

Cita: Hajer Sahli; Nidhal Jebabli; Faten Sahli; Sofiene Amara; Hatem Ghouili; Makrem Zhibi (2023). Effect of teacher's verbal encouragement on psychophysiological responses during soccer small-sided game. *Cuadernos de Psicología del Deporte*, 23(2), 251-259

Efecto del estímulo verbal del maestro sobre las respuestas psicofisiológicas durante un partido de fútbol en espacios reducidos.

Effect of teacher's verbal encouragement on psychophysiological responses during soccer small-sided game.

Efeito do encorajamento verbal do professor nas respostas psicofisiológicas durante jogos reduzidos de futebol.

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RESUMEN

Uno de los factores importantes que mejoran la capacidad de los jugadores de fútbol para participar más en la actividad física es el estímulo verbal. El propósito del estudio fue investigar el efecto del estímulo verbal del profesor en los partidos de fútbol en espacios reducidos sobre los parámetros psicofisiológicos. Catorce estudiantes universitarios varones, especialidad fútbol, completaron aleatoriamente cuatro sesiones (S1-S4) de juegos reducidos con (SSGE) o sin estímulo verbal (SSGN). Se registraron la frecuencia cardíaca, el estado de ánimo y el RPE. La alteración del estado de ánimo total disminuye significativamente en las sesiones con SSGE (S1: $P < 0,05$; S3: $P < 0,001$). Además, el RPE mejoró significativamente en SSGE (S1: $P = 0,035$; S3: $P = 0,02$) en comparación con SSGN. Sin embargo, no se encontraron diferencias significativas entre las condiciones para la frecuencia cardíaca máxima durante las SSG. El estímulo verbal del maestro es un método beneficioso para aumentar la motivación, mejorando así la participación física de los estudiantes universitarios en los partidos de fútbol a pequeña escala.

Palabras clave: motivación extrínseca; estudiante activo; variaciones psicofisiológicas

ABSTRACT

One of the important factors that improve soccer player's ability to engage more in the physical activity is verbal encouragement. The purpose of the study was to investigate the effect of the teacher's verbal encouragement in football small-sided games on psycho-physiological parameters. Fourteen male college students, soccer specialty, completed randomly four sessions (S1-S4) of small-sided games with (SSGE) or without verbal encouragement (SSGN). Heart rate, mood state and RPE were recorded. Total mood disturbance decreases significantly in sessions with SSGE (S1: $P < 0.05$; S3: $P < 0.001$). Also, RPE was improved significantly in SSGE ($P = 0.035$; $P = 0.02$) compared to SSGN. However, no significant differences between conditions were found for maximal heart rate during SSGs. Teacher's verbal encouragement is a beneficial method of increasing motivation, thereby improving the physical engagement of college students in small-scale football matches.

Keywords: extrinsic motivation; active student; psychophysiological variations

RESUMO

Um dos fatores importantes que melhoram a capacidade do jogador de futebol de se engajar mais na atividade física é o incentivo verbal. O objetivo do estudo foi investigar o efeito do encorajamento verbal do professor em jogos reduzidos de futebol sobre parâmetros psicofisiológicos. Quatorze universitários do sexo masculino, especialidade futebol, completaram aleatoriamente quatro sessões (S1-S4) de jogos reduzidos com (SSGE) ou sem incentivo verbal (SSGN). Frequência cardíaca, estado de humor e RPE foram registrados. A perturbação total do humor diminuiu significativamente nas sessões com SSGE (S1: $P < 0,05$; S3: $P < 0,001$). Além disso, o RPE melhorou significativamente no SSGE ($P = 0,035$; $P = 0,02$) em comparação com o SSGN. No entanto, não foram encontradas diferenças significativas entre as condições para frequência cardíaca máxima durante SSGs. O encorajamento verbal do professor é um método benéfico de aumentar a motivação, melhorando assim o envolvimento físico de estudantes universitários em partidas de futebol de pequena escala.

Palavras chave: motivação extrínseca; aluno ativo; variações psicofisiológicas

INTRODUCTION

During the last two decades, small-sided games (SSGs) based on games in team sports have been increasingly used in training sessions and in teaching thanks to their beneficial effects on physical performance (Halouani et al., 2014; Sahli et al., 2020; Selmi et al., 2017; Sahli et al., 2022). Studies undertaken on this theme have focused on the effectiveness of situations played in team sports to motivate and also involve players in motor activity and physical exercise (Rampinini et al., 2007; Evangelos et al., 2012; Konstantinos & Natalia 2012; Radziminski et al., 2013; Batista et al., 2019).

SSGs are modified versions of formal games in which the format of play, pitch dimensions, and rules are constrained in order to improve players' technical, tactical, and physical requirements (Batista et al., 2019). SSGs are appreciated not only by the players but also by the coaches in learning situation (Alvarez et al., 2009). This choice of learning or even of coaching could affect the technical, tactical and physical aspects while promoting a psychological impact during SSGs (Alvarez et al., 2009; Los Arcos et al., 2015; Selmi et al., 2018). To determine the psychological level acquired while the subjects are playing, several factors must be taken into consideration such as motivation (intrinsic and extrinsic), aggressiveness, concentration, self-confidence, self-fulfillment, mood state, constriction and physical enjoyment (Sahli et al., 2022; Sahli et al., 2022; Sahli et al., 2021; Aydi et al., 2022; Edwards et al., 2018; Selmi et al., 2017; Pacholek et al., 2022; Hanin, 2001).

The motivation of the coach during the exercise is a particularly important factor to be able to improve the learning process and the player manages to engage more in the activity, especially during high intensity exercises (Selmi et al., 2017; Kilit et al., 2019; Aguiar et al., 2012; Hill Hass et al., 2011). These studies observed that the heart rate of players during reduced games with coach verbal encouragement (VE) was significantly higher than during the same exercise without external motivation. In addition, Sampaio et al. (2014) showed that the rating of perceived exertion increased significantly during two forms of SSG (2 vs. 2 and 3 vs. 3) during VE condition. Therefore, teaching with VE appears to be an essential mean of improving learning, intensity, performance as well as the level of physical pleasure during exercise (Kilit et al., 2019).

These studies reported the importance of the coach's VE on exercise load and psycho-physiological responses in players performance during SSG (Halouani et al., 2014; Selmi et al., 2017). In other words, SSGs could have beneficial effects on physiological and psychological parameters while developing more motivation and great physical enjoyment (Selmi et al., 2017; Clemente et al., 2012; Dellal et al., 2012; Hammami et al., 2017).

At present, few studies have assessed the effects of verbal encouragement in football small sided-games on psychophysiological parameters. Greater knowledge in this area may assist teachers to use VE during physical education. Therefore, the purpose of this study was to determine the effects of verbal encouragement on total mood disturbance, RPE and Heart rate during football SSGs formats of 7 vs 7 soccer college students. Based on findings from

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previous studies (Sahli et al., 2022; Aydi et al., 2022; Sahli et al., 2021; Sahli et al., 2020), we hypothesized that verbal encouragement enhances the total mood disturbance, RPE and Heart rate during SSGs exercise compared to control conditions.

MATERIAL AND METHODS

Participants

Fourteen college students (age: 22.43 ± 1.91 years; height: 1.79 ± 0.04 cm; body mass: 75.71 ± 4.71 kg; BMI: 23.38 ± 1.08) of sport science were involved, voluntarily, in this study. These college students were selected because they were active in soccer education (6 h•wk⁻¹) with previous competitive experience as former professional soccer players (4 ± 1.5 years). Before the start of the study, all participants received a medical screening. Also, college students were informed on the procedures, risks and benefits of the study. All college students are vaccinated against covid-19. The Ethics Committee of the High Institute of Sports and Physical Education of Kef, Tunisia approved the study (approval number: 2021-133), and it was performed in accordance with the principles of the Declaration of Helsinki (2013).

Instruments

Rating of Perceived Exertion (RPE) of each subject was recorded immediately at the end of each session using the 10-point RPE scale proposed by Foster et al. 22 to assess the internal intensity. The RPE was measured using a standardized question "How did you feel and how did you feel during the exercise". This tool has already been used in previous studies. College students responded individually to avoid hearing scores from their colleagues.

The Mood State Profile Questionnaire (POMS) (McNair DM, 1992) was used to measure mood disorders. This self-assessment questionnaire consists of 65 adjectives designed to assess 6 states (Tension-anxiety, Depression-depression, Anger-hostility, Vigor-activity, Fatigue inertia and Confusion-bewilderment). Responses to each item rated on a 5-point Likert scale (0 indicates "Not at all" and 4 indicates "extremely"). The six POMS subscales can

be combined into a total score for mood disorders (TMD) by adding the T scores for the five negative mood subscales and subtracting the T score for mood state positive, and add a constant of 100 to avoid negative numbers [TMD = ((Anger + Confusion + Depression + Fatigue + Tension) - Vigor) + 100]. The college students answered the questionnaire individually.

Procedure

The research was conducted in June 2021. After a familiarization session of RPE scale, the POMS questionnaire, and anthropometric measurements, college students were required to complete the 10-min of SSGs trials utilizing a randomized crossover design.

In fact, four experimental sessions of 10-min of SSGs (7 vs 7) were performed with (SSGE) and without encouragement (SSGNE) in a field area 40m long and 20 m wide.

Sessions S1 and S3 were with encouragement by teacher and S2 and S4 were without encouragement. Randomization was carried out using public online software (<https://www.randomizer.org>).

In SSGE sessions, the verbal encouragement condition consisted of verbally encouraging statements during session 1 and session 3 for all groups (i.e. 'Come on!'; 'Good job!' 'Excellent!'). All verbal encouragement was at a volume a little louder than normal conversation volume. During SSGN sessions, college students performed the SSG without any verbal encouragement. Heart rate (HR) was continuously monitored during each session by Polar Team Sport System (Polar-Electro OY, Kempele, Finland). In addition, the evaluation of perceived exertion (RPE) was recorded 5 minutes after the competition (Foster et al., 2001). College students also recorded their Mood Status Profile (POMS) before and after each training session. All the measurements, during each session, were carried out by the same teachers, during education session, with the same time of the day (10:00 to 11:30 a.m.) to limit the effects of circadian variations on the measured variables. Table 1 present the experimental design.

Table1. Experimental design table.

SSG: small-sided game, **SSGE:** SSG with teacher’s encouragement, **SSGNE:** SSG without verbal teacher’s encouragement; **POMS:** profile of mood-state; **RPE:** Rating of perceived exertion; **HR:** Heart Rate.

Sessions											
S1			S2			S3			S4		
10-min of SSGE (7vs.7)			10-min of SSGNE (7vs.7)			10-min of SSGE (7vs.7)			10-min of SSGNE (7vs.7)		
Before	during	After 5 min	Before	during	After 5 min	Before	during	After 5 min	Before	during	After 5 min
POMS	HR	POMS RPE	POMS	HR	POMS RPE	POMS	HR	POMS RPE	POMS	HR	POMS RPE

Data Analysis

All data are expressed as mean ± standard deviation (SD). Before using parametric tests, the normality hypothesis was validated using the Kolmogorov-Smirnov test.

For mood status, a two-way analysis of variance (ANOVA) was used to examine the effect of “Training” (SSGE or SSGNE), “Time” (pre- and post-training session) and their interaction (training modality x effort) on the POMS score. Student's paired t test was used to compare pre and post training mood responses at each session.

Regarding RPE scores and HRmax, we used the one-way ANOVA to compare between measures / responses from each session. When a significant difference was found, the analysis was completed by a post hoc test. Cohen's d coefficient was used to give a rigorous judgment on the difference between SSGE and SSGNE. The magnitude scales were considered trivial, small, medium and large, respectively, for values from 0 to 0.20, > 0.20 to 0.50, > 0.50 to 0.80, and > 0.80 (Hopkins et al., 2009).

Analyzes were performed using the Social Science Statistical Package (v26.0, SPSS, SPSS Inc., Chicago, IL, USA) and the significance level was set at $p < 0.05$.

RESULTS

For total mood disturbance (TMD), a significant effect for time ($p < 0.001$; $\eta^2 = 0.52$), time effect ($p < 0.001$; $\eta^2 = 0.98$) and interaction effect ($p = 0.018$; $\eta^2 = 0.19$) were found. However, no significant effect of session ($p = 0.822$; $\eta^2 = 0.01$). Post hoc comparison revealed that TMD was significantly higher before SSG than after during session 1(SSGE), session 3 (SSGE) and session 4 (SSGA) (figure 1).

Using the one-way ANOVA, a significant difference of RPE scores between sessions ($p = 0.004$; $\eta^2 = 0.28$). Post hoc analysis revealed a significant increase of RPE during SSGE sessions (Session 1, 3) compared to SSGN ($P = 0.035$; $P = 0.02$) (figure 2).

For maximal heart rate, using the one-way ANOVA, no significant difference of heart rate between sessions ($p = 0.115$; $\eta^2 = 0.14$) (figure 3).

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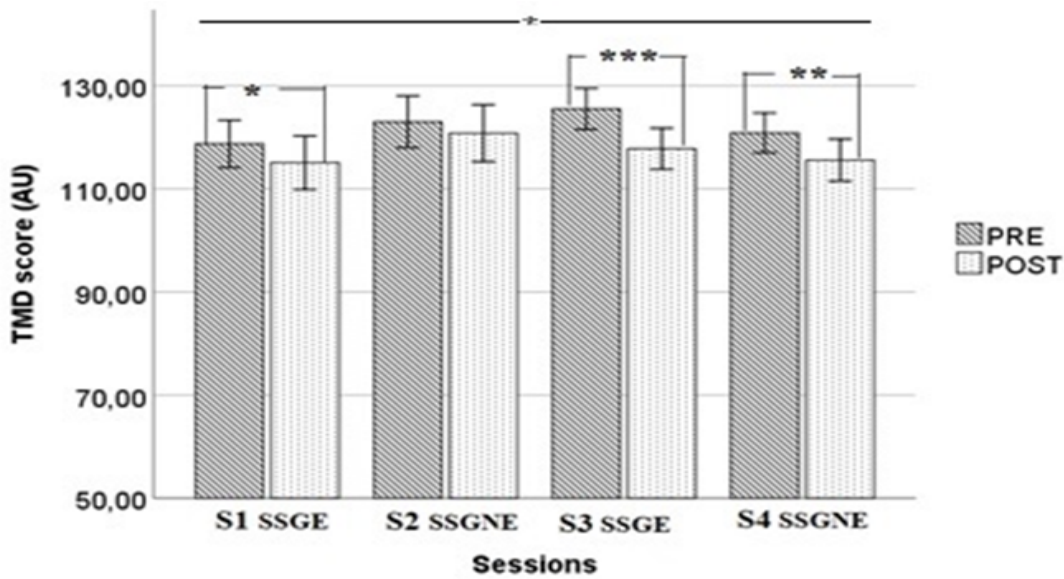


Figure 1. Mean profile of mood states score measured before and after SSG with and without verbal encouragement sessions. SSGE: Small sided game with verbal encouragement; SSGNE: Small sided game without verbal encouragement; TMD: Total mood disturbance. * $p < 0.01$; ** $p < 0.001$; *** $p < 0.0001$

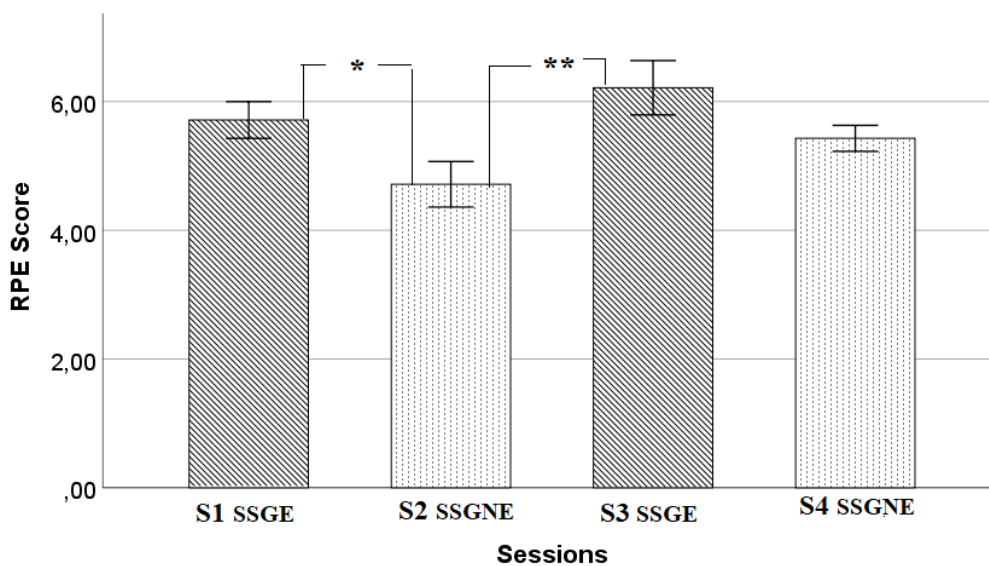


Figure 2. Comparison of Rating of perceived exertion (RPE) score between small-sided games with teacher's encouragement (SSGE) and without teacher's encouragement (SSGN). * $p < 0.01$; ** $p < 0.001$.

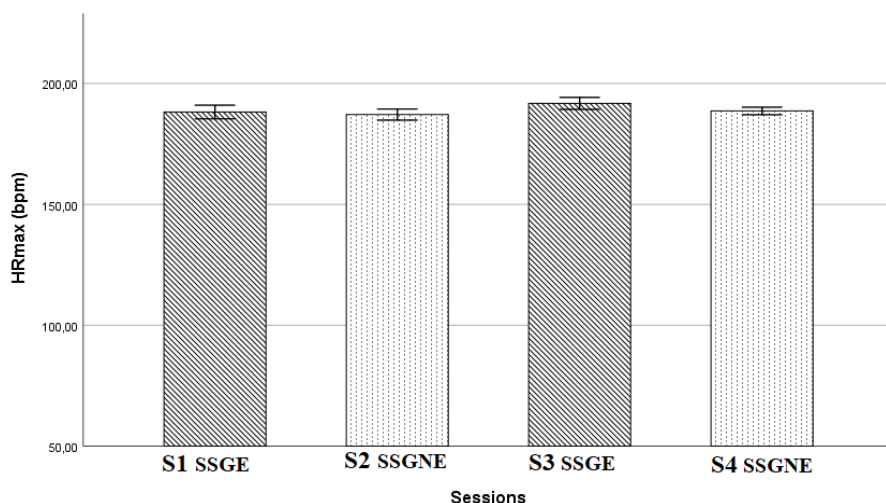


Figure 3. Comparison of Maximal Heart Rate (HRmax) between small-sided games with teacher's encouragement (SSGE) and without teacher's encouragement (SSGN).

DISCUSSION

This present study aims to investigate the effect of the teacher's verbal encouragement in SSGs on psychophysiological parameters. This investigation was carried out with male students between the ages of 21 and 23 years.

The results of the current study showed that the TMD score was decreased after each session of training with VE (S1: $3.59 \pm 4.50\%$; S3: $6.70 \pm 3.83\%$). In the same context, Sahli et al. (2020) have indicated that verbal encouragement given by PE teachers during soccer Small-sided games can decreased total mood disturbance (TMD) ($p = 0.001$, $\eta^2 = 0.60$) in male school college students (age: 17.37 ± 0.48 years). Performing football training with verbal encouragement results in a decrease in TMD. This indicates that a specific training with the ball causes an increase in positive statements and an increased positive mood. These results are in line with those presented by Sparkes et al. (2020) who investigated the influence of reduced games with ball on mood. Decreases in TMD after this type of training are usually related to higher vigor and lower tension.

Findings showed that verbal encouragement can improve the RPE score compared without verbal encouragement (S1-S2: $16.07 \pm 24.74\%$; S3-S4: $8.08 \pm 23.43\%$). However, these results were agreed with those reported by previous studies (Selmi et al., 2017;

Rampinini et al., 2007). Rampinini et al. (2007) investigated the effect of verbal encouragement in several small-sided games (3 vs 3, 4 vs 4, 5 vs 5, and 6 vs 6) on small, medium and large pitches. The same authors showed that the value of RPE was significantly higher in small-sided games when verbal encouragement from the coach was given in amateur footballers (age: 24.5 ± 4.1 years). Likewise, Selmi et al. (2017) examined the effects of coach encouragement for 4 vs 4 reduced games on the physiological responses of young footballers. There also showed that RPE was higher in small-sided games with encouragement compared to reduced games without encouragement in professional footballers. This non-significance at the level of RPE, perhaps due to the difference in the experimental conditions and the types of encouragement imposed by the teachers.

Ours results revealed that HRmax remained unchanged after the both conditions ($p > 0.05$). These results do not agree with those reported by previous studies (Sahli et al., 2020; Selmi et al., 2017). However, Sahli et al. (2020) showed that HRmax was decreased (4.45%) in soccer players during Small-sided games with teacher's verbal encouragement. The same authors indicated that the sports teacher's encouragement can motivate players to provide a high level of physical engagement, maintain a high work rate during the play situations (Sahli et al.,

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2020). In contrast, Rampinini et al. (2007) showed that HRmax was improved during different small side games formats with coach encouragement (3 vs. 3, 4 vs. 4, 5 vs. 5, and 6 vs. 6) in amateur soccer players (age: 24.5 ± 4.1 years). These differences in the results may be from the difference in the level of physical training of participants.

CONCLUSIONS

Teacher's verbal encouragement is an important method of verbal encouragement aimed at improving motivation in school sports (Sahli et al., 2020). Our findings showed that teacher's verbal encouragement can improve motivation with decreased of TMD and RPE during football small-sided games. In addition, verbal encouragement has no effect on maximum heart rate variation. Teacher's verbal encouragement is a beneficial method for increasing motivation and thereby improving the physical engagement of college students during football small-sided games. Future investigations should also incorporate variations in verbal cue in relationship with physical and psycho-physiological parameters during SSG. Furthermore, the results of this study may not be applicable to other measurements of SSG and performance, such as attention and decision-making.

PRACTICAL APPLICATIONS

Small-sided game is one of the main practice tools used to assess technical tactical quality in football. Verbal encouragement can be a common component of any physical exercises. The results of this investigation indicate that the use of the verbal cues, as "Come on! Good job! Excellent!", produce higher motivation with decreased of TMD and RPE during football small-sided games without change on maximum heart rate variation. Consequently, teachers should ensure that when college students are playing SSGs, positive encouragement is provided.

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