# 78 - RELATION BETWEEN LEVELS OF ANXIETY, STRESS AND REACTION TIME OF FOOTBALL PLAYERS

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## INTRODUCTION

The stress is becoming part of the current society routine. Such fact has not been different in the sport context. One of the reasons that allow understanding better this situation is related, basically, to the society reality that always tends to value the victory and the success. Thus, each time more, technician and athletes feel pressured to be successful in what they propose to make (WEINBERG and GOULD, 2001). This way, in athlete, the sources of stress can include since worry about performance, financial costs and time for training until problems of personal order as familiar annoyances.

Beyond stress, another factor that can also affect the sport performance is the anxiety, which can be considered as a negative emotional state characterized by a subjective feeling of tension, worry and apprehension, associated with an autonomic activation (sympathetic beam) that results in specific physiological outcomes. The trait anxiety is related to relatively steady characteristics and can be considered as a "trend" or "predisposition" of the subject to answer with greater or minor anxiety to a stressful event, while the state anxiety is characterized as a transitory emotional state, provoked by specific events (SPIELBERGER et al., 1979).

Stress and anxiety can influence the modulation of the brain activity. The execution of a motor skill demands an adequate degree of attention that is directly related to the level of brain activation. This way, the manner how each person interprets a situation as being threatening or not, can modify his brain activation, being able to harm the motor performance during the execution of skills (SCHMIDT and WRISBERG, 2001).

A variable related to cognitive functions (attention and activation) and to motor functions is the reaction time (RT) (NAITO, et al. 2000). The RT refers to the time and effectiveness of the individual decision-making process. This way, one of the most important characteristics of a highly adept athlete is besides producing efficient movements, to know what to make in specific situations, mainly when little time exists to make a decision. Therefore in many fast skills, the success depends on the speed with the athlete can detect some characteristics of the environment or of the opponent's movements, to decide what to make and then start an efficient movement (SCHIMIDT and WRISBERG, 2001).

There are many factors that can influence the reaction time as the age, the previous training of motor skills and the task complexity (MAGILL, 2000; SCHMIDT and WRISBERG, 2001). Dacey and Travers (1991) cited by Gallahue (2001) detach that variables as motivation, depression and anxiety can be important factors in the difference of adult's reaction time.

Considering the importance of the decision-making process or reaction time for the sport performance and that some factors can influence on the quality of the athlete reaction time and consequently on the result of the game, this study aimed to investigate the level of perceived stress and anxiety of football players in order to verify if these individual characteristics can be related to reaction time and consequently to sport performance of these athletes.

## METHOD

The sample was composed by 21 amateur feminine football players of field and hall, with mean age of 21 years, operating in different positions.

In order to characterize the sample and to obtain information about the self-evaluation stress this research used as instrument a questionnaire developed by Andrade (2001) entitled "Questionnaire of self-evaluation of life style, occurrence and control of stress", adapted for this research. This questionnaire contains the Perceived Stress Scale of Cohen et al. (1983) adapted by Ururahy (1997), the final score of this scale varies from 0 to 56 points.

The level of trait and state anxiety was measured through the State-Trait Anxiety Inventory (STAI / IDATE Portuguese version) developed by Spielberger et al. (1979). The IDATE consists of two scales, each one composed by 20 affirmations, being that each scale results in a score that varies from 20 to 80 points.

The simple reaction time was verified by means of software entitled "Time of Reply of a Motor Action" (ANDRADE and JARDIM, 2003) that measures the RT in milliseconds (ms). The test is divided in four stages according to the type of stimulus, which can be visual, auditory, associative (visual and auditory) and discriminative (visual or auditory) in this sequence. In this study, the athletes had 7 attempts for each stimulus and the RT values had been analyzed by means of the average results presented in each stimulus.

For the accomplishment of this study, firstly was made a contact with the trainer and later with the players of the feminine soccer teams, in which was made a communication of how the research would be carried through, and the days for the data collection had been marked. The data were collected in three consecutive training days, being that no one preceded important competitions.

The data had been treated by means of descriptive statistics (mean, frequency and standard deviation) and by inference ("t" test) for mean comparisons of reaction time in relation to anxiety and perceived stress.

## RESULTS AND DISCUSSION

The athletes had presented a mean age of 21 years (+34 -14/s=5,121), mean height of 1,60 m (+1,69 -1,50/s=5,68) and 56,70 kg of average weight (+80 -43/s=7,985).

Amongst the 21 players, 4 act as goalkeepers and the others acts in the middle field. The majority of the players conciliates study and work with the sport training.

By means of descriptive statistics analyses can be verified that the players had showed the following RTs.

| RT | Mean | Minimum | Maximum | Standard Deviation |
|---|---|---|---|---|
| Visual RT | 436, 91 | 291 | 666 | 84,861 |
| Auditory RT | 419, 85 | 394 | 673 | 97,341 |
| Associative RT | 393, 13 | 305 | 557 | 56,278 |
| Discriminative RT | 447, 84 | 312 | 567 | 67,960 |

Table 1. Results of the means values of the RTs with different types of stimuli

The players had showed an average value of 436,91 ms for the RTs with visual stimulus and an average value of 419,85 ms for the RTs with auditory stimulus. In relation to associative RT, they had showed an RT average of 393,13 ms and a value of 447,84 ms on the discriminative RTs.

These data agree with the literature that indicates that the auditory RT is faster than the visual RT (MAGILL, 2000).

It is suggested that this occurs due to a neural processing route, because the way of visual stimuli processing is longer than the auditory one.

However, Kohfeld (1971) verified that these differences of visual and auditory RT can be questioned depending on the intensity which the stimulus is emitted. This helps to explain why the associative RT was the fastest of all, therefore when presenting the two stimuli simultaneously, the intensity is bigger.

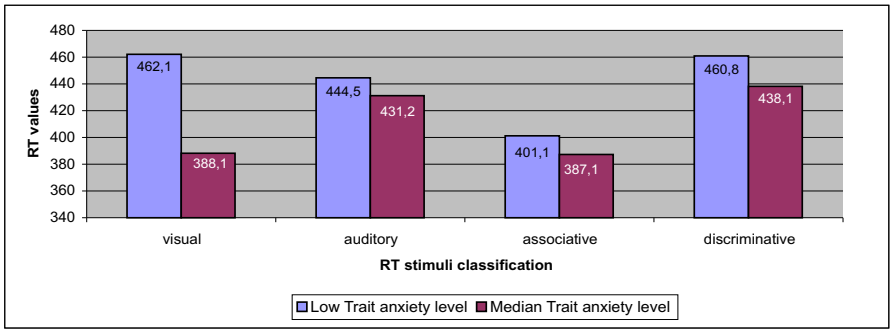
Comparing the results of the Trait anxiety mean with State-Anxiety mean, no significant statistical differences were found. This data demonstrates that there is a positive correlation between the two types of anxiety.

| Anxiety | Mean | Standard Deviation |
|---|---|---|
| Trait Ansiedade | 40,48 | 7,620 |
| State Ansiedade | 39,86 | 7,767 |

Table 2. Comparison between the means of Trait Anxiety and State Anxiety.

Spielberger et al. (1979) consider that trait anxiety is related to individual differences in the disposal to perceive situations as threatening more frequently or not. Individuals with more raised levels of trait anxiety tend to answer proportionally more with raised levels of state anxiety than the individuals with low trait anxiety. Because of the similar values of trait and state anxiety, in this study the comparison between Anxiety and RT was made only with trait anxiety values.

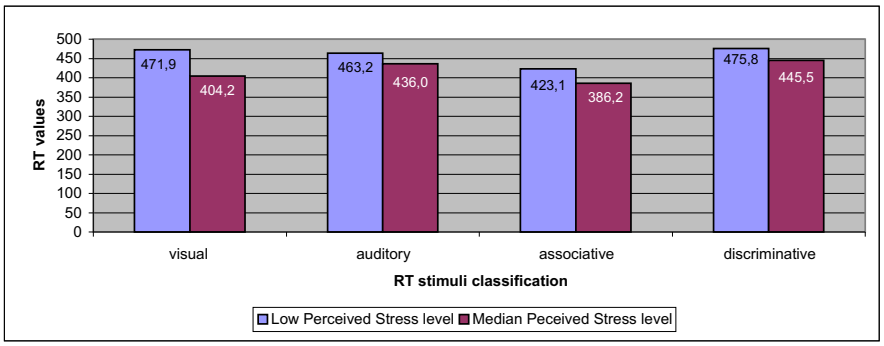
Comparing the levels of trait anxiety with the averages of the RTs results with different types of stimuli can be observed that the players who show low levels of trait anxiety present greater RTs when compared to the players with medium level of anxiety who demonstrate the best RTs. Remembering that how much lesser the RT, better the motor performance (graph1).




Graph 1. Comparison between the levels of trait anxiety and the averages of RT with different types of stimuli.

In the same way, the players who had presented greater levels of perceived stress also had presented worse RT; in addition, the players who had presented minors levels of perceived stress also had disclosed better RTs (graph 2).

According to this research results, can be noted that the players had not showed high levels of anxiety and stress. Such fact can be due to proper constant practices of physical activity that many times can contribute for the control of the stress levels (ANDRADE, 2001). All the players had presented low and middle levels of trait and state anxiety and perceived stress. However, those that had demonstrated middle values of anxiety and perceived stress had also showed better RTs. This suggests that the RT performance depends on a balance in the anxiety and stress levels.




Graph 2. Comparison between the Perceived Stress, the averages RTs with different types of stimuli.

According to Inverted U theory, the best level of physiological activation that would be considered ideal for sport performance is in the middle point. Values of activation very above or below this level can harm the performance of tasks (WEINBERG and GOULD, 2001; SCHMIDT and WRISBERG, 2001).

Bolmont et al. (2000) had investigated the climbers RT in situation of hypoxia, induced for a hypobaric chamber per 31 days. The objective of the study was to relate the RT changes to level of anxiety and to mood states, on this period. The results indicated that how much bigger the anxiety best the RT, and that how much worse the mood states greater the RTs, mainly for the states of tension, hostility, confusion and fatigue.

A research carried through by Kirkeby and Robinson (2004), relating individual characteristics to RT, not only demonstrated the importance of the reply speed to the stimuli, but also showed the importance of errors variability between reply attempts, probably because impulsive people tend to answer faster to the stimuli, nevertheless many times with more number of errors.

Studies with anxious people have demonstrated that these persons tend to modify their capacity to reply to the stimuli when these situations are considered threatening (MARTIN et al., 1991; CARRETIÉ et al., 2004). According to Bonin-Guilaume et al. (2004), depressive people generally present alterations in the information processing and in the capacity to generate outcomes.

The RT depends on the individual characteristics as much of the contexts characteristics in which the tasks are played. Barreto (2003) defends that persons in threatening considered situations show greater trend to modify their capacity of reply the different stimuli. Thus, a research carried through in a pre-competitive situation could supply different results.

**FINAL CONSIDERATIONS**

The results of this study demonstrate that the players who had showed medium level of trait anxiety and perceived

stress had obtained the best RTs, when compared to the players who had showed low anxiety and stress levels. Although the statistical tests not to evidence significant differences between the compared variables, the results indicate that the RT depends on a balance in the anxiety and stress levels.

The study of these variables collaborates for the knowledge of the ideal level of activation that will favor the athlete best performance. However, these data can help to explain the role of anxiety and stress in the athlete performance, but not always they are enough to guarantee the success on sport context. For this, it is necessary besides measure the levels of anxiety and stress, to know the athletes, their individual reactions, their history and its meanings.

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**RELATION BETWEEN LEVELS OF ANXIETY, STRESS AND REACTION TIME OF FOOTBALL PLAYERS**

**ABSTRACT**

The reaction time (RT) performance depends on the adequate individual level of activation. Individual characteristics as levels of stress and anxiety can modify the brain activation and compromise the capacity of attention and the information processing of determined stimuli. Thus, this study aimed to investigate the relation between the levels of Anxiety, Stress and RT of Feminine Amateur football players. The sample was composed by 21 players, with mean age of 21 years. The RT was measured by means of the software "Time of reply of a motor action" (ANDRADE and JARDIM, 2003). The Stress was measured by means of the Perceived Stress Scale of Cohen et al. (1983) adapted by Ururahy (1997) inside the questionnaire developed by Andrade (2001). The levels of trait and state anxiety were measured by means of the State and Trait Anxiety Inventory (STAI - Portuguese version) developed by Spielberger et al. (1979). The data had been treated by means of descriptive statistics (frequency, percentage, mean and standard deviation) and by inference (test t). The results had indicated that the players who had showed medium levels anxiety and stress had presented the better RTs than the players who had presented lower anxiety and stress levels. Although the results have not presented statistics significance, this study indicates that the RT depends on a balance in the anxiety and stress levels.

**Key-Words**: reaction time, anxiety, stress.

**RELATION ENTRE LES NIVEAUX DE L'ANXIÉTÉ, DE LE STRESS ET LE TEMPS DE REÁCTION DES JOUEUSES DE FOOTBALL**

**RÉSUMÉ**

La performance du Temps de Reáction (TR) dépend d'un approprié niveau d'activation cérébrale. Caractéristiques individuelles comme niveaux de stress et d'anxiété peuvent modifier l'activation cérébrale et compromettre la capacité d'attention et le traitement d'information des certaines stimulatons. Cette étude a objectifié enquêter la relation entre les niveaux de l'anxiété, de le stress et du TR des joueuses de football amateur. 21 joueurs avaient participé de cette étude, avec l'âge moyen de 21 ans. Le TR était mensurado avec le Software "Temps de réponse d'une action motrice" (ANDRADE et JARDIN, 2003). Le stress a été vérifié avec l'échelle de le stress perçue de Cohen, et autres (1983) adapté par Ururahy (1997) existant dans le questionnaire développé pour ANDRADE (2001). Les niveaux de l'anxiété ont été des mensurados avec le inventaire d'anxiété (IDATE) de Spielberger et autres (1979). Les données avaient été traitées avec le statistique descriptive (fréquence, pourcentage, moyenne et écart étalon) et inferencial (test t). Les résultats avaient indiqué que les joueurs qui avaient présenté les demis niveaux d'anxiété et de stress avaient présenté le meilleur TRs, quand comparées aux joueuses qui avaient présenté des basses des niveaux d'anxiété et de stress. Bien que les résultats n'aient pas présenté des signification statistique, cette étude indique que le TR dépend d'un équilibre dans les niveaux d'anxiété et stress. **Mot-clef**: temps de reáction, anxiété, stress.

**RELACIÓN ENTRE LOS NIVELES DE ANSIEDAD, ESTRÉS Y TIEMPO DE REACCIÓN DE JUGADORAS DE FUTEBOL**

RESUMEN

El desempeño del Tiempo de reacción (TR) depende Del un adecuado nivel de activación cerebral. Características individuales cómo niveles de estrés y ansiedad pueden alterar la activación cerebral y comprometer la capacidad de atención y el procesamiento de informaciones de determinados estímulos. Así que, ese estudio tiene como finalidad de investigar la relación entre los niveles de Ansiedad, estrés y TR de jugadoras de futebol amador feminino. Han participado en éste estudio 21 jugadoras, con edad mediana de 21 años. El TR ha sido mensurado por medio del software intitulado "Tiempo de respuesta de una acción motora" (ANDRADE y JARDIM, 2003). El estrés ha sido comprobado por medio de la escala de Estrés Percebido de Cohen, et al. (1983) y adaptado por Ururahy (1997) existente en el cuestionario desarrollado por Andrade (2001). Los niveles de ansiedad trazo, el estado fueran medidos por medio del Inventario de Ansiedad-trazo y del estado (IDATE) de Spielberger et al. (1979). Los datos fueran tratados por medio de estadística descriptiva (frecuencia, porcentaje, media, desvio/standard) e inferencial (teste t). Los resultados han indicado que las jugadoras que presentan niveles medianos de ansiedad y estrés presentan los mejores TRs, cuando son comparadas las jugadoras que presentan bajos niveles de ansiedad y estrés. Sin embargo, los resultados no terían presentado significado estadístico, en éste estudio indica que el TR depende de un equilibrio en los niveles de ansiedad y estrés.

Palabras-clave: tiempo de reacción (TR), ansiedad, estrés.

**RELAÇÃO ENTRE OS NÍVEIS DE ANSIEDADE, STRESS E O TEMPO DE REAÇÃO DE JOGADORAS DE FUTEBOL**

**RESUMO**

O desempenho do TR depende de um adequado nível de ativação cerebral. Características individuais como níveis de stress e ansiedade podem alterar a ativação cerebral e comprometer a capacidade de atenção e o processamento de informação de determinados estímulos. Assim, este estudo objetivou investigar a relação entre os níveis de Ansiedade, Stress e TR de jogadoras de Futebol Amador Feminino. Participaram deste estudo 21 jogadoras, com idade média de 21 anos. O TR foi mensurado por meio do software intitulado "tempo de resposta de uma ação motora" (ANDRADE e JARDIM, 2003). O Stress foi verificado por meio da escala de Stress Percebido de Cohen, et al. (1983) adaptada por Ururahy (1997) existente no questionário desenvolvido por ANDRADE (2001). Os níveis de ansiedade-traço e estado foram mensurados por meio do Inventário de Ansiedade-traço e de estado (IDATE) de Spielberger et al. (1979). Os dados foram tratados por meio de estatística descritiva (freqüência, percentagem, média e desvio padrão) e inferencial (teste t). Os resultados indicaram que as jogadoras que apresentaram médios níveis de ansiedade e stress apresentaram os melhores TRs, quando comparadas as jogadoras que apresentaram baixos níveis de ansiedade e stress. Embora os resultados não tenham apresentado significância estatística, este estudo indica que o TR depende de um equilíbrio nos níveis de ansiedade e stress.

**Palavras-chave**: tempo de reação, ansiedade, stress.