horvat et al. (1986), who described successful female athletes as having a very similar profile to male athletes, for example assertive, dominant, self-sufficient, independent, aggressive, intelligent etc.

The intrinsic motivation to know is higher in women than in men and this fact could be explained by the experience although differences were not statistically significant. The men's team had much more experience and they much more years playing together as a team than the women's team and this could be the reason that the women look for the improvement of their techniques. The results showed a significant difference between positions in motivation and external regulation, there is a trend towards the interaction between sex and position. We are following some very promising lines of investigation.

The results showed a significant difference in POMS scores taking into account the position on the field but only for concentration, which open new lines of investigation, is needed more investigation about the mood in rugby between sex and position on the field.

The present study presents some limitations which could be the low number of players involved, more studies with a higher number of rugby players are necessary to generalize the findings and the number of games analyzed, in this case could be necessary to analyze all the season or the last four games before and after the competition. In addition, the motivation which had no differences in this study between sex, has its very important role before the rugby games. Finally, further research is necessary to evaluate all these psychological variables between sex to show how much could differ in rugby union. Is needed more studies about the relationship between sex and position on the field (this last one needs further information in this area) and mood profile, motivation and anxiety before and after games, between winter season and spring-summer season, between different parts of Europe, between professional and recreational players and between different types of rugby (7s, 13 or 15). This future research could be relevant to rugby performance.

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