

The effect of instructional self-talk on performance and learning the backstroke of young swimmers and on the perceived functions of it

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Abstract:

The aim of this study was to investigate the effect of instructional self-talk on acquisition and learning the backstroke of young swimmers and the perceived functions of it. The participants were 46 boys and girls, aged of 10-12 years (M=11.2, SD=.92) and were randomly divided into two groups: the experimental group (instructional self-talk, N=24) in which participants before the execution of skill used aloud specific keywords and the control group (traditional teaching, N=22). The intervention program lasted six weeks (3 sessions of 45' per week). Participants of all groups were evaluated with a pre-test before the beginning of the program, a post-test at the end of the intervention and one week after the final test they were evaluated in retention test. Moreover the evaluation of skill involved ten trials of skill, which were recorded by a digital camera and evaluated in five main elements of skill, by two observers, whom intra and inter reliability were checked. The results showed that the participants of instructional self-talk, was more effective for performance and learning the skill than the group that received feedback with traditional teaching. The results revealed also that the participants used the instructional self-talk during practice had high score in focus attention, effort and self-confidence, but lesser in emotional and cognitive control and automaticity. There was also positive correlation between the dimensions (effort, automaticity, cognitive and emotional control, attention and self-confidence) of the questionnaire. The use of instructional self-talk on younger athletes seems to have positive effects on performance and learning improvement during practicing sports skills. Self-talk can be used as a tool in the hands of the coach / physical education teacher for learning and improving sport performance skills and for increasing focus attention and self-confidence of their athletes.

Key words: instructional self-talk, backstroke, swimming, perceived functions, performance, learning.

Introduction

Previous studies have demonstrated that specific cognitive strategies influence the intensity and duration of someone's performance (Scott, Scott, Bedic, & Dowd, 1999; Tammem, 1996). One of the most commonly used strategies is that of self-talk (Gould, Finch, & Jackson, 1993; Madigan, Frey, & Matlock, 1992). Hardy, Gammage, and Hall, (2001) defines self-talking as the internal dialogue in which the individual interprets his lived perceptions, changes his evaluations and beliefs and gives himself instructions and reinforcements. Also, Hardy (2006) later, describes 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. This underlines the importance of language to the development of thought and, hence, the development of action.

Self-talk includes the thoughts of athletes with themselves that are made silently or out loud, either during the execution of an activity, or a sport skill, either before or after its execution. This process of thoughts happens usually unconsciously and affects the feelings and, consequently, the acts of the athletes. It has been suggested that self-talk interventions are some of the most widely applied and effective strategies used by athletes (Park, 2000; Weinberg, Grove, & Jackson, 1992). According to Lepadatu (2011), self-talk is an important tool for the learning process. Zinsser, Bunker, and Williams (1998) stated that self-talk influences performance in a number of ways including the acquisition of skills, the development of the self-regulation of habits and the self-confidence. Self-talk strategies have been examined in a wide variety of sports and tasks including golf (Harvey, Van Raalte, & Brewer, 2002), ice hockey (Rogerson & Hrycaiko, 2002), cricket (Holt, 2003; Slogrove, Potgieter, & Foxcroft, 2003), swimming (Wang, Huddleston, & Peng, 2003), soccer

(Papaioannou, Ballon, Theodorakis, & Auwelle, 2004), tennis (Mamassis & Doganis, 2004), and water polo (Hatzigeorgiadis, Theodorakis, & Zourbanos, 2004). The popularity of self-talk would seem to support the belief that it is related to sport performance.

The content of individual self-talk tends to be positive, negative, or neutral, although the specific type used may be task-specific (Hatzigeorgiadis et al., 2004, Moran, 1996). It has been suggested by Hardy, Jones, and Gould (1996) that positive self-talk may enhance performance through increases in confidence and anxiety control and Landin (1994) proposed that the effectiveness of positive self-talk was related to attentional processes. A series of studies have reported that positive self-talk is associated with enhanced performance in a number of sports, including figure skating (Ming & Martin, 1996), golf (Kirschenbaum, Owens, & O'Connor, 1998; Thomas & Fogarty, 1997), soccer (Papaioannou et al., 2004), and tennis (Mamassis & Doganis, 2004; McPherson, 2000; Defrancesco & Burke, 1997). Dagrou, Gauvin, and Halliwell (1992) reported that positive self-talk was associated with superior performance, as did Schill, Monroe, Evans, and Ramanaiah (1978). Landin and Hebert (1999) suggested that athletes use self-talk in both practice and competition as the result of, or to bring about, a specific outcome. Anderson (1997) suggested that self-talk refers to what athletes say to themselves in an attempt to think both more appropriately about their performance and to direct their actions in such a way to reach the desired outcome.

It has been suggested that different types of self-talk may be influential across different sports (Hatzigeorgiadis, Theodorakis, & Zourbanos, 2004). In the literature there are several important works valuing the motivational and instructional self-talking in performances from different sports (Theodorakis, & Chroni, 2002; Hardy, Gammage, & Hall, 2001; Landin, & Hebert, 1999). Zinsser and his colleagues (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 kinesthesia, while motivational self-talk refers to statements which are relevant to the increase of self-confidence, of effort and the creation of positive mood.

In another experiment with novice tennis players, Ziegler (1987) used the technique of instructional 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. Gould, Finch and Jackson (1993) also, found that the most common techniques of national level of figure skating athletes were positive thoughts and self-talk. Instructional self-talk has been found to be beneficial for tennis players' volleying (Landin & Hebert, 1999) as well as for 100 m sprinting (Mallett & Hanrahan, 1997). Theodorakis, Weinberg, Natsis, Douma, and Kazakas (2000) extended this approach by examining the influence of instructional versus motivational self-talk on various motor skills. They found both self-talk strategies to be effective at improving performance. However, instructional self-talk was found to be more effective than motivational self-talk for fine motor skills, with both motivational and instructional self-talk being equally effective for motor skills requiring strength and endurance (Theodorakis et al., 2000).

Cotterill, Sanders and Collins (2010) found that self-talk was the second of the cognitive techniques used by golf champions during pregame routines. 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 (Hardy, Oliver, & Tod, 2009). In another study, Van Raalte, Brewer, Rivera, and Petitpas (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 and 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 two months.

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

Hatzigeorgiadis (2006) in his research, was examined the perceived effects of ST on effort, automaticity, confidence, anxiety control, and attention. Physical education students participated in an experiment involving a swimming task. Participants were asked to choose an instructional (technical instruction) and a motivational self-talk cue (from the ones they had practiced), which they subsequently used during the execution of the task. Participants were asked to report their perceptions regarding the perceived functions of self-talk. The results revealed that both types of self-talk helped them mainly to improve their attention to the task. Moreover, it was reported that the motivational self-talk cue had greater impact on effort, than the

attentional self-talk cue, whereas effects for attention, confidence, anxiety, control, and automaticity were similar when using attentional and motivational cues.

In swimming, though there are not a lot of studies, using instructional self-talk (particular key-words) and for this reason, the aim of this study was to examine the effect of the instructional self-talk on the performance and learning of the backstroke and to evaluate the perceived use of self-talk of young swimmers. The hypothesis in question was that the use of instructional self-talk will facilitate the learning of the hand technique in backstroke, 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.

Method

Participants

The participants were 46 boys and girls, aged of 10-12 years ($M=11.2$, $SD=.92$) and were randomly divided into two groups: the experimental group (instructional self-talk, $N=24$) in which participants before the execution of skill used aloud specific keywords and the control group (traditional teaching, $N=22$). All participants were fully informed about the protocol and their written consent by parents was obtained before testing.

Designed and procedure

The intervention program lasted six weeks. All participants were given the training program two times per week, for 30' 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 backstroke skill (hands, body and head/breath), with a pool buoy between the legs. Participants of the experimental group (Instructional Self-Talk Group, $N = 24$) 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 it can be used) and they were provided written the key-words of the backstroke skill. The participants of Control group (CG, $N = 22$), 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 athletes' performance (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 backstroke had been maintained (retention test).

The participants performed 25 m. the backstroke skill with a pool buoy between their legs, starting inside the pool; while in the meantime ten attempts of participants were videotaped. The video camera was followed the participant movement in front of him with 6m distance and 45o angle. The data recordings were evaluated by two observers (expert swimming coaches) who observed the video and they evaluated the athletes' performance in five technical elements of backstroke 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)].

Table 1. Qualitative evaluation of hands in backstroke skill

Nr. crt	Basic elements of backstroke skill
1.	Head and body position
2.	Exit of hand - restoration (thumb-elbow)
3.	Entrance- catching the water (small finger in the water-twist the hand bending the elbow)
4.	Pull with elbow bending
5.	Final propulsion with palm

Functions of Self-Talk Questionnaire-FSTQ

After the final measurement (post-test) participants were completed the Functions of Self-Talk Questionnaire-FSTQ (Theodorakis, Hatzigeorgiadis, & Chroni, 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 videotaped attempts a Digital video camera SONY was used. All participants was carried a pool buoy between their legs, in the measurements and in practice. A thermometer also was used for the temperature of water evaluation, for all the measurements have the same temperature.

Reliability of Observers

Videotapes of all participants' acquisition and retention trials were evaluated individually by two observers (coaches of swimming) who were educated from the researcher about the evaluation of the athletes. The observers were not involved in any way in the testing and were thus blind to the experimental conditions. Each participant was identified by number only. Each observer watched the tapes and judged the participant's performance on a standardized scoring sheet reflecting 5 elements pertaining to performance and proper backstroke swimming technique. The observers were trained by using pilot videos to ensure inter-judge reliability and one scoring sheet per trial per participant. The intra reliability of observers was checked after observation and evaluation of 15 students the first day and evaluation of the same 15 students the next day. The intra-judge correlations were very high (.81) for technique scores. The inter observer reliability was checked after observation and evaluation of 15 students of the two observers and the inter-judge correlations were very high (.79) for technique scores.

Statistics

The analysis of the data was made using the program SPSS 17. Prior to the repeated measures, analysis of variance, distribution normality with Kolmogorov-Smirnov test (K-S test) and homogeneity of variance (Bartlett test) were carried out. There was a non-significant value ($p < .05$), which indicates that the data do not differ significantly from the multivariate normality of variables, thus parametric tests can be applied. Each analysis of ANOVA repeated measures was completed by Bonferroni post-hoc test. Significance was determined at the .05 level. For the questionnaire evaluation descriptive statistics and frequencies was used. Pearson correlation analysis between the dimensions of the questionnaire was used.

Results

Pre-test

The independent sample t-test analysis revealed that there were no significant differences between groups on backstroke swimming skill in pre-test. Descriptive statistics for backstroke performance score for the two groups in the pre-test are presented in Table 2.

Table 2. Means and standard deviations of athletes' pre-test performance score of backstroke.

Group	N	M	SD	T ₍₄₄₎
Self-talk group (ISTG)	24	23.46	1.14	-.251 (p=.803)
Control group (CG)	22	23.63	.27	
Total	46	23.54	2.38	

The instructional self-talk effect on backstroke performance score

Anova Repeated Measures (2 groups x 3 measurements) were calculated to test for differences in backstroke performance changes between the experimental and the control groups. The analysis revealed a significant measurement by group interaction effect, ($F_{(2,88)}=64.33$, $p < .000$, $\eta^2 = .59$), which means that participants had significant differences between three measurements in backstroke skill. There was also a main effect for groups ($F_{(1,44)}=72.78$, $p < .000$, $\eta^2 = .62$), 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 ($M=23.46$, $SD=1.14$) to post-test ($M=37.87$, $SD=2.03$, $t(23) = -27.31$, $p=.00$), and from post to the retention test ($M=38.12$, $SD=1.75$, $t(23) = -30.30$, $p=0.00$). For the CG (control group) the participants improved performance from pre ($M=23.63$, $SD=3.27$) to post-test ($M=30.72$, $SD=3.20$, $t(21) = -10.14$, $p < 0.01$) and from pre to retention test ($M=30.45$, $SD=2.77$, $t(21) = -9.64$, $p < 0.01$). Finally, the results indicated that participants of both groups improved backstroke 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 3).

Table 3. Means and standard deviations of athletes' performance score of backstroke in three measurements

Group	N	Pre-test		Post-test		Retention test	
		M	SD	M	SD	M	SD
Instruction self-talk (ISTG)	24	23.46	1.14	37.87	2.02	38.12	1.75
Control (CG)	22	23.63	3.27	30.72	3.21	30.45	2.77
Total	46	23.54	2.38	34.45	4.46	34.46	4.49

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 ($M = 7.80$, $SD = 2.21$), 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 ($M = 2.29$, $SD = 2.21$).

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 deviations of the dimensions of perceived use of self-talk questionnaire.

Dimensions	M	SD	<i>a</i>
Effort	4.2	.33	.74
Automaticity	2.9	.27	.81
Cognitive and emotional Control	3.5	.34	.87
Self-confidence	3.8	.41	.78
Attention	4.6	.47	.89

Descriptive characteristics of questions

Participants Response to question, if this procedure helps them: In the question, if self-talk helps them, 72.6% of participants were response "very much" (1-10 point scale), and 16.8% "much".

Participants Response to question, if they used key words: In the question, if they used self-talk, 58.7% of participants were response "very often" (1-10 point scale), and 28.7% "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	4.2	.33					
Automaticity	2.9	.27	,710**				
Cognitive and emotional Control	3.5	.34	,722**	,815**			
Self-confidence	3.8	.41	,677**	,564*	,550*		
Attention	4.6	.47	,588*	,902**	,602**	,534*	
			,010	,000	,008	,022	

** $p < 0.01$

* $p < 0.05$

Discussion

The aim of this study was to examine the effect of the instructional self-talk on the performance and learning of the backstroke swimming style and to evaluate the perceived use of self-talk of young swimmers. The results of the present study showed that feedback through the instructional self-talk is superior in comparison to the traditional method as far as teaching of the hand technique in backstroke style in swimming to children is concerned. As shown by the results, athletes, by using key-words loudly, could focus on correcting their mistakes during the execution of the skill and be led to improvement of learning and long-term retention of

the skill. According to the results that emerged from the questionnaire for checking of the use of self-talk, all athletes that took part in the experimental group stated that they used the key-words that were shown to them. The use of these particular words has helped them improve their technique. As far as the perceived effect of the use of self-talk, all athletes realized that the self-talk strategy has helped them a great deal in all the rest of the variables that were evaluated and, mostly to regulate self-concentration and effort and, consequently the regulation of self-confidence, cognitive and emotional control and 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.

The results of the present study confirm that self-talk is an effective mean for enhancing skill performance and learning. Although motivational self-talk has been primarily recommended for gross skills requiring strength and endurance (Theodorakis et al., 2000), the present results suggest that instructional self-talk can also be effective for backstroke swimming skill. Authors suggested that different types of self-talk may have different effects on skill performance and learning based on the nature of the skill and the type of self-talk that is used. Research has generally supported the beneficial effects of self-talk on performance and learning skill in different sports (tennis, Landin & Hebert, 1999; basketball, Theodorakis, Chroni, Laparidis, Bebetos, & Douma, 2001; ski, Rushall, Hall, Roux, Sasseville, & Rushall, 1988; sprints, Mallet & Hanrahan, 1997) and settings (learned skills, Harvey, Van Raalte, & Brewer, 2002; new skills, Hatzigeorgiadis et al., 2004; novice athletes, Perkos et al., 2002; highly skilled athletes, Landin & Hebert, 1999). Hatzigeorgiadis, Zourbanos and Theodorakis (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 the hand technique in backstroke. In accordance with previous findings, the use of self-talk improved skill performance and learning.

Ming and Martin (1996) tested the usefulness of self-talk with the use of key-words to the improvement of the technique. The results showed that the self-talk procedure, that combined design and memorization of keywords and the use of those key-words during execution of an exercise, worked effectively in the improvement of the technique of the athletes. Also the results of the study of Theodorakis, Weinberg, Natsis, Douma and Kazakas (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. In a recent meta-analysis in self-talk, Hatzigeorgiadis, Zourbanos, Galanis and Theodorakis (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. Based on the principle that what people say to them-selves affects the way they behave (Ellis, 1976), self-talk strategies were developed to regulate cognitions and develop or change existing thought patterns. The uses of self-talk plans to control and organize athletes' thoughts which consider that are the key component for successful sport performance, and self-talk is frequently a part of psychological skill training (Hardy, Jones, & Gould, 1996).

Furthermore, the results revealed that the young swimmers learned to use the self-talk effectively, and the five dimensions of the questionnaire (*self-confidence, automaticity, effort, emotion and cognitive control and focus attention*) had positive correlation amongst them. More specifically athletes increased focus attention, effort and self-confidence. Theodorakis, Hatzigeorgiadis, and Chroni (2008) suggested that self-talk can serve to enhance attentional focus, increase confidence, regulate effort, control cognitive and emotional reactions, and trigger automatic execution. Hardy, Gammage, and Hall (2001) based on Paivio's (1985) results regarding the functions of imagery, identified two main functions of self-talk, cognitive and motivational. Landin (1994) and Nideffer (1993) supported an attentional interpretation of the self-talk effects. Landin proposed that self-talk can be used to enhance attentional focus, whereas Nideffer indicated that self-talk can be an effective strategy for directing attention to task relevant cues. Finn (1985) and Zinnser et al. (2006) suggested that self-talk can regulate effort and enhance self-confidence, whereas Hardy et al. (1996) argued that self-talk can also be effective in controlling anxiety. Hatzigeorgiadis (2006) in his research, was examined the perceived functions of instructional and motivational self-talk. The results suggest that the effectiveness of self-talk mainly based upon the attention function, and highlighted that different types of self-talk serve different functions, depending of the content of self-talk cues.

Hatzigeorgiadis, Zourbanos, Mpoupaki, and Theodorakis (2009) examined the effects of motivational self-talk on self-confidence and anxiety and also on performance of young tennis athletes. The results of this study showed that self-talk can enhance self-confidence and reduce cognitive anxiety. Furthermore, it is suggested that increases in self-confidence can be regarded as a viable function explaining the facilitating effects of self-talk on performance. They tried to explain the relationship: "Self-confidence and performance have a

reciprocal relationship, so it is possible that either increases in self-confidence due to self-talk raised task performance, or increases in task performance due to self-talk raised self-confidence (or even both in a reciprocal manner)” (Hatzigeorgiadis, et al., 2009 pp 192). The effects of self-talk on self-efficacy were first examined by Hardy, Hall, Gibbs, and Greensdale (2005) and Hatzigeorgiadis, Zourbanos, Goltsios, and Theodorakis (2008) later examined the effects of motivational and instructional self-talk on self-efficacy and performance of young tennis athletes. The results suggest that increases in self-efficacy may be a main mechanism explaining the facilitating effects of self-talk on performance.

Conclusions

Self-talk helps athletes by using appropriate keywords in order to control and organize their thoughts, to focus on the main elements 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 should integrate self-talk in their programs. 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 skills that each sport demands. At the same time, instructional self-talk can help even the most advanced and experienced athletes correct their mistakes in skill execution and to increase the cognitive mechanisms and psychological skills such as self-confidence, focus attention, automaticity, emotion and cognitive control and effort. This process of self-talk strategy is continuous, either at practice or at competitions.

In similar studies in the future, it would be interesting to investigate the effect of this particular method of feedback with self-talk to other swimming skills (freestyle, breaststroke, butterfly stroke). Moreover, possible effects of instructional self-talk to swimmers of different 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 athletes that participated in the group that used instructional self-talk, improved their technique. It is suggested that the trainers, during practice, teach their athletes to use the instructional self-talk if the goal is to improve the teaching skill.

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