EFFECT OF TRAINING SESSION ON MOOD STATE RESPONSES IN ATHLETES OF WHEELCHAIR BASKETBALL TEAM

EFEITO DE SESSÕES DE TREINAMENTO NAS RESPOSTAS DE ESTADO DE HUMOR EM ATLETAS DE UMA EQUIPE DE BASQUETE EM CADEIRA DE RODAS

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RESUMO

A avaliação do estado de humor pode ser utilizada como uma ferramenta para monitorar as adaptações ao treinamento. Entretanto, para atletas com deficiência física, essa ferramenta ainda encontram-se pouco explorada, principalmente em condições do dia a dia de treinamento. O objetivo do estudo foi analisar o estado de humor durante sessões de treinamento em atletas de basquete em cadeira de rodas. Foram avaliados 12 atletas do sexo masculino, com idade entre 23 e 62 anos. Os sujeitos responderam o questionário POMS pré e pós cinco sessões de treinamento durante o período preparatório. Foram utilizados o teste de *Shapiro Wilk* para normalidade e *Friedman* para comparação do humor entre as sessões, adotando-se p<0,05. Verificou-se que os atletas apresentaram um perfil positivo (*iceberg*) de humor nas sessões analisadas. Uma redução do humor negativo e uma manutenção do humor positivo foi observada após todas as sessões de treinamento. Dessa maneira, os resultados indicam que sessões de treinamento esportivo podem diminuir as dimensões negativas do humor, principalmente a depressão e a raiva em atletas de uma equipe de basquete em cadeira de rodas.
Palavras-chave: Basquete cadeira de rodas. Psicologia do Esporte. Estado de Humor. Treinamento Esportivo.

ABSTRACT

The assessment of mood state can be used as a tool for monitoring the training adaptation. However, to athletes with a physical disability, this tool is still a few explored, especially in training daily conditions. The aim of the study was to analyze the mood state during training sessions in wheelchair basketball athletes. Twelve male athletes, aged between 23 and 62 years old, were evaluated. The subjects answered the POMS questionnaire before and after five training sessions during the preparatory period. Shapiro Wilk test for normality and Friedman were used for comparison amongst sessions, adopting p<0.05. It was found that the athletes presented a positive mood profile (iceberg) during the analyzed period. A negative mood reduction and positive mood maintenance were observed after all training sessions. Therefore, the results indicate that the training sessions can decrease the negative mood dimension, especially the depression and anger in wheelchair basketball athletes.
Keywords: Wheelchair basketball. Sport Psychology. Mood state. Sports training.

Introduction

Nowadays, the search for sports has been increasing, especially for people with physical disabilities[1,2]. This search takes place for different purposes, such as practice due to social, physical, physiological and/or psychological impact[3]. Among the most investigated psychological responses, the "Mood State" is considered a crucial factor within sports practice and has been used as an important parameter in predicting the athlete's performance.

The mood state can be understood as an "emotional state that fluctuates between a continuum of energy towards tension"[5,6] as well as a "temporary feelings that are different in intensity and duration and can last longer than emotions"[7]. The mood state can affect cognition, behavior, success, and failure in external situations. And can be classified into two categories: positive (vigor) and negative (tension, depression, anger, fatigue, and confusion) domain.

In sports settings, the mood state has been used as a psychological marker of stress and adaptation to training[8]. The Profile of Mood State (POMS) questionnaire has been widely used to be a practicable tool to monitor athletes' moods to prevent the decrease in sports performance

or even to avoid the state of overtraining in response to poor adaptation to training routine[9-11]. Additionally, an "iceberg profile" is illustrated as a positive mood profile, in which the positive domain of humor (vigor) is presented with higher values compared to the negative domains, composing an "iceberg" format.

For athletes with physical disabilities, a previous study reported that in wheelchair basketball, athletes tend to have higher values of vigor and lower values of tension, depression, anger, fatigue, and confusion compared to their pairs without physical disabilities[12]. In Brazilian Paralympic track and field athletes, the mood state did not vary during the preparatory period, at the beginning of the training compared to the period before the competition[13].

Therefore, the mood state has been assessed in athletes with physical disabilities, in different conditions, as aforementioned. However, the training session's effect on the mood is not yet elucidated in the literature, especially in this population. The impact of the training session still shows controversial results. Recently, researchers have shown that two training sessions can negatively affect the mood of soccer players[14]. However, other authors have reported that exercise, regardless of the time of day, improves the mood of former elite athletes[15].

Thus, the present study's main objective was to analyze the mood state's responses during training sessions in a wheelchair basketball team in the city of Guarapuava-Paraná. As a central hypothesis, it was considered that wheelchair basketball athletes would present positive changes in mood during training sessions.

Methods

Participants

The sample consisted of 12 male athletes, aged between 23 and 62, belonging to a wheelchair basketball team from the Municipality of Guarapuava, Paraná. For athletes' selection, the following inclusion criteria were considered: belonging to the selected team, interest in participating in the research, regularly attending the training session for at least six months, and signing the Informed Consent Form. Exclusion criteria were considered: the athlete's withdrawal from the team and the questionnaires' non-filling during the training sessions evaluated. The study was approved by the Ethics Committee (opinion number 3,130,340) at Universidade Estadual do Centro Oeste (UNICENTRO).

Procedures

The study lasted five weeks, assessed during the beginning of the preparatory training period. A total of 10 training sessions were evaluated; however, only five sessions were retained for analysis since they had at least eight athletes present during each session. The athletes answered the Profile of Mood State[16] questionnaire before and after each training session. The internal training load (ITL) was quantified in each session by evaluating the session's perceived effort (s-RPE) by the Borg Scale CR-10, applied 30 minutes after the session. The ITL was calculated by multiplying the s-RPE by the duration of the session[17]. Before starting the official data collection, the athletes were familiarized with the questionnaires applied in the study.

Instrument

Mood state was assessed before and after each training session. To assess the mood state, the Profile of Mood States (POMS)[16] questionnaire validated for Portuguese by Pelluso[18] was used. The questionnaire evaluates the mood state's alteration through 42 simple indicators, organized in five negative dimensions: anger, confusion, depression, fatigue, and tension, and a positive dimension: vigor. Participants completed the questionnaire at the training set in a printed form provided by the researcher. All athletes were instructed to answer each item according to a Likert scale from 0 to 4 points, with 0 = nothing and 4 = very much. The final result was given by the sum of the items corresponding to each subscale.

The s-RPE was determined by the Borg19 CR-10 Scale, adapted by Foster[17]. The athletes answered the scale individually, through a link created by the researcher on an online form's platform (Google Forms) and sent 30 minutes after the end of each training session. The athletes answered the question: "How was your training?" regarding the global effort. The ITL was calculated by multiplying the score of the s-RPE by the total duration of the session, in minutes[17].

Traning session

The present team's training sessions took place twice a week, with 120 minutes of duration in each session. The team coach programmed sessions 1 and 2 to present a lower ITL and sessions 3, 4, and 5 to present higher ITL values. All sessions had the following structure: initial warm-up; main part with exercises combining physical capacities; final part with small-sided games focusing on technique and tactics; and return to calm (cool-down). The structure of the session is described in Chart 1.

Session	Duration	Content
Warm-up	10' to 15' min	Running with speed and direction variation; throwing exercises and ball throws.
Main part	30' to 40' min	Speed, agility, strength, motor coordination, and mobility exercises. The exercises were performed in a circuit format, with nine stations, with 2 to 3 min to sessions 1 and 2; and 3 to 4 min to sessions 3,4, and 5.
Interval	5' min	-----------
Final part	20' min	Small-sided games, technical/tactical, attack and defense positioning exercises.
Cool-down	10' to 15' min	Static stretches (upper limbs and torso) and conversation with athletes.

Chart 1. Training session description of the wheelchair basketball team.
Source: Authors

Data analyze

The normality of the data was verified by the Shapiro-Wilk test. Once normality was not observed, the data were described in median and interquartile ranges (Q1 and Q3). The values of the mood state were calculated by the percentage variation before/after the training session. The Friedman test was used to compare a possible difference in mood variation between sessions. The tests were performed using the Jamovi 5.0 software, and for all analyzes, a significance of $p < 0.05$ was considered.

Results

Table 1 shows the participants' characteristics, such as the classification of the injury (according to a previous study by Seron et al. [20]), age (years), and the time of practice in the modality. It is noted that the team is heterogeneous, both in age (23 to 62 years old) and in the time of practice in the sport modality (1 and 13 years).
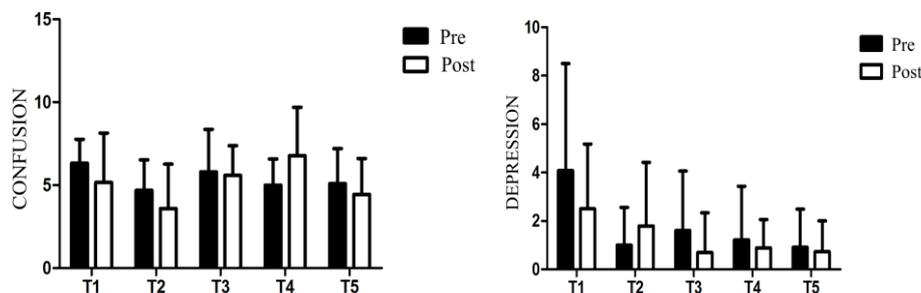
Table 1. Individual description of each athlete, injury, age and practice time

Athlete	Injury (classification)	Age (years)	Time of practice (years)
1	Spinal cord	25	4
2	Spinal cord	23	8
3	Spinal cord	30	7
4	Spinal cord	37	3
5	Spinal cord	29	1
6	Spinal cord	25	2
7	Polio	53	13
8	Polio	52	13
9	Polio	62	10
10	Amputation	51	2
11	Amputation	37	5
12	Amputation	50	10

Source: Authors

The ITL for sessions 1 and 2 showed an average of 288 ± 65.1 A.U and 386.6 ± 80 A.U respectively, and for sessions 3, 4, and 5 an average of 450 ± 106.3 A.U, 570 ± 136.5 U.A and 510 ± 84.8 U.A respectively, reaching what was planned by the team coach.
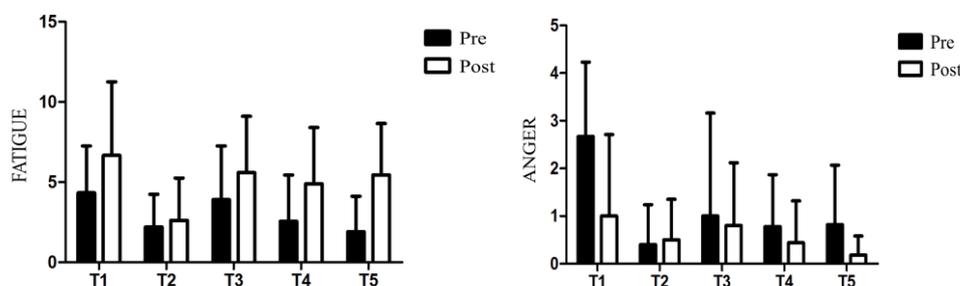
The descriptive values of the mood state domains before and after each training session are presented in Figures 1, 2, and 3. It is noted that the vigor domain presents higher values than the values of the negative mood in all training sessions, demonstrating an "iceberg profile."

Figure 1. Athletes' mood state pre and post-training session for confusion and depression domain

Note: T1: training session one; T2: training session two; T3: training session three; T4: training session four and T5: training session five

Source: Authors

Figure 2. Athletes' mood state pre and post-training session for fatigue and anger domain

Note: T1: training session one; T2: training session two; T3: training session three; T4: training session four and T5: training session five
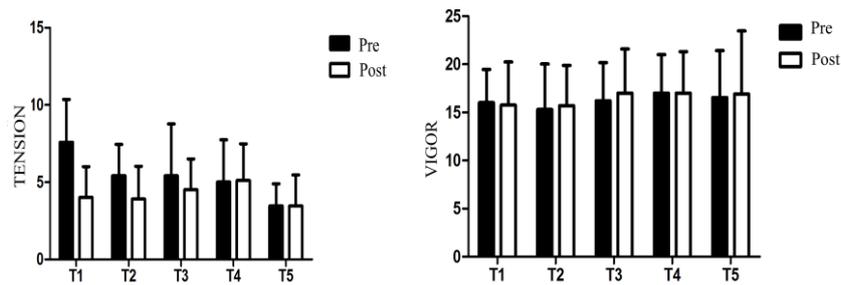
Source: Authors

Figure 3. Athletes' mood state pre and post-training session for tension and vigor domain
Note: T1: training session one; T2: training session two; T3: training session three; T4: training session four and T5: training session five
Source: Authors

Table 2 shows the percentage variation (pre-post training session) of the mood state amongst the five training sessions presented in the median and interquartile range (Q1 and Q3). It is possible to note that the negative domains as depression and anger showed higher percentage variation values, with a reduction of 68.8% for depression and 97% for anger, in session 1. For fatigue, athletes reported higher percentage variation values (69.9% to 84.5%), increasing after the training sessions. When the percentage variation was compared between training sessions, the anger domain demonstrated a statistically significant difference between session 1 compared to t to training sessions 2, 3, 4, and 5. A significant reduction in the anger domain was found after session 1 compared to training sessions 2, 3, 4, and 5 ($p = 0.028$).

Table 2. Difference pre and post-training sessions for each mood domain.

T.S.	Depression				Tension				Anger			
	M	*Q1*	*Q3*	*P*	*M*	*Q1*	*Q3*	*P*	*M*	*Q1*	*Q3*	*P*
1	68.8	20.0	141	0.481	13.5	0.00	33.8	0.077	97.0	75.5	141	0.028*
2	36.9	0.00	57.3		0.00	0.00	18		12.8[a]	0.00	0.00	
3	58.5	0.00	141		28.0	11.0	47		34.8[a]	0.00	50.5	
4	23.5	0.00	35.3		22.0	10.8	47		35.7[a]	0.00	42.3	
5	19.6	0.00	11.8		16.0	0.00	47		29.4[a]	0.00	17.8	
T.S.	**Vigor**				**Fatigue**				**Confusion**			
	M	*Q1*	*Q3*	*P*	*M*	*Q1*	*Q3*	*P*	*M*	*Q1*	*Q3*	*P*
1	14.7	3.00	24.8	0.545	76.5	33.8	141	0.259	29.3	0.00	39.5	0.495
2	9.90	0.00	11.8		74.2	20.0	129		43.4	14.8	42.3	
3	12.5	7.00	15.5		69,9	33.5	124		16.6	9.50	20.0	
4	6.60	4.25	9.00		68.7	2.25	141		29.0	3.25	47.0	
5	10.0	0.00	14.8		84.5	42.3	141		11.2	0.00	17.0	

Nota: T.S.: Training Session; *M:* Median; *Q1*: percentile 25; *Q2* percentile 75; *statistically significant ($p \leq 0,05$); [a] difference in *M* between TS1 and TS2, between TS1 and TS3, and between TS1 and TS5
Source: Authors

Discussão

This study analyzed the possible alterations in the mood state during training sessions in a wheelchair basketball team. As main results, we can highlight that: a) the vigor presented higher values compared to negative mood, in all the training sessions, demonstrating a state of mood as "iceberg profile" during the investigated sessions; b) the negative mood domains as depression and anger showed a greater percentage of variations before the training session,

reducing 68.8% and 97% respectively; c) the variation in anger domain pre-training was more significant in session 1 when compared to the other analyzed sessions.

The iceberg profile, characterized by the high value of vigor and low values in tension, depression, anger, fatigue, and confusion, is expected in a population of athletes in favorable training conditions. An inverted iceberg shape or similar values are associated with an adverse mood profile and symptoms of overtraining[21]. In the case of the present team, a possible justification for an iceberg profile may be related to the fact that the training sessions generate a positive state for improving health. Thus, it is speculated that the health aspect is predominant in this team, and even in sessions with higher ITL values, it does not negatively influence the change in the athletes' mood.

It is worth mentioning that the mood was assessed during the beginning of the pre-competitive training phase, which may be different during the competitive period. Previous studies with sports teams have shown changes in the mood state during the training period. A female volleyball team demonstrated lower values of vigor and higher values of confusion during the preparatory phase compared to competitive ones[22]. However, this behavior is not a consensus in the literature, as shown in long-distance athletes[23] and basketball athletes[24]. Paralympic Brazilian athletics athletes also showed no variation in their mood at the beginning of training than before the competition[13].

When analyzing the mood state before and after the training session, it is noticed that the athletes in the present study showed a reduction in most dimensions of negative mood and maintenance the high values of the positive dimension of mood. Among the domains of negative mood, the dimensions of depression and anger showed a more significant percentage reduction after training, reaching 68.8% and 97%, respectively. These responses can be justified by the fact that individuals have positive feelings after exercise, thus reducing negative feelings, which can be explained by the increase in the concentration of endogenous opioids, such as β-endorphin[25].

Although the present study is one of the first to investigate mood changes during training sessions in wheelchair basketball athletes, it is important to highlight the limitations so that further studies can be conducted to investigate this area of knowledge better. One of the main limitations is the evaluation during only one phase of the training (pre-competitive), making it impossible to obtain results on a possible variation of the mood state between the different phases of the pre-competitive and competitive moments. Additionally, the absence of all athletes in the training sessions restricted the number of sessions analyzed (loss of around 50% of the data); and ending the investigation of just one team of wheelchair basketball allows exploring with caution the results found for the other athletes who practice this sport modality

Conclusion

The results presented show that sports training sessions can reduce the negative dimensions of mood, especially depression and anger, in athletes from a wheelchair basketball team. The training sessions enabled a reduction in the domains of negative mood and maintenance of positive mood, thus demonstrating that the practice of this sports modality can generate benefits associated with the psychological responses of wheelchair athletes. Future research in this area of knowledge is encouraged, seeking a larger sample as well as monitoring the state of mood during a long period of training

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