Original Article

The effect of self-talk on Tae-kwon-do skills' learning of novice athletes and perceived use of it

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ABSTRACT

Zetou, E., Vernadakis, N., Bebetsos, E., & Liadakis, N. (2014). The effect of self-talk on Tae-kwon-do skills' learning of novice athletes and perceived use of it. *J. Hum. Sport Exerc., 9*(1), pp.124-135. The purpose of the present study was to investigate the effect of instructional self-talk on performance and learning two basic skills of W.T.F Tae-kwon-do (*Ap chagi* and *Bandae jireugi*), in the perceived use of self-talk of novice athletes as well as in the possible correlation between the dimensions (*effort, automaticity, cognitive and emotional control, self-confidence and attention*) of the "Functions of Self-Talk Questionnaire,-FSTQ" (Theodorakis, Hatzigeorgiadis & Chroni, 2008). The sample consisted of 36 novice boys and girls, 8-12 years old (*M*=9.53, *SD*=1.53) and were randomly divided into two groups, the experimental (instructional self-talk group, *N* = 18) and the control group (*N* = 18). The intervention program lasted 8 weeks (2 sessions per week). Before starting the practice of skills, the participants spoke aloud specific key-words for the proper use of the technical skill. Participants were evaluated with a pre-test in the beginning of the program, a post-test at the end and one week after the final test they were evaluated in retention test. Moreover the evaluation of skill involved ten trials every skill, which were recorded by a digital camera and evaluated in five main elements of skill, by two observers. The result showed that the instructional self-talk was more effective for performance and learning the skills than the group that received feedback with traditional teaching. The use of instructional self-talk on younger athletes helped them to learn the skills but also to develop the psychological dimensions of the questionnaire (*effort, automaticity, cognitive and emotional control, self-confidence and attention*). Instructional self-talk can be an additional tool in the hands of the coach / physical education teacher for teaching and improving skill performances in other sports. **Key words**: SELF-TALK, INSTRUCTION CUES, TAE-KWON-DO, SKILL ACQUISITION, LEARNING, PSYCHOLOGICAL SKILLS.

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INTRODUCTION

Self-talk has been defined as an "internal dialogue in which the individuals interpret feelings and perceptions, regulate and change evaluations and cognitions and give themselves instructions and reinforcement" (Hackfort & Schwenkmezger, 1993, p. 355). Self-talk refers to statements athletes make to themselves either internally or out-loud, either during the execution of an activity, or a sport skill, and either before or after its execution. This process of thoughts happens usually unconsciously and affects the feelings and, consequently, the acts of the athletes.

Reardon (1993) describes it as a mental activity, known as thought that constitutes one of the contents of conscience. Hardy (2006) defines self-talk as: a) expressions or statements that address ourselves, b) being multidimensional from its nature, c) having explanatory points that coincide with the content of the statements that are said, d) dynamics, and e) accomplishing, at least for an athlete, two functions: a guiding and a motivating function. According to Ellis's cognitive theory (1994), the pressing situations and important and effective decision-making, like the decisions that need to be made in sports, can be the cause of illogical thought amongst athletes. Thus, athletes may be driven to insecurities and emotional conflicts, in disorientation from their goals, and eventually to wrong decisions and acts. Zinsser, Bunker and Williams (2001) described self-talk as the key to cognitive control and as a known strategy that relies on repeated positive statements for controlling acts and behaviors, which is used effectively by athletes and attempts change of illogical or negative thoughts by affecting their behavior. This process is continuous, either at practice or at competitions. Self-talk helps athletes by using appropriate keywords in order to control and organize their thoughts, to focus on points of the skill or to get motivated for greater effort during practice. Thus, scholars consider self-talk to be an indispensable part of psychological programs in practice and many coaches integrate self-talk in their programs.

Sport psychology tries, to help people that exercise to improve-maximize their performance and sport psychologists/coaches in their everyday work with athletes, use self-talk in their programs. According to Lepadatu (2011), self-talk is an important tool for the learning process. The researchers distinguish two categories of self-talk, according to its content, positive and negative. Positive self-talk helps athletes improve their self-evaluation and confidence, maximize their effort and improve their performance. Also, it helps them remain focused to the present, the here and now, and not to get distracted by events and mistakes of the past or distant future designs. On the contrary, negative self-talk refers to thoughts of bad criticism, to statements of self-blame and self-doubt and is considered wrong and ineffective.

Zinsser et al. (2001) mention that positive self-talk is separated into two big categories, positive motivational self-talk and positive instructional self-talk. Instructional self-talk refers to statements relevant to technical instructions, tactical choices and kinesthesis, while motivational self-talk refers to statements which are relevant to the increase of self-confidence, of effort and the creation of positive mood. More specifically, instructional self-talk can be used in learning different skills, as well as to improve the athletes' performance. It can help novice athletes develop rightly the kinetic skills that each sport demands. At the same time, this kind of self-talk can help even the most advanced and experienced athletes correct their mistakes in technical execution. The study claims that using psychological techniques can improve athletes' performance in sports. Even if the efficiency of self-talk is not confirmed in all the relevant studies, never the less a big amount of them confirms its positive effect on the increase of athletic performance in various sports.

Gould et al. (1993) found that the most common techniques of national level of figure skating athletes were positive thoughts and self-talk. Cotterill et al. (2010) found that self-talk was the second of the cognitive techniques used by golf champions during pregame routines. Van Raalte et al. (1994b), by observing a series of games of young tennis athletes, found that the winners used less negative dialogue than those that lost. In the study conducted by Thomas & Fogarty (1997), using a program of mental practice and self-talk had an important effect on the increase of the performance novice golf athletes within 2 months. Mallett & Hanraham (1997) used effectively, as a cognitive strategy, "trigger" words in order to help speed runners have a closer inner focus of attention at the 100 meters race. The results showed significant improvement of their performance, when they used the technique of self-talk during running. Positive thoughts were proved to be more effective than the negative ones at a test in basketball and a test with darts. Positive instructions, instructions of mental stimulation and technical instructions had a positive effect at a ski test.

Ming & Martin (1996) tested the usefulness of self-talk with the use of keywords to the improvement of the technique. The researchers used a full program of self-dialogue for the improvement of the technique and the performance of figure skating athletes. The results showed that the self-talk program, that combined design and memorization of keywords and use of them during execution of an exercise, worked effectively in the improvement of the technique of the athletes. In another experiment with novice tennis players, Ziegler (1987) used the technique of self-talk to help the players focus on forehand and backhand skills. The results showed that participants' of the experimental group learning was increased by 45%, in comparison to the participants of the control group!

Even though many studies have been conducted in sports, either with novice or experienced athletes from different sports, while research on self-talk to small children is limited. In their research, Perkos et al. (2002) used young basketball players aged 12, while Hatzigeorgiadis et al. (2008) and Hatzigeorgiadis et al. (2009) used young tennis players aged 13-14. Kolovelonis et al. (2011) in their research on children in elementary education, found that self-talk was effective for increasing of the children's performance in sport skills in the Physical Education lessons. Similar studies were conducted by Makraki et al. (2010) and Zourmpanos et al. (2012) in volleyball and football respectively, with positive results.

In Tae-kwon-do there are no similar studies, and for this reason, the purpose of the particular study was to investigate the effect of instructional self-talk on performance and learning two basic skills of W.T.F Tae-kwon-do (Ap chagi and Bandae jireugi), in the perceived use of self-talk of novice athletes as well as in the possible correlation between the dimensions (effort, automaticity, cognitive and emotional control, attention and self-confidence) of the questionnaire (Functions of Self-Talk Questionnaire,-FSTQ) of Theodorakis et al. (2008). The hypothesis in question was that the use of instructional self-talk will facilitate the learning of Tae-kwon-do skills, and also that young athletes will realize the positive effect of self-talk, as this reflects through the five dimensions of the questionnaire of the perceived use of self-talk. Also, the dimensions of the questionnaire will be positively correlated amongst them.

MATERIAL AND METHODS

Participants

Thirty six novice young swimmers (girls and boys) aged of 8-12 (M=9.53, SD=1.53). Participants were randomly assigned to two groups, instructional self-talk group (N = 18) and control group (N = 18). Participants of each group were provided with different method of information/feedback by the coach. All students were fully informed about the protocol and their written consent by parents was obtained before testing.

Designed and procedure

The duration of the intervention practice was eight weeks. All participants were given the training program twice a week, for 60 min. the same day and hour. The training program was the same for all participants and it consisted of drills for the correct execution of Ap chagi and Bandae Jireugi skills. In each practice session athletes were executed three sets of ten repetitions of each skill, using hand target. Participants of the experimental group (Instructional Self-Talk Group, N = 18) before executing the skills were used loudly instructional self-talk (key words for technique). Before the intervention athletes were informed by the coach for the self-talk utility (what it is and how is use it) and they were provided written the key-words for each skill. The participants of Control group (CG, N = 18), were given traditional verbal feedback which consists of summary, knowledge of performance or results feedback by their coach.

Measures

Three measurements were taken. More specifically, the athletes were measured at the beginning in order to establish that all started at the same level of technique (pre-test). After the completion of the intervention the final measurements were taken, to note the impact of the intervention on the players' performance in service skill (post-test). One week later, in which athletes didn't practice at all, the retention measurement was made, to establish whether the learned skill of the volleyball overhand service had been maintained (retention test). In the first training unit, after the warm up, participants performed a set of five trials (warm up). Afterwards, the participants performed 10 attempts; in each skill (Ap chagi and Bandae jireugi) while in the meantime all the attempts of participants were videotaped.

The video camera was placed 6m distance and in 45o angle on the right of each participant (if the participant used the left hand, the video camera was placed in the left, in the same distance and angle). The data recordings were evaluated by two observers (expert Tae-kwon-do coaches) who observed the video and they evaluated the athletes' performance in five technical elements of each skill. The score in the check list (five technical elements), was "one" for correct and "zero" for the wrong performance. The perfect performance was evaluated as 50 points [10 attempts X (5 elements X 1 point)].

Functions of Self-Talk Questionnaire-FSTQ

After the final measurement (post-test) participants were completed the Functions of Self-Talk Questionnaire-FSTQ (Theodorakis et al. 2008) which consisted of 25 questions. The questions were evaluated five dimensions: self-confidence, automaticity, effort, emotion and cognitive control and focus attention. Answers were given on a 5-point scale from 1 (not at all) to 5 (very much). Construct validity of FSTQ and internal consistency of subscales was checked (Cronbach's alpha από .76 έως .86). Responses for the five dimensions were averaged to produce self-talk use scores (min. 1, max. 5), with higher scores indicating higher self-talk use. Additionally the participants were questioned (1 to 10 point scale): a) how often they use instructional self-talk, b) if they believe that self-talk help them to perform better, c) if the particular key words help them to perform the skills, d) if they told to themselves something (a word or phrase), every time they perform the skill and if they do it, what exactly was it, and finally, e) how often they use it (1=not at all…10=always).

Apparatus

For the video recording, a digital video camera SONY was used. For the video observation a portable PC with 20΄΄ monitor was used.

Observers' agreement
Videotape recordings of ten trials were used to evaluate the participants' movement pattern of Ap chagi and *Bandae jireugi* skills. Two observers independently recorded the participants' performance scores during each test session. The observers reached an inter-observer agreement percentage of 90% prior to data collection, which was calculated through the procedures described by Kazdin (1982). The following formula was used to compute the inter-observer agreement percentage (%): Interobserver Agreement % = Agreements/Agreements+Disagreements X 100.

Inter-observer agreement checks were also calculated during data collection. Agreement percentage was .88 or higher on each occasion. On each test session each observer simultaneously recorded the performance scores with an instructor for one randomly selected participant. These inter-observer agreement checks, calculated as before, yielded ratings consistently at or above 90%. The test performance scores were determined by the total score accumulated during the required 10 trials.

Statistics
Statistical analysis of data was performed using SPSS 19.0. Mauchly's test of Sphericity was not significant, which confirmed the appropriateness of the test. Two separated (for each skill) analysis of variance (ANOVA) (2 Group X 3 measures) with repeated measures on the last factor were conducted to assess the differences between groups, and pre/post and retention tests. Pairwise comparisons ($p < .05$) were used to reveal significant differences in scores between groups and measurements. For the questionnaire evaluation descriptive statistics and frequencies was used. For the correlation between the dimensions of the questionnaire, Pearson correlation analysis was used.

RESULTS

Initial measurement (pre-test)
One-way ANOVA revealed that there were no significant differences between groups on Tae-kwon-do skills (Ap chagi, Bandae jireugi) in pre-test. The results revealed that there were no differences between groups in the pre-test in the performance score of skills. Descriptive statistics for Ap chagi and Bandae jireugi performance for the two groups in the pre-test are presented in Table 1.

Table 1. *Means and standard deviation of Ap chagi and Bandae jireugi performance score in the pre-test.*

		Instructional Self-talk Group (ISTG)		***Control Group (CG)***			
Skills	***N***	***M***	***SD***	***M***	***SD***	$F_{(1.35)}$	***p***
Ap chagi	18	28.72	4.17	26.61	3.84	.249	.123
Bandae jireugi	18	28.44	3.74	26.39	3.94	.257	.118

The intervention effect on Ap chagi skill performance score
Anova Repeated Measures (2 groups x 3 measurements) were calculated to test for differences in Ap chagi performance changes between the experimental and the control groups. The analysis revealed a significant measurement by group interaction effect, ($F(2.68)=13.48$, $p<.000$, $\eta 2 =.28$), which means that participants had significant differences between three measurements in Ap chagi skill. Pairwise comparisons show that

there was a significant difference from pre to post measurement (p<.01) and from pre to retention test (p<.01).

Analyzing the interaction paired t-test analysis for the measurements were used. The results indicated that participants of the ISTG (Instructional self-talk group) improved performance from pre (M=28.72, SD=4.17) to post-test (M=44.28, SD=4.5, t(17) =-14.33, p=.00), and from post to the retention test (M=44.94, SD=2.58, t(17) =-13.27, p=0.00). For the CG (control group) the participants improved performance from pre (M=26.61, SD=3.83) to post-test (M=34.22, SD=7.74, t(17) =-3.87, p<0.01) and from pre to retention test (M=32.94, SD=6.61, t(17) =-3.34, p<0.05). Finally, the results indicated that participants of both groups improved Ap chagi skill; however the ISTG (instructional self-talk) group was better than the CG (control group) in the post and also retention test, in which participants of self-talk group kept their scores. In contrary participants of control group decreased their scores in retention test (Table 2).

Table 2. *Means and Standard deviation of participants score of Ap chagi skill in post and retention test.*

Groups		***1st test***		***2nd test***		***3rd test***	
	N	***M***	***SD***	***M***	***SD***	***M***	***SD***
Instructional Self-talk Group (ISTG)	18	28.72	4.17	44.28	4.55	44.94	2.58
Control Group (CG)	18	26.61	3.83	34.22	7.74	32.94	6.61
Total	36	27.67	4.09	39.25	8.07	38.94	7.84

The intervention effect on participants' Bandae jireugi skill performance

Anova Repeated Measures (2 groups x 3 measurements) were calculated to test for differences in *Bandae jireugi* performance changes between the experimental and the control groups. The analysis revealed a significant measurement by group interaction effect, ($F_{(2.68)}$=31.25, p=.000, η^2 =.48), which means that participants had significant differences between three measurements in *Bandae jireugi* skill. Pairwise comparisons show that there was a significant difference from pre to post measurement (p<.01) and from pre to retention test (p<.01).

Analyzing the interaction paired t-test analysis for the measurements were used. The results indicated that participants of the ISTG (Instructional self-talk group) improved performance from pre (*M*=28.44, *SD*=3.74) to post-test (*M*= 43.39, *SD*=2.66, t(17) =-15.94, p=.00), and from pre to retention test (*M*=43.94, SD=1.76, t(17) =-15.85, p=0.00). For the CG (control group) the participants improved performance from pre (*M*=26.39, SD=3.94) to post-test (M=32.11, SD=4.78, t(17) =-3.96, p<0.01)) and from post to retention test (M=31.67, SD=2.87, t(17) =-5.08, p<0.01). Finally, the results indicated that participants of both groups improved *Bandae jireugi* skill performance; however the ISTG (instructional self-talk) group was better than the CG (control group) in the post and retention test, in which participants of self-talk group kept their scores. In contrary participants of control group decreased their scores in retention test (Table 3).

Table 3. *Means and Standard deviation of participants score of Bandae jireugi skill in post and retention test.*

Groups		1st test		2nd test		3rd test	
	N	M	SD	M	SD	M	SD
Instructional Self-talk Group (ISTG)	18	28.44	3.74	43.39	2.66	43.94	1.76
Control Group (CG)	18	26.39	3.94	32.11	4.78	31.67	2.87
Total	36	27.42	3.93	37.75	6.87	37.81	6.65

The perceived use of self-talk (Functions of Self-Talk Questionnaire)
The participants of Instructional Self-talk Group were used the key words that were given (*M* = 6.80, *SD* = 2.21), in contrary the participants of Control Group were thought words such as: "I can do it….', 'I can concentrate…." but they were not used them so often (*M* = 1.19, *SD* = 2.20).

The means of participant's responses were all in high score, and explains that the use of self-talk influence all the dimensions more (*attention*) or less (*automaticity*). The dimension of *attention* was higher than the means of other dimensions.This indicates that instructional self-talk influenced the focus attention of athletes on the technique and to perform the skills better than the athletes of control group.

Table 4. *Means and standard deviation of dimensions of questionnaire of perceived use of self-talk*

Dimensions	M	SD
Effort	3.2	.33
Automaticity	2.9	.27
Cognitive and emotional Control	3.5	.34
Self-confidence	3.4	.41
Attention	3.8	.47

Participants Response to question, if this procedure helps them: In the question, if self-talk helps them, 68.4% of participants were response "very much" (1-10 point scale), and 15.8% "much".

Participants Response to question, if they used key words: In the question, if they used self-talk, 52.6% of participants were response "very often" (1-10 point scale), and 21.1% "very much often".

Correlation between the dimensions of questionnaire of perceived use of self-talk
To revealed positive correlations between the five dimensions of questionnaire (if one dimension has positive correlation with others), Pearson correlation analysis was used. Analysis of correlation revealed that there were highly positive correlations amongst variables, which means that one variable affected positively the other (Table 5).

Table 5. *Correlation of the five dimensions of the self-talk questionnaire*

	M	***SD***	*Effort*	*Automaticity*	*Cognitive and emotional Control*	*Self-confidence*	*Attention*
Effort	3,17	,33					
Automaticity	2,97	,26	,710** ,001				
Cognitive and emotional Control	3,46	,35	,722** ,001	,815** ,000			
Self-confidence	3,48	,42	,677** ,002	,564* ,015	,550* ,018		
Attention	3,86	,44	,588* ,010	,902** ,000	,602** ,008	,534* ,022	

***p< 0.01*
** p<0.05*

DISCUSSION

The purpose of the particular study was to investigate the effect of instructional self-talk on performance and learning two basic skills of W.T.F Tae-kwon-do (*Ap chagi and Bandae jireugi*), in the perceived use of self-talk of novice athletes as well as in the possible correlation between the dimensions (*effort, automaticity, cognitive and emotional control, attention and self-confidence*) of the questionnaire (Functions of Self-Talk Questionnaire,-FSTQ) of Theodorakis et al. (2008). The hypothesis in question was that the use of instructional self-talk will facilitate the learning of Tae-kwon-do skills, and also that young athletes will realize the positive effect of self-talk, as this reflects through the five dimensions of the questionnaire of the perceived use of self-talk. Also, the dimensions of the questionnaire will be positively correlated amongst them.

The results of the present study showed that feedback through the instructional self-talk was superior in comparison to the traditional method as far as teaching of the *Ap chagi* and *Bandae jireugi* Tae-kwon-do skills. As shown by the results, athletes, by using keywords loudly, could focus on correcting their mistakes in the technical execution of the skill and be led to improvement of learning and long-term retention of the skill.

Hatzigeorgiadis et al. (2007) characterize self-talk as an effective cognitive strategy for increasing athletic performance. Nideffer (1993) suggested that self-talk can contribute to focusing attention to the right and

relevant points of a skill and Landin (1994) claimed that self-talk is effective in the learning and the improvement of the technique, as it improves the ability of the student to codify, store and retain in memory information that can be used in applied situations. By using instructional self-talk, athletes use specific "trigger" words that are usually associated with the technique of a skill or with the focus of their attention to a specific part of the skill that is executed. Something similar happened in this particular experiment, during the execution of *Ap chagi* and *Bandae jireugi* Tae-kwon-do skills.

About the effect of different methods of feedback (self-talk vs traditional) in the improvement of performance, the results of the study showed that there was improvement on both groups between the initial and the final test and the initial and retention test. In particular, even though the athletes' performance during the initial testing was not so good, the intervention was that influenced on the higher scores that were achieved at the final test. In the retention test, one week without practice, the athletes maintained their scores that indicated that athletes learned the skills. This particular result seems to be affected by the self-talk intervention method followed by the athletes.

The results of the present study agree with Cutton & Landin (1999, 2001, 2007) studies which also were used self-talk as a feedback. They found that self-talk appears to help the athletes' development and execution of skills by verbally providing a guide for the five critical elements of tennis skills. Self-talk may have helped learners to focus their attention toward critical task information. This is especially helpful for novice athletes, wherein, their time and capacity to process critical information is limited (Magill, 2004).

Lots of studies have showed the positive and beneficial effects of instructional self-talk in golf (Harvey et al., 2002; Thomas & Fogarty, 1997; Johnston-O'Connor & Kirschenbaum, 1986), basketball (Perkos et al., 2002; Hamilton & Fremour, 1985), skiing skills (Rushall et al., 1988), and target skills (darts) (Van Raalte et al., 1995; Dagrou et al., 1992). Also, in sports such as swimming (Hatzigeorgiadis 2006; Thiese & Huddleston, 1999; Rushall & Shewchuk, 1988), tennis (Van Raalte et al., 2000; Landin & Herbert, 1999), 100 meters in track and field (Mallet & Hanrahan, 1997), female football (Johnson et al., 2004), handball (Tsiggilis et al., 2003), and competitive climbing (Chroni & Kourtesopoulou, 2002). In their study, Ming & Martin (1996) tested the usefulness of self-talk with the use of keywords to the improvement of the technique. The results showed that the self-talk program, that combined design and memorization of keywords and the use of those keywords during execution of an exercise, worked effectively in the improvement of the technique of the athletes.

Also the results of the study of Theodorakis et al., (2000), showed that instructional self-talk had better results in skills that demanded precision and subtle movements, while technical instructions and encouragement were equally effective to activities that demand strength and stamina. Recently, the study of Zourbanos et al. (2013) found positive effect of self-talk on elementary students' motor task performance and also in Football in Elementary Physical Education Students (Zourbanos et al., 2012). In a recent meta-analysis in self-talk, Hatzigeorgiadis et al., (2011), claimed that instructional self-talk, besides subtle skills, is more effective than motivational self-talk as far as learning of new skills is concerned.

As far as the perceived effect of the use of self-talk, all athletes realized that the method of self-talk has helped them a great deal in all the rest of the variables that were evaluated. Particularly, mostly to focus their attention on the technique of the skills, increased their efforts and, consequently they increased their self-confidence, their cognitive and emotional control and less the automatic execution. Additionally, the analysis of correlation showed that there were highly positive correlations amongst variables, which means that one variable affected positively the other.

In similar studies in the future, it would be interesting to investigate the effect of this particular method of instructional self-talk to other sport skills (open vs closed skills). Moreover, possible effects of instructional self-talk to athletes of different experience level, age and sex could be investigated, in comparison with the improvement of their technique. The results of this particular study come to the conclusion that the Tae-kwon-do athletes that participated in the group that used instructional self-talk, improved their technique in *Ap chagi* and *Bandae jireugi* skills. It is suggested that the trainers/coaches of all sports, during practice, teach their athletes to use the instructional self-talk if the goal is to improve the technique.

CONCLUSIONS

The performance times at the Oita Marathon decreased during 1980's until the middle 1990's and stabilized thereafter for both half-marathoners and marathoners. During the studied period, the mean age of the finishers increased significantly for both half-marathoners and marathoners. The best time performance was observed for the age comprised between 16 and 54 years for half-marathon, and between 25 and 49 years for marathon, respectively. Future studies are needed to investigate the physiological characteristics of elite wheelchair endurance athletes and the reasons why wheelchair half-marathoners can maintained a high level of performance until older age than marathoners. The influence of the level of spinal cord lesion on wheelchair performance needs also investigating in additional studies.

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