Title: From the lab to the field: Effects of self-talk on task performance under distracting conditions

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Abstract

This study explored the effectiveness of self-talk strategies on task performance under conditions of external distraction in laboratory and field experiments. In the laboratory experiment, 28 sport science students (mean age 21.48 ± 1.58 years) were tested on a computer game requiring attention and fine execution following a baseline assessment and a short self-talk training. In in the field experiment, 28 female basketball players (mean age 20.96 ± 4.51years) were tested on free-throwing, following a baseline assessment and a six-week intervention. In both settings the final assessment took place under conditions of external distraction (non-continuous, sudden, loud noise). Analyses of covariance showed that participants of the self-talk group performed better than participants of the control group. Findings suggest that self-talk can counter the effects of distraction on performance, and indicate that the attentional effects of self-talk is a viable mechanism to explain the facilitating effects of self-talk on performance.

Keywords: attention, auditory distraction, self-talk mechanisms, concentration

From the lab to the field:

Effects of self-talk on task performance under distracting conditions

Self-talk research in sport has flourished due to its direct applied value. It is noteworthy that even the first studies in the sport self-talk literature examined the effectiveness of self-talk strategies on performance (e.g., Rushall, Hall, Roux, Sasseville, & Rushall, 1988; Ziegler, 1987). Self-talk strategies have been described as the instrumental use of self-addressed cues aiming at facilitating learning and enhancing performance through the activation of appropriate responses (Hatzigeorgiadis, Galanis, Zourbanos, & Theodorakis, 2014). There is now considerable evidence regarding the effectiveness of self-talk strategies through the implementation of self-talk interventions in a wide variety of tasks and sports, employing different methodological approaches including, in addition to experimental research, longitudinal interventions (e.g., Perkos, Theodorakis, & Chroni, 2002), single-subject designs (e.g., Hamilton, Scott, & MacDougall, 2007), and case studies (e.g., Latinjak, Font-Llado, Zourbanos, & Hatzigeorgiadis, 2016). More emphatically, two reviews – a systematic review (Tod, Hardy, & Oliver, 2011) and a meta-analysis (Hatzigeorgiadis, Zourbanos, Galanis, & Theodorakis, 2011) – have provided robust support for the valuable effects of self-talk on performance.

Recently, the need to explore the mechanisms explaining the facilitating effects of self-talk has been identified, as the understanding of these mechanisms will help constructing theory and developing more effective interventions (Galanis, Hatzigeorgiadis, Zourbanos, & Theodorakis, 2016). Hardy, Oliver and Tod (2011) proposed a conceptual model describing four clusters of mechanisms that may explain the effects of self-talk on sport task performance; cognitive, motivational, emotional, and behavioural. Based on preliminary empirical findings, Galanis et al. (2016) elaborated on the motivational and cognitive mechanism, and attempted to forward postulations regarding the attentional functions of self-talk. They argued that even though research on self-talk mechanisms is still in early stages, there is reasonable evidence suggesting that the effects of self-talk on attention is a key mechanism explaining the effectiveness of self-talk strategies.

The facilitating effects of self-talk strategies on attention have been identified through reports from athletes participating in self-talk interventions (e.g., Landin & Hebert, 1999), case studies (Cutton & Hearon, 2014), and qualitative inquiries (Wayde & Hanton, 2008). Further evidence evolves from experimental studies exploring the effects of self-talk strategies on aspects of attention. Bell and Hardy (2009) examined the effect of self-talk cues fostering either an internal or an external focus of attention on self-reported attentional focus and performance. In relation to attentional focus, the findings showed that participants using self-talk reported higher (either internal or external) attentional focus, in accordance with the cue that was used, compared to the control group. The authors suggested that self-talk can help strengthening attentional focus. Finally, Galanis, et al. (2016) reported a series of experiments examining the effects of self-talk on attention functions as these conceptualized by Sturm’s (2005) - namely, alertness, vigilance, focused, selective, divided, and spatial attention - through direct behavioral measures using the Test Battery for Perception and Attention Functions from the Vienna Test System (VTS, Schufried). In these experiments, in 16 out of the 17 tests that were performed the experimental groups displayed better attentional performance compared to the control groups. The above findings provide reasonable indications that self-talk may have beneficial effects on attentional performance.

Van Raalte, Vincent and Brewer, (2016), in their self-talk model for sport, address the reciprocal relationship between contextual factors and athletes’ self-talk. They claim that contextual factors can exert an important influence on athletes’ self-talk but also that self-talk can help athletes dealing with contextual factors. Furthermore, they stress that research exploring contextual demands in sport shall help developing effective self-talk interventions; such a contextual factor in sport is distraction. Indeed, the ability of athletes to focus attention efficiently and remain focused on the face of distractions has been recognized as an integral part of sport performance (Lidor, 2007). Nelson, Duncan, and Kiecker (1993) described ‘distraction’ as the occurrence of competing stimuli that may interfere with task-related stimuli and divert attention from its original focus. According to Moran (1996, 2012), these distractions may come from internal as well as external sources. Typical internal sources include factors such as intrusive thoughts (e.g., worrying), emotions (e.g., anger), and even bodily sensations (e.g., fatigue); whereas, external sources include factors such as visual triggers (e.g., crowd movements), auditory triggers (e.g., crowd noises), gamesmanship by opponents (e.g., verbal taunting of opponents), and environmental conditions (e.g., windy whether). In psychology, research on distraction has mostly focused on the effects of external distraction to attention and performance, possibly due to methodological reasons. On the one hand, sources of information coming up from inside (e.g., inner thoughts) have been less examined because of a false perception that information has only one direction, from the outside world inwards; but also due to difficulties related to manipulation and measurement

(Moran, 2009). On the other hand, sources of information coming from outside (e.g., environmental conditions) have received more research attention due to methodological convenience of creating and manipulating such distractions (Eysenck & Keane, 1995). Nevertheless, research in psychology has supported that distractions, either internal or external, humper attention and performance in cognitive-motor tasks (e.g., Coy, O’Brien, Tabaczynski, Northern, & Carels, 2011; Dalton & Behm, 2007; Persoon et al., 2011).

In sport, the role of distractions has been greatly recognized, and can be easily identified in anecdotal reports. In the 1995 Spanish Open golf championship, Eamon Darcy was disturbed by an unexpected loud noise of a mobile phone that went off during his downswing, and he sent the ball ‘out of bound’; he then acknowledged that “after the ringing I was upset and actually never got my rhythm back after that”. Similarly, in the 1992 Wimbledon tennis tournament, Monica Seles was accused by an opponent for her sonorous grunting during the strokes. Her opponent found such noise distracting because she could not hear the ball leaving Seles’ strings. Despite the significant role of distraction for attention and ultimately actual performance, the topic has received relatively limited research interest. Janelle, Singer, and Williams (1999) examined the effects of visual distraction in a driving simulation task under anxious conditions. They reported that external distractions were associated with attentional narrowing and poor performance in central and peripheral tasks. In a study examining the effects of distractions, Hohmann, Exner, and Schott (2016) investigated the temporal congruence between physical execution and motor imagery in a Timed-Up and-Go-Test type of task, under neutral and auditory distraction conditions. They found that auditory distraction negatively affected mental chronometry.

The ability to focus attention, and remain focused despite distractions is a skill, and as such it can be developed and improved through practice (Wilson, Peper, & Schmid, 2006). To that end, the use of cognitive strategies becomes important. Lidor, Ziv, and Tenenbaum (2013) tested the effectiveness of internal and external focus of attention instructions on a throwing accuracy task, under neutral and distracting conditions. They reported that under distracting conditions, both external and internal focus instructions groups yielded better accuracy and consistency scores compared to the control group.

Considering the conceptual models (Galanis et al., 2016; Hardy et al., 2009, Van Raalte et al., 2016) and the relevant self-talk literature addressed above, it evolves that self-talk may be an effective strategy to attenuate the detrimental effects of distraction on performance. In fact, a study by Hatzigeorgiadis, Theodorakis, and Zourbanos (2004) provided valuable preliminary evidence for the potential of self-talk strategies to attenuate internal distractions. The authors examined the effects of two types of self-talk (instructional and motivational) on performance in a precision and a power task in water-polo. In addition, the occurrence of internal distractions in the form of interfering thoughts was examined through self-reports immediately after the conclusion of the tasks. Findings revealed that both self-talk types were effective in reducing the occurrence of distracting thoughts in both tasks. Importantly, reductions in interfering thoughts were related to increases in performance, thus suggesting that reduction of distractions, reflecting improvements of attention, may be a viable mechanism to explain the facilitating effects of self-talk.

Considering the importance of attention for sport performance and the detrimental effects of distractions on attention, the present study aimed at exploring the potential of self-talk as a strategy to attenuate the effects of external distraction. In particular, we examined experimentally the effects of self-talk strategies on performance under conditions of auditory distractions in two different settings (laboratory and field). The laboratory experiment involved performance on a computer game requiring fine motor execution. The field experiment involved free-throwing in basketball. We expected that in both settings under condition of distraction performance of the self-talk groups would be superior to that of the control groups.

Experiment 1. Laboratory

Method

Apparatus. An E-prime psychology software tool (E-prime 2.0) was used to develop an integrated environment aiming to present, control, and record the temporal parameters of the computer game. The visual stimuli were presented on a 19-in LCD computer monitor with screen dimensions of 1280x1024 pixels. Participants were responding on the presented stimuli via a joystick (Logitech Attack 3) that was placed in front of the computer monitor. In addition, a set of headphones was used for the final assessment when the external distraction was introduced.

Participants. Twenty-eight sport science students (17 males, 11 females) were randomly assigned into two equal groups. The mean age of participants was 21.48 (± 1.58) years. Participants provided written informed consent before the onset of the study and received course credit for their participation.

Performance task. A computer game was designed for the purposes of this study. Specifically, the game was designed in an E-prime environment and resembled the old "pong" game. In one side of the monitor there was a goal in the middle (15cm wide) and a paddle (5cm wide), and in the other side of the monitor there was a cannon throwing balls, which were all directed towards the goal. The width of the goal and the paddle were decided following pilot testing to produce an average between 50% and 60% so that participants would perceive the task as of moderate difficulty and challenging (not too easy to be boring, not too difficult to be disappointing). Participants were instructed to block the balls, not allowing to go through the goal. In order to block the balls participants should move the paddle horizontally (left/right) with the joystick.

Procedure and intervention. The institution's ethics committee provided permission to conduct the study. The experiment included three phases that were completed in one session: baseline assessment, short intervention, and final assessment. The total time of the session was approximately 50 minutes.

Phase 1: Baseline assessment. Initially, all participants received information about the requirements and the procedures of the experiment. They were also informed that the data would be confidential, and that they could withdraw from the experiment at any time. Subsequently, the baseline assessment took place in a controlled laboratory room. Participants were informed that they had to be tested on a computer game named "pong". Participants had the opportunity to practice the game for one minute to become familiar with the concept of the game and the equipment. The frequency of the balls thrown from the cannon for the familiarization was one ball per second. After the familiarization, the baseline assessment took place.

Participants were instructed to block as many balls as they could for a period of two minutes. The frequency of the balls thrown from the cannon for the baseline assessment was two balls per second. Each participant was tested individually.

Phase 2: Intervention programme. Following the completion of the baseline assessment the intervention phase took place. The intervention involved practicing a mini golf task that was introduced as an attention training fine task. The training lasted approximately 20 minutes, during which participants completed 4 sets of 15 hits (a total of 60 hits) attempting to putt the ball from a distance of 180cm from the hole. Participants of the control group received basic information about technical aspects of mini golf (e.g., body position, gripping of putter, swing). In addition they received for approximately 5 minutes information regarding the history of the game and structure of a competition. The participants of the experimental group received the same information regarding mini golf instructions, and in addition they were introduced to the use of self-talk strategy. Specifically, they received information about self-talk as a performance enhancing strategy and instructions on how to use self-talk for the upcoming task; what to say (e.g., putt it), when to say it (e.g., just before the putt), and why to say (e.g., to ensure readiness and increase confidence). Participants were told that they could use the cue words either overtly or covertly. The self-talk for the golf training task included a variety of instructional (e.g., body still, eyes on target line) and motivational (e.g., ready, putt it) self-talk cues aiming on different aspects of performance (e.g., focus, confidence). In general, the intervention phase was designed for the participants to get acquainted with the use of self-talk (i.e., education and practice), but in a task different than the performance task, thus minimizing the learning effects on performance and isolate to the highest possible degree the self-talk effects. At the end of training session participants were asked to verbally report how frequently they were using the self-talk cues during the practice on a 10-point scale (1 = not at all, 10 = throughout the training).

Phase 3: Final assessment. Following the completion of the intervention phase, participants took place to the final assessment. Participants completed the same task as in the baseline assessment, only this time they were wearing headphones through which a sudden, non-continuous (10 seconds on, 5 seconds off), loud (approximately 95 dB) noise was introduced. This volume has been recommended as high enough to distract human attention and hamper performance, in contrast to lower volume whose impact has been questioned, but not to cause any harm (Smith, 1991). All participants were informed that they would perform the same computer game under condition of external distraction in the form of a noise through the headphones, and were asked to block as many balls as possible despite the distraction. Participants of the experimental group were instructed in addition, to use a cue word (hit it) repeatedly to help them focus on the ball. The selection of the cue was decided following pilot testing where individuals were asked to select the most appropriate among a list or other relevant cues. After the completion of the final assessment, all participants completed a typical self-talk manipulation check protocol (Hardy, Hall, Gibbs, & Greenslade, 2005; Hatzigeorgiadis, Galanis et al., 2014) to ensure the integrity of the experimental conditions. In particular, participants in the experimental group were asked (a) to indicate the degree to which they used the instructed self-talk cues (from 1 = not at all, to 10 = all the time), (b) to report whether they consistently used any other self-talk cues, and if so (c) what these cues were, and (d) the degree to which they used these other cues (from 1 = not at all, to 10 = all the time).

Participants in the control group were asked to indicate (a) whether they systematically used any form of self-talk during the task, and if so (b) what self-talk cues they used and (c) to what degree (from 1 = not at all, to 10 = all the time).

Results

Self-talk Manipulation Check. Participants of the experimental group reported very consistent use of self-talk during the self-talk short training sessions (*M* = 9.92, *SD* = 0.26) suggesting the intervention succeeded getting participants familiar with using self-talk. Similarly, for the final assessment participants of the experimental group reported, following the instructions, consistent use of self-talk during the task (*M* = 8.64, *SD* = 0.63); in addition, none of these participants reported using other self-talk in a consistent way. Regarding the control group, no participant reported using self-talk in a strategic or consistent way; one participant reported self-talk 'move the bar' and one 'focus' but only occasionally (4 and 3 respectively on the 10-point scale).

Task Performance. One-way ANCOVA was conducted to test for differences between the experimental and the control groups on final task performance, assessed as the percentage of blocked balls out of total, controlling for baseline performance. The analysis showed (a) that the covariate, baseline performance, was significantly related to final task performance $F(1, 27) = 6.76$, $p < .05$, partial $\eta^2 = .21$, and (b) that the group effect after controlling for the effect of baseline performance was significant, $F(1, 27) = 4.52$, $p < .05$, partial $\eta^2 = .15$. Examination of the estimated mean scores showed that the self-talk group performed better (*M* = .60.77, *SE* = .90) than the control group (*M* = .58.01, *SE* = .90). The observed means for both groups in the baseline and final assessment are shown in Table 1.

Experiment 2. Field

Method

Participants. Female basketball players (mean age 20.96 ± 4.51; mean sport experience 9.21 ± 3.69 years) from two teams competing at the second division of the National Championship participated in this study. The teams were randomly assigned as either intervention (n = 12) or control (n = 16) groups. For the intervention group 11 players completed the intervention and one withdrew due to injury. No differences were found between participants of the two groups on age, $t(25) = 0.69$, $p = .49$, and sport experience, $t(25) = 0.31$, $p = .76$.

Procedure and intervention. The institution's ethics committee provided permission for the conduct of the study. Each team was contacted and a meeting was arranged with a member of the managing staff and the coach during which the requirements of the research were explained. Upon agreement the dates of the intervention were decided. The study included three phases (baseline assessment, intervention, and final assessment) over a period of eight weeks, which were completed just prior to the play-offs of the season. Both team participated in the play-offs for promotion to the premier division.

Phase 1: Baseline assessment. All players received information about the requirements and the procedures of the experiment. They were also informed that the data would be confidential, and that they could withdraw from the experiment at any time. Participants then provided written informed consent for their participation in the study. Subsequently, the baseline assessment took place. Players were asked to perform 10 sets of free-throw pairs, as free-throws in games are most often performed in pairs. Each player was tested individually.

Phase 2: Intervention programme. In the first training session following the baseline assessment the intervention was initiated. Players of both teams were explained how the free-throw training will be for the following six weeks. In particular, they were informed that for all sessions they will perform 8 sets of free-throw pairs after warming-up and prior to cooling-down. Three times per week a research assistant would attend the training. For the intervention group this session also included in addition a 20min presentation regarding self-talk strategies, where athletes were explained what self-talk is, how it benefits performance, and how the self-talk training will be introduced into their training. Thereafter, for three training sessions per week during the six following weeks, players of the intervention group were receiving just before the onset of the scheduled sets specific instructions about self-talk plans (what to say, when to say, why to say it). Upon completion of each free-throwing session participants were asked to verbally report how frequently they were using the self-talk cues during the execution on a 10-point scale (1 = not at all, 10 = throughout the set).

Overall, following the protocol of Hatzigeorgiadis, Galanis et al. (2014), the purpose of the intervention was to educate players on the use of self-talk, to get them to train using self-talk consistently, and finally to enable them to develop personal self-talk plans for free-throwing. During week 1 participants practiced using instructional self-talk cues (e.g., focus, rim); during week 2 they practiced using motivational self-talk cues (e.g., it’s in, count it); during weeks 3 and 4 they practiced using combinations of instructional and motivational self-talk; finally during weeks 5 and 6 they developed their own free-throw self-talk plan for the final assessment. Following the last training of each week players were asked to reflect their experiences with the use of self-talk and were guided towards developing effective self-talk plans.

Phase 3: Final assessment. Following the completion of the intervention, the final assessment took place. Athletes, similarly to the baseline assessment were asked to perform ten sets of free-throw pairs. However, they were informed that this time the assessment would take place under conditions of external distraction in the form of a sudden, non-continuous (2-3 seconds on, 1-2 seconds off), loud noise (horn, approximately 95 dB). Players of the experimental group were instructed to use their personal self-talk plan they developed during the training program. After the completion of the final assessment, all participants completed a typical manipulation check protocol similar to that of the previous experiment.

Results

Manipulation check. Participants of the intervention group reported consistent use of self-talk during the training sessions across the intervention (M = 7.51, SD = 1.15), with a tendency to increase weekly except for week 5, suggesting that participant integrated successfully the self-talk strategy into their free-throwing (the mean scores for the six weeks were respectively: 6.63 ± 2.08; 7.51 ± 1.68; 7.90 ± 1.12; 8.26 ± 1.52; 7.71 ± 1.34; 8.39 ± 1.35). Similarly, for the final assessment participants of the intervention group reported consistent use of self-talk during free-throwing (M = 8.30, SD = 1.25); in addition, none of these participants reported using other self-talk in a consistent way. Examination of the players’ self-talk plans showed that 60% of the cues had motivational content (e.g., it’s in), whereas the remaining 40% had instructional content (e.g., focus). Regarding the control group, the manipulation check revealed that 3 participants made consistent use (scored 8 or higher on the 10-

pont scale) of self-talk (two participants reported the cue “it’s in”, and one the cue “get it in”). To protect the integrity of the experimental conditions, and following previous recommendations (Hatzigeorgiadis, Zourbanos, Goltsios, & Theodorakis, 2008) and recent criteria (Gregersen, Hatzigeorgiadis, Galanis, Zourbanos, & Papaioannou, in press), these three participants were removed from the main analysis; yet, to provide a complete picture of the data, an analysis including these participants is also reported.

Free-throwing performance. One-way ANCOVA was conducted to test for differences between the experimental and the control group on final performance, assessed as percentage of successful free-throws, controlling for baseline performance. The analysis showed (a) that the covariate, baseline performance, was significantly related to final performance, $F(1, 23) = 8.21$, $p < .01$, partial $\eta^2 = .28$; and (b) that the group effect after controlling for the effect of baseline performance was significant, $F(1, 23) = 6.11$, $p < .05$, partial $\eta^2 = .23$. Examination of the estimated mean scored showed that the self-talk group performed better ($M = 64.64$, $SE = 4.59$) than the control group ($M = 49.15$, $SE = 4.22$). The observed means for both groups in the baseline and final assessment are presented in Table 2. The analysis was repeated including participants from the control group who were excluded from the former analysis on the evidence of the manipulation check. The analysis yielded similar results for the covariate, $F(1, 26) = 9.28$, $p < .01$, partial $\eta^2 = .28$, and the group effect, $F(1, 26) = 6.14$, $p < .05$, partial $\eta^2 = .20$; estimated mean scores showed that the self-talk group performed better ($M = 63.84$, $SE = 4.41$) than the control group ($M = 49.55$, $SE = 3.64$).

General Discussion

The present research examined the effectiveness of self-talk strategies under auditory distracting conditions. Two experiments were conducted, one in a laboratory context and one in a field context. Findings showed that in both experiments participants using self-talk performed better than control participants. There is a plethora of empirical evidence that self-talk strategies are effective in enhancing sport/task performance in a variety of settings, and this evidence has been well supported through systematic (Tod et al., 2011) and meta-analytic (Hatzigeorgiadis et al., 2011) reviews. Recently there has been a call for identifying and exploring the mechanisms underlying the facilitating effects of self-talk (Theodorakis, Hatzigeorgiadis, & Zourbanos, 2012); attention has been identified as a critical mechanism (Galanis et al., 2016; Hardy et al., 2009). In numerous studies the attentional effects have been postulated, in particular for tasks requiring precision and fine execution (Van Raalte et al., 1995), which place particular demands on attention functions. Distraction in the form of noise has been found to interrupt focused attention and harm performance in several settings (e.g., Coy et al., 2011; Dalton & Behm, 2007). In sport, despite the recognised harm distraction may produce on actual performance – evidenced in anecdotal reports and athletes' attributions of poor performance (Moran, 1996) – research is to date rather sparse.

The present findings suggest that using self-talk benefited performance under conditions of distraction in the form of sudden, loud, non-continuous noise. Two interrelated but seemingly different interpretations could be suggested for this effect. The first interpretation is that self-talk can help blocking, or deteriorating the intensity of the distracting stimuli; i.e., participants not hearing the noise, or not noticing its intensity. Hatzigeorgiadis et al. (2004) reported in two experiments that the use of self-talk was linked to reduced cognitive interference, which has been described as a form of internal distraction (Moran, 1996). Even though the nature of internal distractions is different than that of external distractions, this finding align with the interpretation suggesting that self-talk can help blocking distractions. Considering a relevant study on external distractions, Jeon and colleagues (Jeon, Kim, Ali, & Choi, 2014) investigated the effects of a mental practice programme (imagery and relaxation) on task performance under distracting noise conditions in two badminton tasks. Participants were assigned into three groups: mental practice, mental practice with noise distraction, and control. The results showed for the closed-skill task participants of the mental practice group with noise performed better than the control group, whereas for the open-skill task participants of the mental practice group performed better than the control group. The authors suggested that mental practice may reinforce the main stimulus (i.e., task completion) while lessening the effect of external auditory stimuli.

The second interpretation for the beneficial effects of self-talk under distracting conditions is that self-talk helped enhancing the function of focused attention required when executing the tasks, thus minimizing the impact of distraction; that is, participants managed to maintain an effective focus despite experiencing the noise. Janelle et al. (1999), based on the principles of the limited capacity models of attention, argued that distraction reduces available attentional resources and constrains the processing of relevant cues. Thus, it may well be that self-talk can help preserving, or renewing attentional resources that benefit focused attention and subsequently performance. Considering evidence on the effects of self-talk on attention functions through behavioural measures, Galanis et al. (2016) reported that self-talk assisted performance in tests of focused attention. Furthermore, the findings of Gregersen et al. (in press), who reported that self-talk facilitated attentional performance under conditions of ego depletion, align with the interpretation that self-talk can enhance the quality of focused attention. Social validation data could have clarified some of the above postulations; however, this was not predicted in designing the study. Thus, future research could further examine whether such postulation can further explain the attentional effects of self-talk against distractions.

An interesting aspect of the results from the field experiment involves the participants’ choice of cue words at the final assessment. As described in the methods, participants were trained to use different instructional and motivational cues for four weeks, while for the last two weeks they were asked to develop and practice their own plan for the final assessment. Most participants chose to include both instructional and motivational cues, but overall, 60% of the cues used were motivational and 40% instructional. The matching hypothesis stated by Theodorakis et al. (2012) suggested that for tasks requiring accuracy and precision, instructional self-talk would be more effective; whereas, for tasks requiring strength and endurance, motivational self-talk should be more effective. Nevertheless, Hatzigeorgiadis, Zourbanos, Latinjak and Theodorakis (2014) argued, based on further empirical evidence (e.g., Hatzigeorgiadis, Galanis, et al., 2014; Zourbanos, Hatzigeorgiadis, Bardas, & Theodorakis, 2013), that two more matching hypotheses should be considered; one involving the *setting by self-talk type* matching and one involving the *learning stage by self-talk type* matching. Regarding the former, they argued that motivational self-talk seems more appropriate in competitive or evaluative settings, whereas instructional self-talk seems more appropriate in training settings. Regarding the latter, they argued that instructional self-talk should be more effective for novel tasks, or tasks at the early stages of learning, whereas motivational self-talk should be more effective for well-learned tasks, or tasks at the automatic stage of performance.

Indeed, in a study with swimmers, where competitive performance was assessed following a similar intervention, participants developed competitive self-talk plans containing almost exclusively motivational self-talk (Hatzigeorgiadis, Galanis et al., 2014). Free-throwing in basketball is considered a task comprising fine features, thus according to the original matching hypothesis instructional self-talk should be more effective; however, participants were experienced players performing under evaluative conditions. Thus, according to the two latter matching hypotheses described above, the attributes of this situation would favour the use of motivational self-talk. Participants developed plans including both instructional and motivational elements, thus suggesting that personal characteristics, such as individual needs (Theodorakis et al., 2012) and cognitive processing preferences (Hardy et al., 2009), and the setting (environment) should be also considered when developing self-talk interventions (Hatzigeorgiadis, Zourbanos et al., 2014; Van Raalte et al., 2016).

In the present research several issues require consideration with regard to both study procedures and findings interpretation. First, we should notice that in the field study some control participants reported systematic use of self-talk. Athletes often talk to themselves spontaneously to direct or evaluate action and this is normal practice. The purpose of the manipulation checks was not to assess participants' spontaneous self-talk, but rather to identify control participants using self-talk in a systematic and strategic way. In the self-talk literature, the use of manipulation checks has been considered crucial to protect the integrity of the experimental conditions

(Hardy, Hall, Gibbs, & Greenslade, 2005). In studies where detailed manipulation checks have been used, participants have been excluded for either reporting the use of strategic self-talk while in a control condition (Hatzigeorgiadis et al., 2008), reporting not using self-talk while in an experimental condition (Hatzigeorgiadis, Zourbanos, Mpoumpaki, & Theodorakis, 2009), or reporting some other type of strategic self-talk, rather than the one instructed (Hardy, Begley, & Blanchfield, 2015). In accordance to this practice, control participants using self-talk systematically were excluded to prevent the integrity of the experimental manipulation; yet results including all participants were also presented to provide a full description of the data.

Another methodological issue involves the distraction condition. The distraction introduced was in accordance with the relevant recommendations for creating distracting conditions (e.g., Smith, 1991); however, the degree to which the distracting stimuli were perceived by participants as such was not assessed. Such an assessment would serve as a manipulation check if adopted in both the baseline and the final assessments. In addition, it would be interesting for social validation reasons, as it may have shown that participants of the self-talk group perceived the stimuli as less distracting, thus providing a perceptual interpretation to the findings. Such an assessment would be recommended in future studies. Also, in relation to the distracting stimuli in the field experiment, the horn used to create the noise is a typical distraction that basketball players of such a competitive level face regularly within the sport culture of the country where the study took place. Nevertheless, this may not be the case in other countries or in other sporting disciplines; in future field studies researchers are therefore encouraged to adjust and create realistic distraction conditions such as the one used in our field study.

A final issue involves the training of self-talk itself in our laboratory study. There is robust meta-analytic evidence suggesting that training self-talk improves its effectiveness (Hatzigeorgiadis et al., 2011); therefore, we opted to include such training to our experimental design. Considering however that the experimental task was novel and attempting to avoid learning effects, we choose to use another task for training self-talk (golf putting). The purpose of the training was to get participants familiar with the use of self-talk so that they would use it consistently in the final assessment. The training was based on an educational approach focusing on the function of self-talk strategies as instructions that initiates appropriate responses. Participants were trained on ‘what’, ‘when’, and ‘why’ the cue words were used, a rationale that was also presented for the experimental task. Despite the discrepancy between that training task and the final assessment task, participants of the self-talk group reported consistent use of self-talk, thus supporting the effectiveness of the self-talk training. The training of self-talk was not an issue for the field study where experienced athletes were tested on a well learned task, where learning effects were not possible, thus allowing the training to be implemented on the experimental task.

One of the strengths of the present investigation is the testing of the hypothesis both in laboratory and field settings. The laboratory provides a suitable environment for basic research hypothesis testing, however the external validity of findings cannot be supported with confidence. In contrast, field experiments provide a setting where, despite relative losses in control over experimental conditions, the ecological validity can be confidently supported. Sport settings place particular demands on athletes and part of these demands involve contextual factors. Van Raalte et al. (2016) addressed the reciprocal relationship between self-talk and contextual factors, identified that self-talk can have important influences, and argued for the need of research to address such effects. The results of these two studies combined provide strong evidence that self-talk can help countering the effects of external distractions, as contextual factor, on performance. Considering that distractions have detrimental effects on focused attention, the findings suggest that self-talk can be an effective strategy to enhance the quality of attention functions. Coaches are encouraged to work with players susceptible to distraction through the development of self-talk plans, considering the sources of distraction and athletes’ individual characteristics and preferences, to help defy the effect of the distractions. Finally, the findings provide indication that the attentional effects of self-talk may be a viable mechanism explaining the facilitating effects of self-talk on sport performance. Thus, future research could use research designs that allow testing this mediation to help developing robust hypotheses for self-talk mechanisms and a comprehensive self-talk theory.

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“From the lab to field: Effects of self-talk on task performance under distracting conditions”
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Table 1.

Laboratory experiment: Descriptive statistics for percentage of blocked balls for the two groups.

	Baseline		Final	
	M	*SD*	*M*	*SD*
Experimental	57.88	3.93	60.29	3.71
Control	59.82	2.82	58.48	3.58

Table 2.

Field experiment: Descriptive statistics for percentage of successful free-throws for the two groups.

	Baseline		Final	
	M	*SD*	*M*	*SD*
Experimental	60.00	14.49	65.90	18.81
Control	56.53	12.97	48.07	16.27