Original Article

Changes in Global Self-esteem after Short-term Sprint Interval Training in Elite Soccer Players

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ABSTRACT

We attempt to highlight of the effect of intensive training on global self-esteem (GSE) and relationship between specific self-esteem and anaerobic performances among the young elite soccer player. Thirty-two healthy, elite soccer men from the same 1st division club participated in this study (mean (SD) age 21.4 (0.9) years). None of the participants were participating in any other physical activity except the soccer training and the high-intensity sprint training (HIST). HIST consisted on repeated-sprint exercises performed during the warm-up period for eight-weeks (3-times a week). Before (T1) and after (T2) the HIST, all participants performed the repeated-sprint ability test (RSA) which consisted in 7x30-m runs with 30-s of active recovery. During the recovery, a French translated form of the RES 10 scale was used to determine the Global Self-Esteem (GSE) change for all participants before and after training. We observed significant (p<0.05) increase of GSE results after training for all participants. In fact, results were increased from 29.81±2.92 in T1 to 32.4±3.00 in T2. Before training and after training, the total sprint time (TT) was positively correlated to GSE (r= 0.64, p<0.01 in T1 and r= 0.66, p<0.01 in T2). In addition, the fastest time (FT) was also positively correlated to GSE before (r= 0.53, p<0.01) and after training (r= 0.45, p<0.01). Maximum speed sprint workouts are an effective way to improve anaerobic performances in elite soccer. The Short intense sprint exercise training should be integrated into the training program for development of self-esteem in young soccer.

Keywords: Intense exercise, motivation, perception of exertion, physical education, self confidence

INTRODUCTION

Team sports achievement and self-esteem were classified as the primary reason of successful and satisfaction in sport and/or social life (Tesser et al. 1983). The global self-esteem (GSE) is defined as a conscious perception of one's qualities and abilities, or as a psycho-social construct used by an individual and his or her peers in assessing behavior and perceptions of self-worth (Rosenberg, 1965). It is a determinant key for motivation during regular practice of physical activity (Coleman et al. 1993). It is also an important sign of good mental health (Harter et al. 1998; Roberts et al. 1981) and academic success (Trudeau et al. 2008; Schurr et al. 1970).

Most previous data examined behavioral influences during physical activity on self-esteem and has been considered as an important component of positive self-evaluation (Fox, 2000). McAuley and al. (1995) reported a strong relationship between self-esteem and physical activity. Studies have confirmed that physical activity (PA) is also associated with an increase in self

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confidence and sense of well-being (Brownson et al. 2000; Sonstroem, 1984). Scientific approaches (Fox et al. 1989; Marsh et al. 1985) permitted a growing understanding of interrelationships between the practice of a physical activity and self-esteem, and facilitated experts to evaluate the impact of physical education and rehabilitation programs upon self-esteem and mental health (Taylor et al. 1985).

Gruber (1986) observed that moderately trained children (14-15 years) have higher self-esteem scores with higher performances compared with the control group. High self-satisfaction of the physical performance in soccer female practice improved perceptions of overall physical ability, with a positive influence upon global self-esteem (Khasawneh, 2015). Conversely, an immediate decrease in global self-esteem has a negative influence upon self-assessments in specific sub-domains (Keith et al. 1999). However, previous studies have reported equivocal results because of measurement issues and lack of conceptual clarity. In fact, training status, anthropometric differences, sports type and fitness can underestimate the self-esteem response to social cues (Fox, 2000) and even during workout in sport training (Marsh et al. 1985).

To the best of our knowledge, most previous studies have investigated the effect of endurance training or low intensity exercise on global self esteem (Kirkcaldy et al. 2002; Daley et al. 1999) and tend to gravitate toward low and moderate exercise. In addition, due to conflicting findings, research into the relationship between physical activity and measures of self-worth is warranted, particularly in the adolescent years (Bowker, 2006).

While most studies have explored the effects of physical activity on GSE, there was no data concerning effect of intensive physical training in young adult on assessments of global self-esteem. This is an important omission, particularly when testing athletes, since many are likely to have engaged in recent vigorous physical activity. Hence, the aim of our study was to investigate the relationship between immediate measures of global self-esteem and the practice of vigorous training in moderately-trained young men (soccer players).

MATERIALS AND METHODS

Participants

Thirty-two healthy and trained athletes (mean age: 21.4 ± 0.9 years; height: 170 ± 0.0 cm; body mass: 74.0 ± 6.9 kg, BMI: 21.4 ± 0.9 kg/m2) participated in our study. All were informed about the experimental procedures and subsequently signed a written consent form according to the standards of the Ethical Committee on Human Research (ECHR) of the local University.

All participants were students at the School of Physical Education, with a 6.8 ± 1.7 years history of soccer practice. They followed a weekly soccer training program of <180 min.week^{-1}. None had participated in regular intensive training prior to the preceding year months. A medical examination was carried out before the start of the study. All were found to be healthy, and were not consuming any medications. Basic anthropometric parameters were measured before and after the experimental period (T1, T2) under the same clinical conditions.

Training Program

Before training, all subjects were familiarized with the experimental procedures in the outdoor-track field. All Subjects participated in a classic football training program during 8 weeks (3 sessions a week during 8 weeks).

Before the start of the session, during warm-up, subjects performed repeated sprint exercise. RSE consists of a series of repeated short track of 7×30-m sprints with 30-s of active recovery (jogging in ~50 m) between sprints. Each track was performed at maximum intensity (all-out).

Testing Procedures

The evaluation was divided into two phases, the first period (T1) was before HIST and the second one (T2) was after the training period.

Tests were performed under identical conditions (Temperature: 26C°, Humidity: 55%, speed of wind: 2 m.s^{-1}).

Subjects performed an initial warm up of 10 minutes of jogging (50-60 % of Maximum Heart Rate (HR$_{max}$)), followed by five sprints over short distances (50m) and 5 minutes of stretching. After 5 minutes of rest (setting position); all participants carried out a repeated sprinting test RSA: 7 × 30-m runs, with 30-s active recovery intervals between sprints (Barbero-Álvarez et al. 2010). Sprints began from a standing start, and at the signal, subjects covered

the required distance at their maximum speed. A demonstration was made to ensure the test procedure was well understood. The time taken for each sprint was recorded by photocells (Microgate, Bolzano, Italy). The data recorded were the Fastest sprint Time (s) (FT), Total sprint Time: the sum of the 7 sprint times (s) (TT) and a Fatigue Index (FI) based on the decrement in speed from the fastest to the slowest run (Fitzsimons et al. 1993). The observer called out each subject's performance immediately after completing each run.

Psychological Survey

After 15 minutes of recovery from RSA, subjects completed a translated French form the Rosenberg Self-Esteem Scale RSES-10 (Hamrouni et al. 2012; Vallières et al. 1990) in order to determine their global self-esteem (GSE).

This questionnaire comprises 10 items; half are presented in a positive way (e.g. "I feel that I have a number of good qualities," "I have a positive attitude towards myself"), and the other half are presented in a negative form (e.g., "Sometimes I think I'm good for nothing», «I feel I do not have much to be proud of").

Subjects respond on a 4-level Likert type scale (1: Strongly Agree; 2: Agree; 3: Disagree, 4: Strongly Disagree).

If the overall score is less than 25, GSE is considered as "very low", between 25 and 31, GSE is considered as "low". A score between 31 and 34 is considered as "moderate" GSE, a score between 34 and 39 corresponds to a "high" GSE, and if the score exceeds 39, the GSE is considered "very strong".

The questionnaire was explained by expert in order to facilitate the understanding of the survey.

Statistical Analysis

Statistical analyses were carried out using the SPSS 20 program for Windows (SPSS, Inc, Chicago, IL, USA). Descriptive statistics (means and standard deviations) and calculation of linear regressions and Pearson correlation coefficients were calculated by least squares linear regression analyses. T1 and T2 of the Rosenberg Self-Esteem Scale were compared using an appeared Student t-test. The confidence level for statistical significance was set at $p < 0.05$.

RESULTS

Repeated Sprint Performance

Before HIST, scores of the repetitive sprint test averaged were 45.0 ± 1.2 s for total sprints time (TT), 6.2 ± 0.2 s for the fastest (FT) and $44.7 \pm 2.7\%$ for fatigue index (FI). After HIST, scores of the repetitive sprint test decreased significantly ($p < 0.05$) for Total sprints time (TT) 42.1 ± 1.5 s, best running time 5.8 ± 0.2 s and increased slightly to $45.8 \pm 3.5\%$ for fatigue index (FI).

Global self esteem

All participants showed a significant ($p < 0.05$) increase in GSE after HIST (from 29.8 ± 2.9 to 32.4 ± 3.0).

Relationship between global self esteem and repeated sprints performances

Before HIST and after HIST, the total sprint time (TT) was correlated to GSE (r = 0.64, p < 0.01 in T1 and r = 0.66, p < 0.01 in T2).

In addition, the fastest running time was also correlated to GSE before (r = 0.53, p < 0.01) and after HIST (r = 0.45, p < 0.01).

However, no correlation between fatigue index % (FI) and GSE was observed from before to after HIST.

DISCUSSION AND CONCLUSION

The present study demonstrated for the first time that intensive training based on repeated sprint exercises improves GSE in young trained athletes. These results were associated to elevated significant decrease in the total sprint time (TT).

Global self esteem results differ from one study to another, depending on the physical activity, the range of age of participants and methods used during experimental protocol. For example, the average score observed in the United States in high school student was 32.2 while in Morocco in high school student it was 29.1(Schmitt et al. 2005). In a small sample of 136 teachers in Tunisia, the average score was 31.2 for teachers of physical education and 29.9 for those who teach academic subjects (Hamrouni et al. 2012). However, information about global self esteem scores in trained athletes is missing. Hence, we examined prospectively the relationship between physical activity and self-efficacy and multidimensional self-esteem in a sample of trained-athletes.
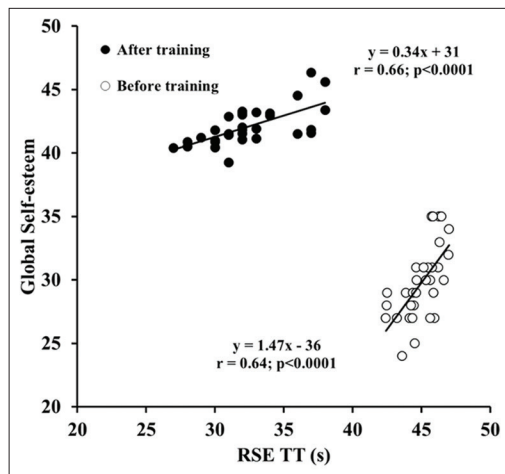
Figure 1: Correlation between the global self esteem and RSE TT before and after training (n=32). RSE: Repeated sprint exercise, TT: Total speed time
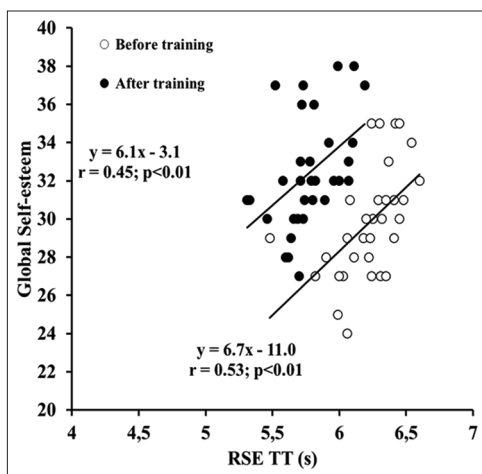
Figure 2: Correlation between the global self esteem and RSE FT before and after training (n=32). RSE: Repeated sprint exercise, TT: Total speed time
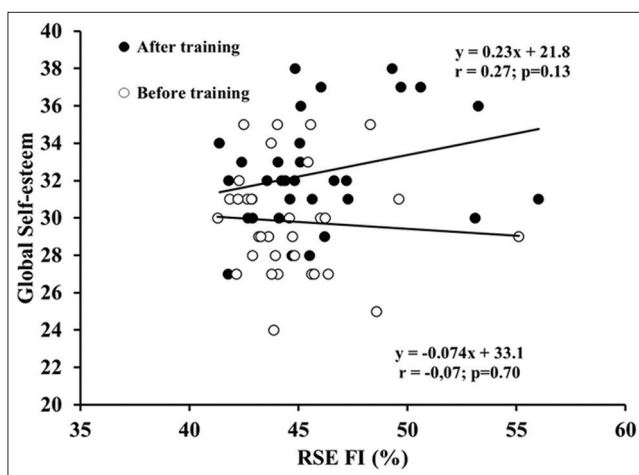
Figure 3: Correlation between the global self esteem and RSE FI before and after training (n=32). RSE: Repeated sprint exercise, FI: Fatigue index

We should mention that global self esteem depends on several factors such as environment, training status and psychological condition (Gauvin et al. 1999; Rejeski, 1994). In our study, the training adherence was determined for each participant during all the experiment in order to limit the interference of personal and sociological factors.

Previous investigation, Elavsky et al. (2007) observed high global self-esteem with higher performances in young trained (endurance activities) compared with control groups. These results were also correlated to greater mental health status (Plante et al. 2000).

However, the exercise's perception rate depends on exercise intensity. In fact, for Dishman (1994), the individual's perception of the physical workout would differ according to exercise dose. The rating of self-esteem showed correlations between individual's highest physical performance and higher self-esteem (André et al. 2011; Baumeister et al. 2003). Similar results were also found in our study. In fact, the fastest running Time (FT) and the total sprint time (TT) was correlated to GSE before HIST and after- training. It seems that repeated sprint exercise allowed improvement of perception of workout and then the resulted performance. According to some authors, the increasing number of repetition of specific activity allows good learning and enhances self esteem (Duclos et al. 1995).

For some other studies, higher self esteem and higher performances are probably due to physiological (neuromuscular, hormonal and metabolic responses) changes to intensive training (Schneider et al. 2008; Spence et al, 2005). Such training induced physiological adaptations may have direct impact on subject answers to the RSES-10 questionnaire (Kernis et al. 1989). In fact, with HIST, individual's perception to pain will be reduced (Veale, 1991) and the exercise related to stress will be diminished (Wipfli et al. 2008).

In summary, we find that repetition of short bouts of intensive exercises increased repeated sprint performance in young soccer. The HIST increased also total speed time and fastest time in young soccer. Interestingly, the global self esteem increase after intensive training. Intensive training thus has potential interest as a tactic for enhancing self-esteem in both sports and social life.

Table 1: Training program for all participants

	Intensity	W1-W8
Warm-up	Moderate-high-intensity	Exercises=Jogging (10 minutes)+5 sprints (50m)+stretching (5 minutes)+RSE (7 sprints-30m)+Rest (5 minutes)
Session	Moderate-high-intensity	Football training program: (strength training/endurance training/sprint training/technical and tactical skills in soccer)
Rest	Low intensity	Walking (5 minutes)+stretching (5 minutes)

RSE: Repeated sprint exercise, W: Week

Table 2: Repeated sprint performances measured for all participants (n=32) before and after training

	Before training (T1)			After training (T2)		
	TT (seconds)	FT (seconds)	IF (%)	TT (seconds)	FT (seconds)	IF (%)
Mean±SD	45.0±1.2	6.2±0.2	44.7±2.7	42.1±1.5**	5.8±0.2*	45.8±3.5

Mean±SD, TT: Repeated Sprint Exercise Total Time, FT: Fastest Time recorded during repeated sprint exercise, IF: Fatigue Index, *: $P<0.05$, **: $P<0.01$

Table 3: Global Self Esteem measured for all participants (n=32) before and after training

	GSE before training (T1)	GSE after training (T2)
Mean±SD	29.8±2.9	32.4±3.0**

Mean±SD, GSE: Global Self Esteem, *: $P<0.05$, **: $P<0.01$

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Conflict of Interest

The authors declared no conflict of interests regarding the publication.

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