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The Impact of Imagery on Self-efficacy and Volleyball Spike Performance: Mediating Role of Positive Self-talk

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ABSTRACT

The aim of this study is to determine the impact of imagery on self-efficiency and spike implementation of girl volleyball players in Tafresh, considering the mediating role of positive self-talk. For this purpose, in a non-equivalent pretest-posttest control group design, 45 female football players aged 17-25 with sports record of 6 months to 2 years were selected out of high schools and universities in Tafresh. They were distributed in 3 groups on the basis of spike skill level, imagery ability and the level of Self-efficiency. The first group imagery and physical practices program, the second group imagery and positive self-talk and physical practices and the third group without any programs took part in an experimental course three days a week for 12 sessions. For data collection, sports imagery questionnaire (Hall *et al.*, 1998), feeling of sufficiency scale (Bandura, 1994) and volleyball spike standardized test (AAHPERD) were used. Data analysis was done at a meaningful level of 0.05 through variance analysis with repeated measurements and Tukey posthoc (HSD) test. The results of the research showed that imagery along with physical practice leads to spike improvement and self-efficiency but if imagery is associated with positive self-talk, effectiveness rate of imagery will be increased.

Keywords: Self-efficiency, Mental imagery, Positive self-talk, Volleyball spike.

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INTRODUCTION

Bandura (1986 and 1977) defines self-efficiency as one's belief in his/her own ability to arrange and implement a set of activities needed to achieve desired performance (1, 2). In general, there is a relationship between self-efficiency and an individual's belief for being successful in implementing a specific behavior or different behaviors which are necessary for obtaining a specific result (3-5). Individuals are willing to do the tasks that make them feel self-sufficient. In sport, there are a lot of situations in which self-efficiency beliefs can contribute. On the other hand, there are factors which are supposed to be able to increase self-efficiency. Some of these factors are successful behavior, emotional and physiological arousal, observational experiences, verbal encouragement (6), positive emotions regard and centralization, goal, and mental imagery (7).

Among these factors, imagery, which can occur in any sensory strategy, can be introduced as a symbolic sensory practice. Richardson (1969) introduces imagery as knowledge of quasi-perceptual and quasi-sensory practices that leads to real perceptual and sensory experiences in situations of real incitement (8). Generally, imagery is a mental process (9) or an intellectual method (10).

Through a case study, experimental methods and narrative techniques, researchers have found imagery has a positive effect in various sports and in different situations (11). Imagery can be used with different purposes for promoting physical and psychological skills. The cases imagery is used include increasing focus, control of emotional responses, and psychological skills control (12). Increasing confidence, learning and practicing skills and sports strategies, eliminating low performances (13), tolerating pain or injury,

goal setting, and relaxation (14, 15) are the examples.

On the other hand, some other studies have shown that imagery with negative attitude results in harmful consequences so that researchers have acknowledged that detrimental effects of negative imagery are high; and as positive imagery leads to positive results, negative imagery will result in negative consequences (3).

The research of Hall *et al.* (2009) on 345 athletes with the average age of 17-34 showed that mental imagery has a meaningful effect on sportive confidence at the time of practice and competition. They believed that most sportsmen have positive imagery associated with victory and success of their performance and seldom imagine themselves in defeated conditions (16). Cumming's (2008) research on 162 participants with the average age of 23 showed that physical health and technical imagery may have positive effects on self-efficiency belief and promoting sportive behavior (17). The results of Short and Short (2005) research on 79 soccer players between the ages 18 to 23 showed that high confidence results in better and easier imagery (4). Short, Tenute and Feltz (2005) also showed through a research on 74 female athletes of various sports that athletes with high confidence for the use of specific images have used imagery more than the others and self-efficiency in using imagery for a modified form showed only the relation between imagery ability and the use of cognitive imagery (5). Since mental skills refer to innate or learned features of athletes which can make their success possible or probable, mental methods or strategies are trainings that lead to the acquisition of these skills. Anxiety control, attention control, having inner motivation, and maintaining self-confidence are of mental skills. Examples of mental methods also include imagery, self-talk, and goal selection (11).

Additionally, coaches and athletes believe that regulation of motivation, mental imagery, increasing the self-confidence, increased motivation (goal selection), and attention and focus skills (self-talk and mental programs) can be beneficial to be part of mental preparation programs (18, 19). Accordingly, although the researches done indicate the important point that in imagery the individual's imaginations of himself in successful completion of a skill (that is, skill imagery as a promoter) leads to increase in self-efficiency expectations, but it seems that in this case also imagery should be positive and if the individual's imagery is negative it does not increase self-efficiency (3).

There are some interfering methods for eliminating the problem of negative imagery such as: relaxation techniques (20) motivation and real expectations, clarity and controllability of the image (21-24).

Optimistic thinking is in relation to pessimistic thinking and positive self-talk. In addition to centralization increase, positive self-talk has lots of uses such as: quitting bad habits, starting an action, perseverance in learning skills, promoting confidence, enhancing motivation and reducing anxiety. Self-talk has an important contribution in determining the type of reaction to a situation and these reactions affect the following actions and feelings (25). Weinberg & Gould (2011), quoted from Micheas, expressed 6 rules for self-talk as follows (18):

- Statements should be short and specific,
- First-person singular and present tense should be used,
- Statements should be affirmative,
- Statements should be expressed with a special meanings and intentions,
- Speak kindly to yourself,
- Statements should be repeated periodically.

Cumming *et al.* (2006) in a research on 95 participants concluded that association of

driving imagery and driving self-talk improves performance and vice versa prohibitive imagery and self-talk prevents doing the action (3). Whitbread and Newell (2013) conducted a study on 30 tennis players with an average age of 20 years and concluded that combination of imagery and self-talk (educational and motivational) increase and improve self-efficiency (26). Zetou *et al.* (2012) conducted a study on 57 women with a mean age of 13 years and concluded that self-talk improves the performance and learning of service skill and also develops self-efficiency (27).

In a research on 5 men with the average age of 24, Thelwell and Greenlees (2001) concluded that practicing intellectual skills has been effective in promoting implementation of triad sports of all participants and has resulted in success and feeling of satisfaction. In general, application of mental skills is effective in implementation of endurance-like activities (28).

Although, in a research that Palmer (1992) executed on 12 ski racers of routines with the average ages of 12-17, he concluded that self-talk does not have any impacts on improving implementation of ski racers skills in ski routines (29). In order to evaluate psychological factors (self-confidence, intellectual imagery and self-talk) in relation to practice and competition, Highlen and Bennett (1983) also performed a research on 39 wrestlers and 44 professional divers respectively. They showed that professional divers used positive self-talk less than this group of athletes who were not professional (30). The research of Rotella *et al.* (1980) also on 47 professional and skillful ski racers of the United Nations of America with the average ages of 12-19 showed that thoughts content of professional and successful ski racers was not different from less successful ski racers (31).

As all our activities, abilities, attitudes and feelings are emanated from our self-talk; in fact, it is self-talk that unconsciously leads us to our activities. In reality, it is this self-talk that determines all our behaviors. It is possible that the use of positive self-talk improves the effect of imagery resulting in the change of belief, self-efficiency and performance (32). As a study about the impact of imagery associated with positive self-talk on self-efficiency and sportive performance has not been done so far, the present study is persuaded to investigate, does positive self-talk improve the effect of mental imagery on self-efficiency and spike implementation of girl volleyball players?

Thus, the following hypotheses are proposed:

Positive self-talk improves the effect of mental imagery on self-efficiency of female volleyball players.

Positive self-talk improves the effect of mental imagery on spike implementation of female volleyball players.

MATERIALS AND METHODS

The present study was a quasi-experimental research with pre - post test plan and experimental and control treatments.

Subjects. the community under study included 787 girl student volleyball players at the ages of 17 to 25 in Tafresh in 2010-2011(including 246 students from girls' schools of Education and Training Organization from Tafresh, 223 students from Islamic Azad University in Tafresh, 220 students from National University and 98 students from Payame Noor University). One hundred and twenty students were selected as two stage cluster sampling. For selecting eligible members, first AAHPERD standardized test of spike skill was done among 120 candidates and 72 students who gained 12 scores out of 20 were selected for the next stage. Then, mental imagery questionnaires were distributed among the

participants and 55 individuals whose average score of imagery was between 120 and 150 were selected. In the last stage also physical self-efficiency questionnaires were distributed among the rest of individuals and the participants who got the minimum self-efficiency grade of 14 from 23 were selected. From among the rest of individuals, 45 students were randomly selected and were similarly divided in three groups: a) "first experimental group" which had mental imagery and physical practice, b) "second experimental group" which had mental imagery associated with positive self-talk and physical practice, c) "control group" which hadn't any intervention and only participated in pretest and posttest. Such that statistically, there was not a meaningful difference between the grades of imagery, self-efficiency and spike skill implementation of three research groups.

Instruments. The tools used in this research were an individual data questionnaire, Hall *et al.* (1998) mental imagery questionnaire (33). The answers to this 30-question questionnaire were on a 7-degree Likert scale from 1 (seldom) to 7 (often) which graded imagination. Based on the data related to basic evaluation, Cronbach's Alpha coefficient for 5 subscales ranged between 0.76 and 0.88 in the present research. Moreover, Alpha coefficient for the whole scale was obtained 0.84 which indicates the internal equivalence acceptable for the scale and the questionnaire's validity had been confirmed by instructors and experts in this field. Self-efficiency feeling questionnaire made by Bandura's (1994) (obtained from Bahrami, 2005) included 23 phrases with correct and incorrect answers and the nearer an individual's grade was to Figure 23, the individual's perception of his ability was more and vice versa (34). The reliability of this questionnaire was assessed through Spearman-Brown Prophecy Formula (SBPF) by Bahrami (2005). Its Alpha coefficient was %78 and the questionnaire's

validity had been confirmed by instructors and experts. The goal of volleyball spike standardized test (AAHPERD) was measuring precision in hitting spike. In this test, the individual had to throw the ball in a specified area.

Statistical Analysis. All obtained information were analyzed using Repeated

Measures ANOVA and Tukey HSD test for posthoc by SPSS software at a significance level of 0.05.

RESULTS

The result show that the main effect of within the group for self-efficiency was significant ($F = 35.465$, $p = 0.001$) [Table 1].

Table 1. Comparison of self-efficiency of three groups

Change resources	Sum of squares	df	Mean squares	F	p
Within group	145.800	1	145.800	35.465	0.001*
Between groups	25.411	2	12.706	5.254	0.009*
Interactive effect	78.533	2	39.267	9.551	0.001*
Total	249.744	5			

*: $p < 0.01$.

Paired sample t test analysis show that the self-efficiency of both “First experimental group” and “Second experimental group” elevated significantly (both $p = 0.001$) from pretest [(Mean = 14.733 ± 1.752) and (Mean

= 15.733 ± 1.579) respectively] to posttest [(M= 17.866 ± 1.726) and (Mean = 18.000 ± 2.138) respectively]. But, the self-efficiency of control group didn't significant change ($p = 1.00$) [Figure 1].

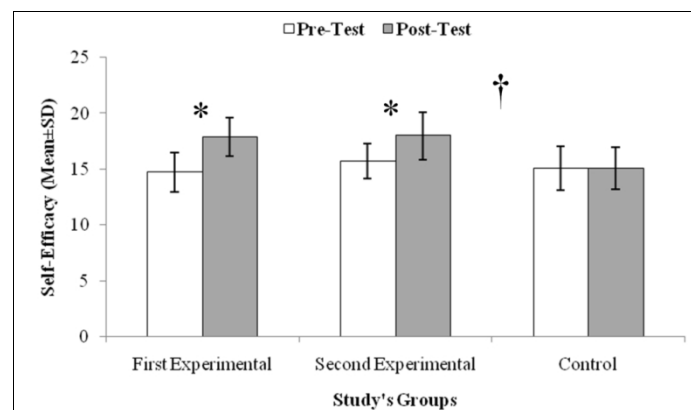


Figure 1. Comparison of self-efficiency of three groups. *: Significant difference between pretest and posttest at $p \leq 0.01$. †: Significant difference between “Second experimental group” and “Control group” at $p \leq 0.01$.

Also the results show that between group effects test for self-efficiency is meaningful ($F = 5.254$, $p = 0.009$); that is, there are significant differences in self-efficiency scores of 3 groups (Table 1). The results of Tukey's posthoc test show that the “First experimental group” hadn't significant

difference with “Second experimental group” (Mean difference = -0.566 , $p = 0.582$) and “Control group” (Mean difference = 1.23 , $p = 0.088$). But, “Second experimental group” significantly had higher self-efficiency in comparison with Control group (Mean difference = 1.8 , $p = 0.008$).

That is, the second experimental group that used mental imagery associated with positive self-talk and physical practice showed higher self-efficiency in comparison

with control group which made use of none of these practices (Figure 1).

The result show that the main effect of within the group for spike performance was significant ($F = 32.89$, $p = 0.001$) [Table 2].

Table 2. Comparison of spike performance of three groups

Change resources	Sum of squares	df	Mean squares	F	p
Within group	32.89	1	32.089	16.121	0.001*
Between groups	6.711	2	3.356	6.190	0.004*
Interactive effect	2.311	2	1.156	0.581	0.564
Total	41.111	5			

*: $p < 0.01$.

Paired sample t test analysis show that the spike performance of both “First experimental group” and “Second experimental group” elevated significantly (both $p = 0.027$) from pretest [(Mean = 14.533 ± 0.915) and (Mean = $15.133 \pm$

0.741) respectively] to posttest [(M= 15.6 ± 1.352) and (Mean = 15.666 ± 1.117) respectively]. But, the spike performance of control group didn’t significant change ($p = 0.164$) [Figure 2].

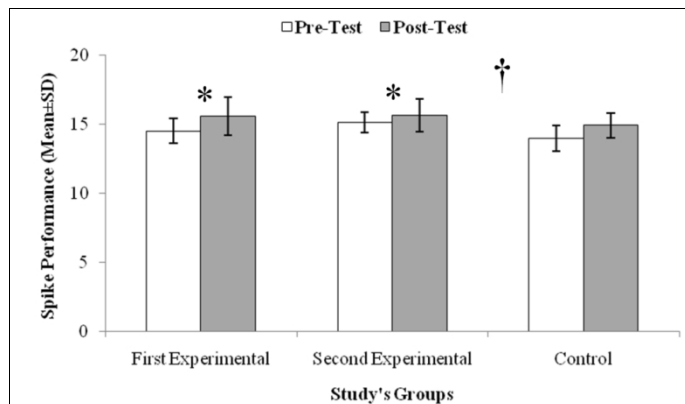


Figure 2. Comparison of spike performance of three groups.

*: Significant difference between pretest and posttest at $p \leq 0.05$. †: Significant difference between “Second experimental group” and “Control group” at $p \leq 0.01$.

Also the results show that between group effects test for spike performance is meaningful ($F = 6.19$, $p = 0.004$); that is, there are significant differences in spike performance scores of 3 groups (Table 2). The results of Tukey’s posthoc test show that the “First experimental group” hadn’t significant difference with “Second experimental group” (Mean difference = -

0.333 , $p = 0.437$) and “Control group” (Mean difference = 0.6 , $p = 0.077$). But, “Second experimental group” significantly had higher spike performance in comparison with Control group (Mean difference = 0.933 , $p = 0.003$). That is, the second experimental group that had used mental imagery associated with positive self-talk and physical practice obtained higher scores

in spike performance in relation to control group which had not had the benefit of any of these practices (Figure 2).

DISCUSSION

The results of the research about the effect of mental imagery, based on positive self-talk, on self-efficiency and performance showed that although mental imagery increases self-efficiency and improves performance but the combination of physical practice with mental imagery, based on positive self-talk, has more effective contribution in improvement of self-efficiency and performance levels and positive self-talk improves imagery effect on self-efficiency and female volleyball players' performance. The result of this research is consistent with researches of Tod *et al.* (2011), Cumming *et al.* (2006), Hardy *et al.* (2006), Thelwell and Greenlees (2001) and Van Raalte *et al.* (1994). The results of these researches also showed that positive self-talk has increased self-efficiency and improved performance. These researchers showed in their researches that positive self-talk helps the athlete to focus on the present time through affecting self-confidence and controlling anxiety. Through admiration, positive self-talk may convince the individual to ignore past or future errors. In addition, positive self-talk may increase self-efficiency feeling with emphasizing that individuals have the necessary abilities for doing what they want (35). Hackfort and Schwenkmezger (1993) also believe that positive self-talk is a strategy through which the individual reports his perceptions and feelings and improves and trains centralization performance and increase and precise implementation (36). In this regard, Bandura (1997) has supported these results in his self-efficiency theory and states that positive self-talk not only increases athletes' assurance to reach their sportive goals, but also trains the athletes how to achieve these objectives (35). But researchers such as

Palmer (1992), Highlen and Bennett (1983), and Rotella *et al.* (1980) have concluded that positive self-talk does not improve imagery impact on Self-efficiency (29-31). In this regard, the results of their researches are not consistent with the present research. Maybe this inconsistency is due to the difference in the community under study of the mentioned researches with the present research.

In relation to the effect of mental imagery on performance, it has been shown that combination of physical practice with imagery has a significant role in improving the level of performance. These findings are consistent with the researches of Hemayattalab *et al.* (2006) (37). They also concluded in their researches that mental imagery is effective on performance. But researchers such as Gaeini *et al.* (2006) and Epstein (1990) are not consistent because they concluded in their researches that the use of imagery has no impact on performance. According to some dowsing based on researches, time has an important contribution in effectiveness of mental practice (38, 39). As it is shown by evidence, mental practice is a powerful cognitive activity that its impact on cognitive aspects of skill learning is greater than its impact on other aspects. Comparison of skill development rate also shows that the longer the time of mental imagery time, the higher the development of the subjects in this skill. This issue can be caused by facilitation of neuromuscular connections that ultimately takes individuals one step closer to Self-efficiency. Because the brain does not distinguish between mental images and actual performance in this case and the brain takes mental images as a real training and its repetition improves the performance of the subjects (20). On the other hand, according to Petterlang's biological informational theory or data processing (1979), mental images are a collection of propositions, or organized features that are stored in brain long-term memory and based on this theory,

an image is “organization of a limited number of targets stored in the brain” (40, 41). For this reason, the difference in the period of applying imagery in different studies results in achieving different results.

CONCLUSION

In general, the results of the present research showed that combination of physical practice with mental imagery, when

associated with positive self-talk, has a more effective role in improving athletes’ self-efficiency and implementation level, and positive self-talk improves imagery impact on self-efficiency and performance of girl volleyball players.

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تازه‌های علوم کاربردی ورزش

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اثر تصویرسازی ذهنی بر خودکفایی و اجرای اسپیک والیبال: نقش میانجی گر گفتار درونی مثبت

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چکیده

هدف این تحقیق تعیین تأثیر تصویرسازی ذهنی بر خودکفایی و اجرای اسپیک دختران والیبالیست شهرستان تفرش با در نظر گرفتن نقش میانجی گر گفتار درونی مثبت بود. به این منظور، در یک طرح گروه کنترلی ناهمسان با پیش آزمون و پس آزمون، ۴۵ دختر والیبالیست با سن ۱۷-۲۵ و سابقه ورزشی ۶ ماه تا ۲ سال از بین دبیرستان‌ها و دانشگاه‌های شهرستان تفرش انتخاب و بر اساس سطح مهارت اسپیک، توانایی تصویرسازی و سطح خودکفایی به صورت همسان در سه گروه توزیع شدند. گروه اول برنامه تصویرسازی ذهنی و تمرینات بدنی، گروه دوم تصویرسازی ذهنی و گفتار درونی مثبت و تمرینات بدنی، و گروه سوم بدون هیچ برنامه‌ای، به مدت ۴ هفته و ۱۲ جلسه (سه روز در هفته) در دوره آزمایشی شرکت کردند. برای گردآوری اطلاعات از پرسشنامه تصویرسازی ورزشی (هال، و همکاران، ۱۹۹۸)، مقیاس احساس خودکفایی (بندورا، ۱۹۹۴) و آزمون استاندارد شده اسپیک والیبال (ایفرد) استفاده شد. نتایج تحقیق نشان داد که تصویرسازی ذهنی به همراه تمرین بدنی باعث بهبود اجرای اسپیک و خودکفایی می‌شود، اما اگر تصویرسازی ذهنی با گفتار درونی مثبت همراه شود میزان اثر بخشی تصویرسازی بیشتر خواهد شد.

واژگان کلیدی: خودکفایی، تصویرسازی ذهنی، گفتار درونی مثبت، اسپیک والیبال.

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