THE INFLUENCE OF PSYCHOPHYSIOLOGICAL VARIABLES IN THE RESULT OF A ELITE PISTOL SHOOTERS COMPETITION.


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INTRODUCTION
The target practice is a traditional and competitive modality that it is disputed in the Olympic Games since 1896 and it propitiated the first Brazilian Olympic gold medal conquered by Guilherme Paraense, in Rapid Fire Pistol proof.

In the incessant search of improvement of the human performance in the field of the competitive sport, a balanced emotional state comes as a decisive factor in the conquest of good results.

The development of physical capacities, techniques, tactics and psychological it should be synchronized and coordinated. The capacity to maintain appropriate levels of anxiety, before and during a competition, it is of fundamental importance, because the loss of the effectiveness in one of these varied will directly be able to interfere in the success of the final performance.

Studies as the one of Taylor (1953) they have been proposing the existence of a lineal relationship between anxiety-state and acting, postulating that as larger the anxiety of larger state will be the level of the individual's acting, the same happening in the contrary process.

Recent studies have focused on anxiety control and its effects on athletes’ results in elite competitions.

OBJECTIVE
The main purpose of this study was to verify the influence of heart rate (HR) and pre-competition anxiety level in elite pistol shooters performance

METHODS
Subjects
The sample was constituted by seven male athletes of the Brazilian Army Pistol Shooting team that were submitted to psychophysiological assessments before one training session (Tr) and 2 different competitions (Comp). Thirty minutes before the shooting series, the athletes had their skin conductance level (SCL) measured for 3 min, to characterize the anxiety level. The values were registered in 1s intervals, in μSiemens (μS). During the 1min shooting series, athletes’ Heart Rate (HR) was registered in 5s intervals. The statistical analysis considered the raw data of SCL, HR and shooting performance (SP), the differences among the competition and training results (Δ1= Comp1-Tr; Δ2= Comp2-Tr), and athletes’ ranking for the raw results and for Δ1 and Δ2. MANOVA, Pearson Correlation and Spearman Ranking Correlation were used for results comparison (p<.05).

Table 1 – Characteristics of subjects (Mean ± SD)

<table>
<thead>
<tr>
<th>Variables</th>
<th>Group</th>
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<tbody>
<tr>
<td>Age (years)</td>
<td>32.1 ± 4.3</td>
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<tr>
<td>Weight (kg)</td>
<td>79.4 ± 3.74</td>
</tr>
<tr>
<td>Height (cm)</td>
<td>181.9 ± 7.62</td>
</tr>
<tr>
<td>% Body Fat †</td>
<td>15.9 ± 3.8</td>
</tr>
<tr>
<td>Experience time in competitive shot</td>
<td>18.7 ± 4.7</td>
</tr>
<tr>
<td>Average in high level championships</td>
<td>22.4 ± 9.5</td>
</tr>
</tbody>
</table>

Protocol
The sample of the Brazilian Army Pistol Shooting team were submitted to psychophysiological assessments before one training session (Tr) and 2 different competitions (Comp) of national level, all with maximum score of 600 points, in a total interval of 8 days.

From one until thirty minutes before the shooting series, the athletes had their SCL measured for 3 min, to characterize the anxiety level (NCP) measured by a System of Biofeedback, during 3 min.
For that evaluation, the individuals stayed sat down comfortably in a room refrigerated to 20°C ahead of
a computer, without execute any action, while NCP was measured through electrodes of Ag/AgCl stuck in
the medium phalanges of the index finger and medium of the no-dominant hand. Were the measured
values registered to each 1s, in μSiemens (μS).

The HR was monitored during the accomplishment of the training sessions and the competitions for a
“Polar” Heart Rate Monitor, model S-610, taking registrations of five in five seconds.

Statistical Analyses
For the statistical analysis NCP and the punctuation were considered in the proofs, being computed the
rude results, the differences among the results obtained in the competition and in the training (Δ1 = Comp
1 - training; Δ2 = Comp 2 - I) and the athletes’ ranking as for the rude results and to the differences Δ1 and
Δ2. through the test Shapiro-Wilk W, it was verified that the distributions of frequencies didn't differ
significantly (p <0,05) of the normal, being used then for comparison of the results, MANOVA, the
Correlation of Pearson and the Correlation of Spearman.

RESULTS AND DISCUSSION

MANOVA didn't verify significant alterations (F = 0,84; p = 0,51) in the behavior of NCP of the training
for the Comp 1 and 2 (10,1±5,3 against 6,9±3,8 and 7,2±3,4?S; respectively, Figure 1), as well as of the
Punctuation of the training for the Comp 1 and 2 (572,9±7,5 against 577,0±7,0 and 577,1±7,0 points;
respectively, Figure 2).

Significant correlations were not verified between Δ1 NCP and Δ1 score (r = -0,02; p=0,96; IFigure 3) and
between Δ2 NCP and Δ2 score (r= -0,27; p=0,55; Figure 4). there were not ranking correlations between NCP
and the scores in the Comp 1 (R=0,25; p=0,59) and 2 (R=0,32; p=0,48). Also ranking correlations were not
observed between Δ1 NCP and Δ1 scores (R = -0,04; p=0,94) and between Δ2 NCP and Δ2 score (R=0,54;
p=0,22).

Figure 1 – Behavior of the variable NCP during the Training and the Comp 1 and 2.

Figure 2 – Shot performance during the Training and the Comp 1 and 2.

Figure 3 - Correlation between Δ1 NCP and Δ1 score (r= -0,02; p= 0,96).

Figure 4 – Correlation between Δ2 NCP e Δ2 score (r= -0,27; p= 0,55)
In spite of a reduction of the anxiety it was observed, characterized by NCP, of the training for the proofs, simultaneously to an increase in the punctuation, those alterations were not significant. The correlation tests didn't also present a significant influence of NCP in the performance of the shot. For the analysis of the relationship between FC and the shot performance, only the series of fast shot were considered.

Considering HR and SP, there were no significant correlations during Tr (r =-.01; p = .96), Comp1 (r=-.17; p = .33) and Comp2 (r=.07; p = .71) Analyzing FC and the performance of the shot, we can verify that there were not significant correlations among those varied nor in the training nor in the proofs 1 and 2.

TREMAYNE et al (2001) it verified that the individual's capacity focuses the attention in certain point is associated at smallest levels of FC. That characteristic is applied with great property to the shot proofs.

It was waited that as better the result of the shot, smaller the level of FC. Though, due to the particularities of the present study, mainly for limitations fruit of the specifications of official proofs of central fire, during which the data were collected, it was not possible to measure FC with larger precision in the seconds than they preceded the shots.

Figure 5 - The relationship between FC and the shot performance, a significant correlation was not observed among those varied in the training (r = -0.01; p = 0.96).

Figure 6 and 7 - There was not a significant correlation between FC and the shot performance during the Comp 1(r = -0.17; p = 0.33, Figure 6 - left) and 2 (r = 0.07; p=0.71;Figure 7 - right).

CONCLUSION
Results suggest that there is no relationship between HR and SP and that the anxiety level does not affect shooters' performance. However, it's important to notice that, despite the lack of statistical differences regarding to the variations observed in SCL and SP, in elite competitions, small differences can lead to better rankings.

REFERENCES