

THE MEDIATING ROLE OF JACOBSON RELAXATION TECHNIQUES IN THE RELATIONSHIP BETWEEN ANXIETY AND PERFORMANCE OF FEMALE HANDBALL PLAYERS

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ABSTRACT. One of the most discussed relationships in sport psychology is the relationship between competitive anxiety and sport performance. The issues addressed in this paper refer to the affective state of female competitive players and its link to the effectiveness/achievement of their long-term game. **Objectives:** The current work aimed to study how a high degree of anxiety affects the playing efficiency of the SCM Gloria Buzău handball team and to what extent the level of anxiety and, implicitly, of performance, can be modified in a beneficial way, by using the Jacobson technique. **Methods and means.** To carry out this study, the SAS-2 questionnaire, a multidimensional instrument that measures cognitive and somatic characteristics related to anxiety, was applied in the context of practicing performance sports. To analyse the data obtained, the SPSS Statistics V.20 analysis software was used, thus performing a multiple regression analysis, with anxiety as a predictor and efficiency as a criterion. In order to capture the effect of the Johnson method on the athletes' performance, a two-way mixed ANOVA analysis of the 2x2 type was used. **Results.** Following this analysis, the following aspects can be noted: efficiency and anxiety correlate strongly, in the opposite direction, with a negative correlation coefficient between the two variables, $r = -0.902$. This correlation has high statistical significance ($\text{sig} < 0.001$). We observed that there is a strong, positive correlation between the level of control of emotions acquired as a

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result of therapy and the level of performance in the game, $r=0.96$, the result being statistically significant, $\text{sig}<0.001$. **Conclusions.** The hypothesis on how a certain relaxation technique, applied in a consistent manner over a sufficient period of time, leads to an improvement in the quality of the athletes' game was confirmed. Thus, following Jacobson relaxation techniques applied on female handball players, an increase in performance level was observed in both anxious and low-anxious individuals.

Keywords: *anxiety, performance, handball, Jacobson method*

REZUMAT. Rolul mediator al tehnicilor de relaxare jacobson în relația dintre anxietate și performanța jucătoarelor de handbal. Una dintre cele mai discutate relații în psihologia sportului este relația dintre anxietatea competitivă și performanța sportivă. Problemele abordate în această lucrare se referă la starea afectivă a jucătoarelor competitive și legătura acesteia cu eficacitatea/realizarea jocului pe termen lung. **Obiective.** În această cercetare, autorii, și-au propus să studieze modul în care un grad ridicat de anxietate afectează eficiența jocului echipei SCM Gloria Buzău și în ce măsură nivelul de anxietate, și implicit, de performanță, poate fi modificat în mod benefic prin utilizarea metodei Jacobson. **Metode și mijloace.** Pentru realizarea acestui studiu a fost aplicat în contextul practicării sporturilor de performanță chestionarul SAS-2, un instrument multidimensional care măsoară caracteristicile cognitive și somatice legate de anxietate. Pentru analiza datelor obținute s-a utilizat software-ul de analiză SPSS Statistics V.20, realizându-se astfel o analiză de regresie multiplă, cu anxietatea ca predictor și eficiența ca și criteriu. Pentru a surprinde efectul metodei Johnson asupra performanței sportivilor, a fost utilizat testul de analiză ANOVA mixtă bidirecțională de tip 2x2. **Rezultate.** În urma acestei analize se remarcă următoarele aspecte: eficiența și anxietatea se corelează puternic, în sens invers, cu un coeficient de corelație negativ între cele două variabile, $r = -0.902$. Această corelație are o semnificație statistică puternică ($\text{sig.} < 0.001$). Am observat că există o corelație puternică, pozitivă, între nivelul de control al emoțiilor dobândit în urma terapiei și a nivelului de performanță în joc, $r = 0.96$, rezultatul fiind semnificativ statistic ($\text{sig.} < 0.001$). **Concluzii.** S-a confirmat faptul că o anumită tehnică de relaxare, aplicată în mod consecvent pe o perioadă suficientă de timp, conduce la o îmbunătățire a calității jocului sportivilor. Astfel, în urma tehnicilor de relaxare Jacobson aplicate pe jucătoarele de handbal, s-a observat o creștere a nivelului de performanță atât la sportivele anxioase, cât și la cele cu o anxietate mai scăzută.

Cuvinte cheie: *anxietate, performanță, handbal, metoda Jacobson*

Introduction

One of the most discussed relationships in sport psychology is the relationship between competitive anxiety and sport performance, as high levels of stress during competition lead to decreased ability to concentrate and thus regulate emotions (Amanendra et al., 2008).

The issues addressed in this paper refer to the affective state of female performance players and its link to the effectiveness/performance of their game in the long term.

According to the literature, the affective component is a particularly important element in maintaining a successful career, thus we chose to specifically explore the effect of anxiety on the life of an athlete, having a significant impact on performance (Amit, 2016; Hossein et al., 2016; Miftakhul, 2018).

Performance sport is strongly shaped by the emotions that athletes display, forming an interdependent relationship between these components. Many athletes experience emotions that have a strong impact on them, therefore, we can observe differentiated behaviour and moods when the athlete wins a match (joy, excitement) or when they experience a defeat (disappointment, sadness) (Smith et al., 2006; Gucciardi et al., 2014).

In performance sport, anxiety arises especially in public competitions, where everyone in that context knows the performance of the athletes. These people present, may have positive opinions, but also some negative ones, which arouse anxiety in performance athletes (Lazarus, 2000; Algani et al., 2018).

The method proposed by Edmund Jacobson is an effective way to relax quickly, but also to learn to differentiate between tension and muscle relaxation, involving a relaxation technique that focuses on tensing muscle groups gradually, combined with breathing exercises or specific mental images.

Objectives

The current work aimed to study how a high degree of anxiety affects the playing efficiency of the SCM Gloria Buzău handball team and to what extent the level of anxiety and, implicitly, of performance, can be beneficially modified by using the Jacobson technique.

Methods and means

To carry out this study, the SAS-2 questionnaire, a multidimensional instrument that measures cognitive and somatic characteristics related to anxiety, was applied in the context of practicing competitive sports. It contains 3

subscales of 5 items each, ranging on the Lichter scale from 15 (low anxiety) to 60 (high anxiety). SPSS Statistics V.20 analysis software was used to analyse the data obtained, thus performing a multiple regression analysis with anxiety as predictor and efficiency as criterion. To capture the effect of the Johnson method on athletes' performance, a 2x2 two-way mixed ANOVA was used.

Research subjects

This study was conducted between 28.01.2021 - 16.05.2021, within the SCM Gloria Buzău women's handball team, participating in the Romanian National Women's Handball League. The studied group was composed of 26 female subjects, aged between 20 and 39 years. This group was divided into an experimental group and a control group in a randomized way.

The research process

Table 1. Research stages

Stage I (28.01.2021 - 01.02.2021)	Measuring the effectiveness of each player by recording data from 8 official matches.
Stage II (28.02.2021)	Application of the Sport Scale Anxiety-2 questionnaire on the two groups - experiment and control.
Stage III (01.02.2021 - 23.04.2021)	Applying the Jacobson relaxation technique with the help of a sports psychologist. A session lasts 8-10 minutes and the progress of the relaxation technique was monitored at the end of each week through an anamnesis of the athletes' anxiety levels.
Stage IV (26.04.2021 - 16.05.2021)	Measuring the effectiveness of each player by recording data from the last 8 official matches played and analysing the data obtained.

Results

In the first stage of this scientific work, a multiple regression analysis was performed, with anxiety as predictor and efficiency as criterion.

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Table 2. Analysis of anxiety data

		performance	anxiety
Pearson Correlation	performance	1.000	-.902
	anxiety	-.902	1.000
Mr (1-tailed)	performance	.	<.001
	anxiety	.000	.
N	performance	26	26
	anxiety	26	26

Following this analysis, the following aspects can be noted: efficiency and anxiety correlate strongly, in the opposite direction, the correlation coefficient between the two variables being negative, $r = -0.902$. This correlation has high statistical significance ($\text{sig} < 0.001$). What can be observed is that 81% of the variability in performance can be explained by differences created by the level of anxiety of the players, so the level of anxiety can be considered an important predictor in the playing effectiveness of athletes.

Table 3. Analysis of emotion of control data

		Performance	MT
Pearson Correlation	performance	1.000	.815
	MT	.815	1.000
Mr (1-tailed)	performance	.	<.001
	MT	.000	.
N	performance	26	26
	MT	26	26

We observed that there was a strong positive correlation between the level of control of emotions acquired as a result of therapy and the level of performance in the game, $r=0.96$, the result being statistically significant, $\text{sig}<0.001$.

In the second part of the statistical research, a 2x2 mixed two-way ANOVA was used to investigate the effect that a specific relaxation technique has on the performance of female professional handball players according to their degree of anxiety. Using the GPOWER test, we assumed a mean statistical effect of the within-subjects and between-subjects variable ($\eta^2=0.06$), and a type I error rate of 0.05.

Table 4. Bifactor Anova analysis

		Descriptive Statistics		
	Anxiety	Mean	Std. Deviation	N
Before	grown	20.9091	6.26825	11
	low	64.2667	17.15254	15
	Total	45.9231	25.64515	26
After	grown	26.6364	4.98543	11
	low	67.9333	16.91773	15
	Total	50.4615	24.55888	26

Table 5. Analysis of the effect of relaxation techniques on athletes

Source	performance	Type III Sum of Squares	df	Mean Square	F	Mr	Partial Eta Squared
performance	Linear	280.012	1	280.012	23.600	<.001	.496
performance * anxiety	Linear	13.473	1	13.473	1.136	.297	.045
Error(performance)	Linear	284.758	24	11.865			

Following the two-way mixed ANOVA test, the effect that relaxation techniques can have on the performance of female competitive players was observed. Thus, a main effect on performance was found, $F(1.4) = 23.6$, $p<0.001$. A significant main effect was also found for anxiety, $F(1.24) = 64.33$, $p<0.001$. Furthermore, the interaction effect between anxiety and performance was not significant, $p = 0.297$, allowing direct comparisons between the means of the two groups.

Conclusions

The current study is focused on how emotions affect the quality of play of performance athletes. The selected sample consisted of 26 female professional handball players in Romania, and what was investigated was the extent to which the degree of anxiety affects the players' performance, with the effects of the variable taken independently. Following the results, we concluded that a high level of anxiety, predicts a lower level of efficiency on the court; and, moreover, this aspect can be improved by applying a valid relaxation technique.

The hypothesis of how a particular relaxation technique, applied consistently over a sufficient period of time, leads to an improvement in the quality of play of athletes has been confirmed. Thus, following Jacobson relaxation techniques applied to female handball players, an increase in performance levels was observed in both anxious and low-anxious individuals (albeit to a lesser extent). One explanation is that these techniques help athletes to focus better in the current situation, their cognition being shifted from threatening stimuli (e.g. spectator disappointment) to how to manage their emotions so that they are fully dedicated to the end goal.

The current study contributes to the literature by reinforcing the findings of previous studies on the effect of anxiety on elite athlete performance. By the fact that this research was conducted within a specific spatial and cultural context, the current results may also help to reflect certain particularities of Romanian competitive athletes.

Authors' Contribution

All authors have equally contributed to this study and should be considered as main authors.

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