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Investigating the Functions of Self-Talk: The Effects of Motivational Self-Talk on Self-Efficacy and Performance in Young Tennis Players

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The purpose of the current study was to examine the effects of motivational self-talk on self-efficacy and performance. Participants were 46 young tennis players (mean age 13.26, *SD* 1.96 years). The experiment was completed in five sessions. In the first session, participants performed a forehand drive task. Subsequently, they were divided into an experimental and a control group. Both groups followed the same training protocol for three sessions, with the experimental group practicing self-talk. In the final session, participants repeated the forehand drive task, with participants in the experimental group using motivational self-talk. Mixed model ANOVAs revealed significant group by time interactions for self-efficacy ($p < .05$) and performance ($p < .01$). Follow-up comparisons showed that self-efficacy and performance of the experimental group increased significantly ($p < .01$), whereas self-efficacy and performance of the control group had no significant changes. Furthermore, correlation analysis showed that increases in self-efficacy were positively related to increases in performance ($p < .05$). The results of the study suggest that increases in self-efficacy may be a viable mechanism explaining the facilitating effects of self-talk on performance.

In the sport psychology literature the study of self-talk has been progressively growing. Self-talk is a cognitive strategy aiming at enhancing performance, and as such, the vast majority of the self-talk research has justifiably focused on the effects of self-talk on performance. Studies using various research designs and tasks have thoroughly supported that self-talk can be an effective cognitive strategy for skill acquisition and performance enhancement. In particular, the effectiveness of self-talk has been supported in studies using experimental tasks (e.g., Harvey, Van Raalte, & Brewer, 2002; Theodorakis, Weinberg, Natsis, Douma, & Kazakas, 2000), intervention studies (e.g., Johnson, Hrycaiko, Johnson, & Hallas, 2004; Perkos, Theodorakis, & Chroni, 2002), and studies employing single-subject multiple-baseline designs (e.g., Landin & Hebert, 1999; Hamilton, Scott, & McDougall, 2007).

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Based on the solid evidence regarding the effectiveness of self-talk in relation to performance, research has recently begun to examine the functions of self-talk, that is the mechanisms through which self-talk operates. The significance of investigating the functions through which self-statements affect behavioral processes was first highlighted by Meichenbaum (1977). In his self-instructional approach to cognitive-behavior modification, he suggested that "the goal of a cognitive functional assessment is to describe . . . the functional significance of engaging in self-statements of a particular sort followed by an individual's particular behaviour" (p. 202). Meichenbaum viewed self-statements as indices of individual's beliefs which may play a mediational role in behavioral performance.

Hardy, Gammage, and Hall (2001) in a qualitative inquiry examined the reasons for which athletes talk to themselves. They identified two broad dimensions of self-talk functions, motivational and cognitive. The motivational dimension refers to functions such as psyching-up, increasing self-confidence, and regulating anxiety, whereas the cognitive dimension refers to functions such as the execution of skills and development of strategies. Based on Hardy's conceptualization of self-talk functions, Zervas, Stavrou, and Psychountaki (2007) developed an instrument assessing these two broad dimensions. Their results supported the distinction of self-talk functions in motivational (e.g., I talk to my self to enhance my confidence) and cognitive (e.g., I talk to my self to give directions); nevertheless, the authors identified that research should examine the relationships of self-talk with other psychological aspects such as anxiety, concentration, and self-confidence, as potential mechanisms through which self-talk facilitates performance. Toward this direction, Theodorakis, Hatzigeorgiadis, and Chroni (2008) presented a multidimensional approach of self-talk functions, attempting to address the issues of how self-talk operates. In developing an instrument based on athletes' reports and empirical evidence from the literature they identified five distinct functions of self-talk. In particular, they suggested that self-talk can serve to enhance attentional focus, increase confidence, regulate effort, control cognitive and emotional reactions, and trigger automatic execution.

Several experimental studies have tested the assumptions described in the above conceptual frameworks. A first attempt to examine experimentally the functions of self-talk was made by Hatzigeorgiadis, Theodorakis, and Zourbanos (2004). They investigated the effects of instructional and motivational self-talk on performance and cognitive interference in two (a precision and a power) water-polo tasks. After an initial assessment, participants were divided into three groups, two experimental (instructional and motivational self-talk) and control. The results showed that for the precision task performance improved for both self-talk groups, whereas for the power task performance improved significantly only for the motivational self-talk group. With regard to the effects on cognitive interference, it was found that for both tasks participants in the experimental groups reported less interfering thoughts compared with the initial assessment, whereas no differences were found for the control group. The authors suggested that the use of self-talk reduces cognitive interference, thus increases in performance were attributed to the enhancement of concentration, which was identified as one of the possible functions of self-talk. Furthermore, the authors suggested that different types of self-talk have different performance effects and speculated that self-talk may serve several functions depending on the type of self-talk that is used.

Hatzigeorgiadis (2006) further supported this assumption in a subsequent experimental study. Participants were tested before and after the implementation of a self-talk training program on a swimming task. At the final assessment when instructional and motivational self-talk was used, participants reported that motivational self-talk had greater impact on effort, than instructional self-talk. In a similar experiment, Hatzigeorgiadis, Zourbanos, and Theodorakis (2007) used an experimental water-polo precision task to examine differences in self-talk functions when using a technical instruction and an anxiety regulation self-talk cue. They found that the use of both self-talk cues reduced interfering thoughts and increased effort. In addition, they reported that the anxiety regulation self-talk cue had greater impact on anxiety (reduced anxiety to a greater degree) than the technical instruction self-talk cue. They concluded that self-talk enhanced concentration and effort, and that the functions of self-talk can be moderated by the type of self-talk that is used. This preliminary evidence highlights the importance and encourages further research on the issue of self-talk functions in sport.

Hardy (2006) in a critical review of the self-talk literature stressed the lack of theory-based research and considered, among others, the relevance of self-efficacy theory (Bandura, 1997) with regard to the effectiveness of self-talk. Self-efficacy refers to one's beliefs that a certain level of performance can be attained in a given situation. These beliefs activate cognitive, motivational, and affective responses, and subsequently are important determinants of performance accomplishments. According to Bandura, one of the sources contributing to the formulation of self-efficacy beliefs is verbal persuasion. Significant others are considered most influential agents, nevertheless, Hardy indicates that verbal persuasion can also originate from oneself in the form of self-talk and can have an important impact on efficacious beliefs. The effects of self-talk on self-efficacy were first examined by Hardy, Hall, Gibbs, and Greensdale (2005). After performing a baseline sit-up task, participants were assigned to three groups, instructional self-talk, motivational self-talk, and control. Examination of the manipulation protocol revealed that the intended groups were not formed. In particular, more than half participants in the instructional self-talk group reported using in addition some form of motivational self-talk, and most of the participants in the control group reported using some form of self-talk. Even though the a priori groups were not formed, the authors tested the relationship between self-talk and self-efficacy based on reported rather than assigned self-talk. They found that self-talk was moderately related to self-efficacy. In addition, they reported that self-efficacy was positively related to performance, however, self-talk was not related to performance. The researchers argued that their results provided preliminary evidence regarding the effects of self-talk on self-efficacy and highlighted the importance of detailed manipulation checks to ensure the integrity of the experimental design.

Further preliminary evidence regarding the above propositions can be found in studies examining the effectiveness of self talk and athletes' perceptions regarding the effects of self-talk through postexperimental reports. Johnson et al. (2004) in an intervention study using a single-subject multiple-baseline design with female soccer players reported that according to participants' perceptions self talk helped them increase their confidence. Similar reports have been provided by

Perkos et al. (2002) in an intervention study using a free-throw task in novice basketball players, and Thelwell and Greenlees (2003) in a qualitative inquiry with triathletes. As self-efficacy can be viewed as a situation-specific variation of self-confidence (Feltz & Chase, 1998) the above studies further encourage the examination of the impact of self-talk on self-efficacy.

The relationship between self-efficacy and performance is well established in the sport psychology literature in various settings and sports such as distance running (Martin & Gill, 1995), swimming (Miller, 1993), and volleyball (Alexander & Krane, 1996). Feltz and Chase (1998) in their review of self-efficacy research in sport have supported the positive relationship of self-efficacy with performance and skill acquisition. Moreover, Moritz, Feltz, Fahrbach, and Mack (2000) in their meta-analysis showed an average positive effect of .38 for the relationship between self-efficacy and performance in various sports. Thus, if self-talk increases self-efficacy, then this increase may contribute, at least partly, to the explanation of the facilitating effects of self-talk on performance.

Investigating the functions of self-talk will enhance our understanding regarding the mechanisms underlying the facilitating effects of self-talk on performance and will allow athletes, coaches and sport psychologists to better design, implement and evaluate self-talk training plans, in accordance to the needs of the athletes. The primary purpose of the current study was to examine the effects of motivational self-talk on self-efficacy in young tennis players. In addition, to explore whether increases in self-efficacy were related to increases in performance, the effects of self-talk on performance were also examined. Research has shown that the effects of self-talk are particularly evident when the technique is practiced (Ziegler, 1987). Thus, a self-talk training program was implemented. Research has also supported that different self-talk cues can have different effects on performance, which led Hatzigeorgiadis et al. (2004) to suggest that the relative impact of self-talk on measured outcomes depends on the content of the cues that are used. It has been suggested that motivational self-talk can have greater impact on motivational-related outcomes, such as effort, self-confidence, and self-efficacy beliefs (Zinsser, Bunker, & Williams, 2006). Preliminary evidence in favor of this assumption has been provided by Hatzigeorgiadis (2006) in an experimental study where it was found that motivational self-talk increased effort more than instructional self-talk. Therefore, the impact of motivational self-talk on self-efficacy was tested. Overall, it was hypothesized that the use of motivational self-talk will enhance self-efficacy and performance.

Method

Participants

Participants were 46 young tennis players (22 boys and 24 girls). Their mean age was 13.26 (SD = 1.96) years. All participants had at least one year of competitive experience (M = 2.33, SD = 2.17 years) and had been training systematically for 4.46 (SD = 2.61) years. All players had regional age-group rankings and their competitive experience involved regional and national competitions at junior level.

Instruments

Performance. The Broer-Miller Forehand Drive test (as described by Barrow, McGee, & Tritschler, 1989) was used to evaluate performance. The one side of the court was divided into zones corresponding to a point-system (2, 4, 6, and 8 points), with balls landing close to the baseline counting for 8 points and balls landing close to the net counting for 2 points. A rope was placed at the height of 1.22 m above the net. Participants were standing on or near the baseline of the other side of the court and were hitting the balls coming from a ball machine (Lobster Elite Freedom). The score of participants was the total points gained out of ten strokes. In accordance with the description of the test, balls traveling over the rope were scored half their original value.

Self-Efficacy. In the recent sport literature, self-efficacy has been conceptualized as a multifaceted phenomenon, comprising certain types of self-efficacy (Feltz, Short, & Sullivan, 2008; Hayes, Maynard, Thomas, & Bawden, 2007). For the purposes of the study, a performance self-efficacy measure was used to assess participants' beliefs regarding their capabilities to attain certain performance levels to the task to be performed. In particular, following the recommendations of Bandura and Jourden (1991) a hierarchical task-specific self-efficacy scale regarding participants' beliefs for the points to be scored was constructed. The scale comprised seven items asking participants how certain they were that they could score (a) 20 out of 80 points, (b) 30 out of 80 points, (c) 40 out of 80 points, (d) 50 out of 80 points, (e) 60 out of 80 points, (f) 70 out of 80 points, and (g) 80 out of 80 points. Answers were given on a 5-point scale from 1 (not at all certain) to 5 (totally certain). Cronbach's alpha for the scale in this study ranged from .78 to .91. Responses for the seven items were averaged to produce self-efficacy scores (min. 1, max. 5), with higher scores indicating higher self-efficacy for achieving higher scores on the test.

Procedures

Permission to conduct the study was obtained by the institution's research ethics committee. Athletes agreed to participate and written parental consent was also obtained. The experiment was completed in five sessions, which took place over a week: initial assessment (session 1), training (session 2 to session 4), and final assessment (session 5).

Session 1—Initial Assessment. Participants were initially informed that for the five sessions to follow they were going to take part in a program evaluating tennis abilities. To raise participants' involvement, they were informed that three participants with the best record would be awarded tennis goods. Participants were then instructed regarding the procedures of the initial assessment. Subsequently, the initial assessment took place. Three sets of ten forehand strokes were performed, with a one minute interval in-between. The first set was used as familiarization (not assessed). After the completion of the first set, participants completed the self-efficacy scale with regard to the second set. Subsequently, they performed the second set, completed the self-efficacy scale with regard to the third set, and performed the third set. All participants were tested individually.

Sessions 2–4—Training Phase. After the completion of the initial assessment, participants were divided into two groups, balanced for performance and self-efficacy scores, to facilitate the interpretation of the results. The two groups were randomly assigned as experimental and control. For the three sessions that followed the two groups underwent the training phase. The backhand drive was used during the training phase so that participants do not practice the stroke that was to be evaluated at the final assessment. The use of the backhand drive was decided to minimize possible increases in performance due to practicing the stroke, and attempting to isolate to the highest possible degree the effects of self-talk on performance. At the onset of the second session, the experimental group was given a short introduction on the use of self-talk. In brief, they were told that self-talk is a cognitive strategy used by many athletes aiming at enhancing performance. They were informed that self-talk refers to the use of key words before or during play that athletes use out loud or in their head, and that the key purpose of self-talk is trying to follow the instruction that is used and trigger appropriate action. They were also told that the test applied in the previous session was a test assessing the ability of players to place the ball deep in the opposite side of the court, which is an important element of tennis performance. Finally, they were told that a special training program involving the use of self-talk cues relevant to the execution of the tennis strokes will be implemented to test whether their performance on the test will be affected. Participants were given instruction regarding the procedures to follow and were allowed questions on these procedures. Finally, an assistant demonstrated how and when they should use the key words that they would be instructed, and were told that they could use the self-talk cues either out loud or internally, according to their preference. Subsequently, participants performed four sets of eight strokes on the backhand drive using a different self-talk cue for each set. Balls in the training session were thrown by the coach. Because the purpose of this phase was to train participants using self-talk, learn how to use self-talk and get a thorough understanding of how self-talk works in each instance, instructional cues (e.g., ‘deep’, ‘shoulders’) and motivational cues (e.g., ‘go’, ‘I can’) were used. For each day participants practiced two sets of backhand drives using instructional cues and two sets using motivational cues. After the completion of each set participants completed the scale assessing how often they used the instructed cue. Overall, the instructional cues that were used were “shoulders”, “step”, “ball”, “low”, “follow”, “deep”, and the motivational cues were “I can,” (I’m) “Strong,” “Let’s go,” (I’ve) “got it.” In the fourth session, for the final two sets participants were asked to choose among the motivational cues they had previously practiced.

The control group was given a short introduction on tactical aspects of the stroke (regarding the importance of placing the ball deep in the opposite side of the court, what are the implications of deep strokes and how the game of the opponent is disadvantaged). Subsequently, they were told that the test applied in the previous session was a test assessing the ability of players to place the ball deep in the opposite side of the court, and were informed that a special training program will be implemented for the three sessions to follow to test whether their performance on the test will be affected. Subsequently they performed the same number of sets, without the use of self-talk. The same procedures were followed for the third and the fourth sessions. During this phase, to avoid contact between

participants, the training of the two groups took place in different hours of the day. The training program was applied to groups of four or five athletes.

Session 5—Final Assessment. On the fifth session the procedures of the initial assessment were repeated. With regard to the awards, and to sustain levels of involvement for all athletes, it was pointed out that awards would be given to the three athletes that showed greatest improvement, in relation to their initial scores. Participants of both groups performed three sets of forehand drives and completed the self-efficacy scale as in the initial assessment. Athletes of the experimental group were asked to choose and report one of the motivational self-talk cues that had previously practiced, to use it (overtly or covertly) during their strokes. In particular, eight participants chose the cue "I can", six the cue "strong", four the cue "let's go", and four the cue "got it". After the completion of the final assessment the manipulation check protocol regarding the use of self-talk was administered to the experimental and the control group. After the conclusion of the experiment participants were explained the purpose of the study and were thanked for their participation.

Manipulation Check Protocol

Two protocols were used for the manipulation check. The first involved the use of self-talk during training for the participants of the experimental group. Participants were asked to indicate how frequently they were using the instructed self-talk cue on a 10-point scale, from 1 (*not at all*) to 10 (*all the time*). The second protocol involved the use of self-talk for the final assessment. Participants in the experimental group were asked to indicate (a) how frequently they were using the self-talk cue of choice, (b) whether they were using some other type of self-talk, (c) if so, what were they saying to themselves, and (d) if so, how often, on a 10-point scale (1 = *few times,* 10 = *all the times*). Participants on the control group were explained what self-talk is and were asked to indicate (a) whether they used any form of self-talk, (b) if so, what were they saying to themselves, and (c) if so, how often, on a 10-point scale (1 = *few times,* 10 = *all the times*).

Results

Manipulation Check

Two issues were considered with regard to the integrity of the experimental conditions. First, the use of self-talk during the training phase from participants in the experimental group, and second the use of self-talk in the final assessment by participants in the experimental and the control groups. Regarding the first, examination of the means revealed that participants in the experimental group made adequate use of self-talk during the training phase. The means for the three training sessions were 7.41 (*SD* = .76), 7.52 (*SD* = .67), and 7.51 (*SD* = .68) respectively.

Regarding the second, it was revealed that five athletes from the control group reported using consistently some form of self-talk during the trials, whereas one athlete from the experimental group reported using some other type of self-talk

than the one initially selected. These athletes were subsequently excluded from further analyses. As a result, the control group consisted of 18 athletes, whereas the experimental group consisted of 22 athletes.

Within Assessment and Baseline Differences

As described in the procedures section, within each assessment (initial and final) performance and self-efficacy were measured twice (once for each set). To test for differences within each assessment for performance and self-efficacy paired-samples *t* tests were calculated for the total sample. For the initial assessment the results revealed that there were no performance differences between the two sets, $t\,(39) = 1.48$, $p = .15$, and no self-efficacy differences between the two sets, $t\,(39) = 1.61$, $p = .12$. Similar results were obtained for the final assessment; for performance, $t\,(39) = 1.20$, $p = .24$, and for self-efficacy, $t\,(39) = 1.01$, $p = .32$. Subsequently, scores for the two sets within each assessment were averaged to provide overall initial and final assessment scores for performance and self-efficacy.

Because six participants were excluded from further analyses, analysis of variance were performed to ensure that no differences in performance and self-efficacy scores existed between the experimental and the control groups for the initial assessment. The assumptions regarding normality and homogeneity of variance and covariance were met. The analyses revealed a nonsignificant multivariate effect, $F\,(2, 37) = .09$, $p = .91$, indicating that there were no differences in performance, $F\,(1, 39) = .12$, $p = .73$, and self-efficacy, $F\,(1, 39) = .02$, $p = .90$, between two groups (mean scores for performance 42.57, $SD = 14.99$ and 43.08, $SD = 9.58$ for the experimental and control groups respectively; mean scores for self-efficacy 2.76, $SD = .55$ and 2.69, $SD = .65$ for the experimental and control groups respectively).

Main Analysis

A 2×2 (group by time) mixed model analysis of variance was conducted, with group as an independent factor and time as a dependent factor, to test for changes in performance and self-efficacy for the experimental and the control groups. The assumptions of normality and homogeneity of variance and covariance were met. The analysis yield a significant multivariate group by time interaction, $F\,(2, 37) = 10.09$, $p < .01$, $\eta^2 = .35$. Regarding performance, the univariate analysis revealed a significant interaction effect, $F\,(1, 38) = 19.10$, $p < .01$, $\eta^2 = .34$. Pairwise comparisons revealed that performance of the experimental group increased significantly ($p < .01$), whereas performance of the control group did not change significantly ($p = .64$). The interaction effect and the means for the two groups are displayed in Figure 1. Regarding self-efficacy, the univariate analysis revealed significant interaction effect, $F\,(1, 38) = 5.12$, $p < .05$, $\eta^2 = .12$. Pairwise comparisons, performed to further examine the identified interaction, revealed that self-efficacy of the experimental group increased significantly ($p < .01$), whereas self-efficacy of the control group did not change significantly ($p = .08$). The interaction effect and the means for the two groups are displayed in Figure 2.

To examine the association between increases in self-efficacy and performance improvement, the correlation between changes in self-efficacy and changes

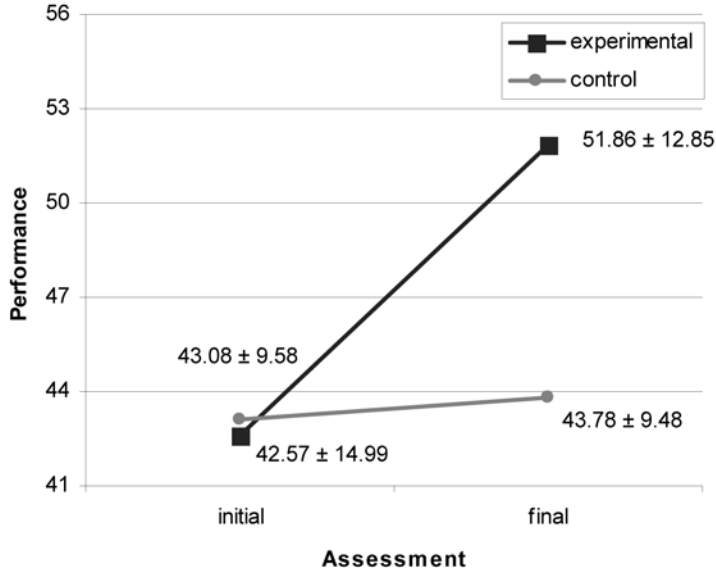

Figure 1 — Performance scores in the initial and final assessment for the experimental and control groups.

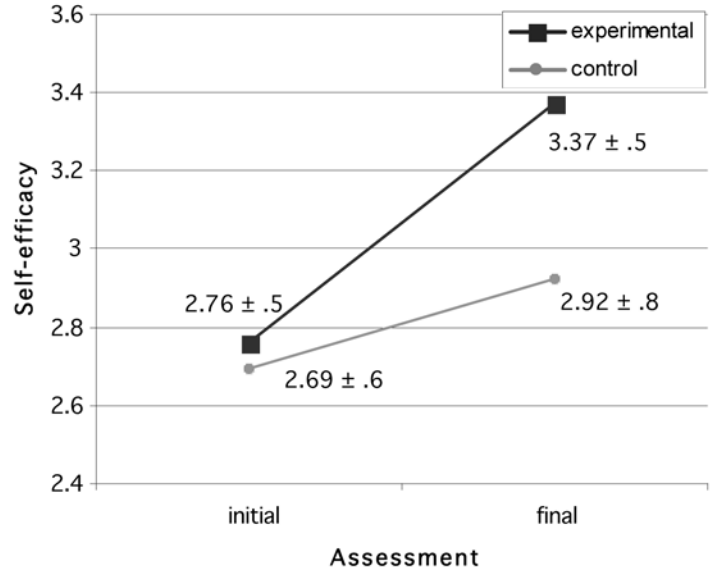

Figure 2 — Self-efficacy scores in the initial and final assessment for the experimental and control groups.

in performance (scores in the final assessment minus scores in the initial assessment) was calculated for the total sample. The analysis revealed a positive moderate relationship ($r = .38$, $p < .05$), suggesting that changes in self-efficacy were related to changes in performance.

Discussion

The present study examined the effects of motivational self-talk on young athletes' self-efficacy. Furthermore, effects on performance were recorded to test whether increases in self-efficacy were related to increases in performance. Overall, the results showed that the use of motivational self-talk increased both self-efficacy and performance, and that changes in self-efficacy were related to changes in performance, thus suggesting that increases in self-efficacy may be a viable mechanism explaining the facilitating effects of self-talk on performance.

Hardy et al. (2005) highlighted the importance of detailed postmanipulation checks, which ensure the integrity of the experimental conditions created by the researchers. They suggested that assigning self-talk to participants does not rule out the possibility that they use additional self-talk. Furthermore, they suggested that participants assigned as controls, are also likely to use self-talk, thus threatening the experimental validity. Toward this direction, two sets of manipulation checks were employed. First, the use of self-talk during the training phase of the experimental group was assessed. Following Hardy et al.'s recommendations, this sort of check was not used in the training phase of the control group to prevent promotion of self-talk thereafter. Second, the use of self-talk by participants of the control and the experimental groups during the final assessment was assessed. Regarding the first, the results suggested that the experimental group made adequate use of self-talk during training. Regarding the second, it was found that five participants in the control group reported consistent use of self-talk. In particular, two participants reported using the cue 'deep' (referring to the placement of the ball), and three participants reported using the cues 'I can do it' or 'strong'. Furthermore, it was found that one participant from the experimental group reported using the instructional cue 'low' (referring to the posture) instead of the motivational one that was originally selected by the athlete. These participants were subsequently excluded from further analyses to protect the integrity of the experimental manipulations.

In accordance with previous findings regarding the effects of self-talk on performance (Theodorakis et al., 2000; Van Raalte et al., 1995), in particular when the technique has been practiced (Johnson et al., 2004), the results of the current study confirmed that self-talk can be an effective performance enhancing strategy. Performance of the experimental group improved considerably, whereas that of the control group remained unchanged. Nevertheless, the primary purpose of the study was to explore whether self-talk can increase self-efficacy, and if so, whether increases in self-efficacy are related to increases in performance.

Hardy et al. (2005) based on the premises of Bandura's (1997) seminal work on self-efficacy, suggested that one of the likely mechanisms explaining the effectiveness of self-talk is the effects self-talk has on self-efficacy. In their experiment, even though they were not able to test differences in self-efficacy between self-talk and control groups, because the manipulation checks revealed that the a priori

treatment groups were not obtained, they found that self-talk was related to self-efficacy. In contrast to Hardy et al.'s study, only one participant from the experimental group reported using some other type of self-talk during the final assessment and this can be attributed to the training that the experimental group received and the fact that participants were allowed to choose the motivational cue they would use. The results of the current study showed that self-efficacy of participants in the experimental group improved significantly compared with the initial assessment. Self-efficacy of the control group also increased, and this was reasonable considering that they had repeated the test in the initial assessment, however this increase was not statistically significant, and was lower than that of the self-talk group. The identification of a significant group by time interaction effect support that the use of self-talk can enhance self-efficacy.

Taken together, the results of the current study suggest that increases in self-efficacy may, at least partly, explain the facilitating effects of self-talk on performance. In one hand, it was found that self-talk increased self-efficacy and performance. On the other hand, it was found that increases in self-efficacy were related to increases in performance. Considering that the relationship between self-efficacy and performance has also been consistently supported in the literature (Moritz et al., 2000), the current study provides evidence that self-efficacy may be among the mechanisms explaining how self-talk affects performance.

High self-efficacy is an important psychological asset for athletes. The results of the current study supported that motivational self-talk can be an effective strategy toward the growth of self-efficacy. Athletes, coaches, and sport practitioners are therefore encouraged to promote the use of motivational self-talk to instill athletes' beliefs regarding their capabilities of accomplishing tasks and goals. To maximize gains through the use of self-talk, it is recommended that athletes' needs in relation to desired outcomes are assessed, athletes' preferences regarding the content of self-talk are considered, and the use of self-talk is thoroughly practiced and mastered.

At this point, issues pertaining to the boundaries of the study should be discussed. It should be noted that for the final assessment only motivational self-talk was used. The type of self-talk employed by athletes is said to interact with the type of the task in determining the effectiveness of self-talk (Hatzigeorgiadis, 2007). Theodorakis et al. (2000) argued that instructional self-talk should be more beneficial for fine tasks and tasks requiring accuracy and precision, whereas motivational self-talk can be more beneficial for gross tasks and tasks requiring strength and endurance. In their experiments they found that instructional self-talk improved performance on both fine and gross tasks, whereas motivational self-talk improved performance only for gross tasks. Hatzigeorgiadis et al. (2004) found that motivational self-talk improved performance in a precision task and a power task, whereas instructional self-talk improved performance only for the precision task. Thus, it can be supported that different types of self-talk can have different effects on performance and this can vary depending on the type of self-talk and the specifics of the task. Zinsser et al. (2006) suggested that instructional self-talk can more beneficial for enhancing concentration and focusing on the execution, whereas motivational self-talk can be more beneficial for psyching-up and persistence. In the current study motivational self-talk was selected because motivational self-talk has been considered more effective for motivational outcomes. Even though it is possible that instructional self-talk can also help increas-

ing self-efficacy, conclusions from the current study regarding the effectiveness of self-talk in raising self-efficacy are restricted to the use of motivational self-talk.

Participants of the experimental group apart from the use of motivational self-talk in the final assessment were also involved in a three-day self-talk training program that involved the use and practice of motivational and instructional self-talk. This approach was decided so that participants learn thoroughly how to use self-talk and get a broader understanding of how self-talk works. As the purpose of the study was to examine the effects of motivational self-talk, only participants reporting using motivational self-talk were included in the experimental group, and only participants not reporting consistent use of self-talk were included in the control group. Nevertheless, one cannot overlook that the training of self-talk, which also included instructional self-talk, may have contributed o the facilitation of self-efficacy and performance. Thus, future studies could apply designs where the effects of both instructional and motivational self-talk are examined, and compare their effectiveness in raising self-efficacy.

Self-efficacy and performance are said to have a bidirectional relationship. According to the self-efficacy theory (Bandura, 1997) mastery experiences are significant sources and determinants of self-efficacy. Furthermore, plethora of studies has supported the facilitating effects of self-efficacy on performance (Moritz et al., 2000). In the current study, self-efficacy was assessed after participants performed the task for reasons of familiarization, and subsequently before executing the experimental trials. Thus, one could be argued that the effects of self-talk on self-efficacy mirror those on performance, thus giving hence to a reciprocal interpretation. In addition, it should be noticed that only correlational evidence regarding the self-efficacy—performance relationship were provided. Thus, the present findings cannot support the mediational role of self-efficacy in the self-talk performance relationship, but rather suggest that self-efficacy is a likely mechanism through which self-talk facilitates performance and foster further research with appropriate designs to support the mediational role of self-efficacy.

Self-talk has been documented in the literature as an effective strategy for performance improvement. Examining the functions of self-talk enhances our understanding regarding the mechanisms underlying the effectiveness of self-talk, and allows the development and implementation of comprehensive psychological skill training plans. Toward this direction the current study examined the effects of motivational self-talk on performance and self-efficacy, and provided evidence that increases in self-efficacy may be among the functional mechanisms explaining the facilitating effects of self-talk on sport performance.

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