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**Strategic Self-Talk and Running Performance in a Middle-Distance  
Race**

By

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## **ABSTRACT**

The effectiveness of strategic self-talk has been well-documented in the sport psychology literature. Nonetheless, the vast majority of studies have been conducted in lab settings or have involved isolated motor and sport tasks, thus not examining the impact of self-talk in more realistic field settings and sport performance. The present study aimed to explore the effectiveness of a 5-week self-talk intervention in intermediate level runners competing at a middle-distance running event. Participants were 22 runners (12 males and 10 females) with a mean age of 31.4 years and mean competitive experience of 3.45 years. Performance was recorded in two time-trials with a 5-week interval in between. In between the two time trials, participants followed a structured training programme, during which participants of the intervention group followed a self-talk training intervention. Results showed that performance of both groups improved significantly; nevertheless, participants of the strategic self-talk improved more, thus displaying better times in the final trial compared to participants of the control group. This study supports the effectiveness of self-talk training in running performance in a realistic field setting.

## INTRODUCTION

The main purpose of the introduction is to set up the framework of this research that attempts to investigate the effect of a self-talk intervention. The authors scrutinized published articles to synthesize the arguments of related research and to present a hypothetical foundation of this thesis. Prior experience of professional researchers in the area of investigation is illustrated to anticipate common problems and to allow for the creativity of a new perspective of researching Self-Talk and its effect on running performance.

By definition, Self-Talk (ST) has been defined as the talk people address to themselves either silently or audibly; it could be automatic or strategic, and it is generated for several reasons mainly to stimulate, shape and assess actions (Hatzigerogiadis et al., 2014). According to Hackfort & Schwenkmezger (1993, p.355), ST is considered as the “internal dialogue in which the individuals interpret feelings and perceptions, regulate and change evaluations and cognitions and give themselves instructions and reinforcements”. Also described as “a multidimensional phenomenon concerned with athletes’ verbalizations that are addressed to themselves” (Hardy, Hall, & Hardy 2005), ST is one of the most prevalent cognitive strategy employed by athletes. It is found to be an intervention that boosts confidence in performance in sports (Vargas-Tonsing et. al, 2004). It is also defined as “an act of syntactically recognizable communication” (Van Raalte et al., 2016). For instance, an athlete, instead of words, might implement a gesture or a facial expression which is also considered as ST (Latinjak et al., 2019).

As mentioned before, self-talk in sports is used both covertly and overtly and both as an inner dialogue internalized through the self but also with cue words, which could be perceived more as a monologic form and this is the reason why in sports, it is preferred to use the broader term of “self-talk” rather than “inner dialogue” or “inner speech” as in developmental psychology. In sport psychology, through the term self-talk, organic and strategic self-talk or spontaneous and goal- directed self-talk are distinguished. Latinjak, Hatzigeorgiadis et al (2019), define self-talk as linguistic elements, “verbalizations addressed to the self, overtly or covertly, characterized by interpretative elements associated to their content and it also either (a) reflects dynamic interplays between organic, spontaneous and goal-directed cognitive processes or (b) conveys messages to

activate responses through the use of predetermined cues developed strategically, to achieve performance-related outcomes”.

The researchers in this study attempt to examine ST as the verbal conversation the athlete has with himself in the form of strategic self-talk which is the main part of self-talk interventions in sport psychology as this one. Galanis et al (2018), refer to strategic self-talk as “the use of predetermined cue words and phrases that are verbalized to achieve-performance- related outcomes”. In contrast to organic self-talk, strategic self-talk can be planned before sport practice other than the moment of it and it can also be based to athletes’ self-reflections. While practicing strategic self-talk as a part of an intervention, athletes become able to internalize the use of the predetermined cue words and finally they choose them unintentionally as part of their organic self-talk during the moment they perform and this comes as a part of their metacognitive process (Latinjak et al., 2019).

Historically, the concept of ST in athletics have been researched since the 1980s, but the investigation faced numerous challenges basically due to the limited theories available back then (Latinjak et al., 2019).

Hardy (2006) was a pioneer in this area as he examined ST with respect to: behavior, cognition and effect. His studies serve as the building blocks of our current understanding of ST; however, and according to Latinjak (2019), his findings must align with contemporary literature in order to address to the complexities of tackling ST and the related mediators. Today, Hardy and Oliver (2011) indicated that “second generation research” in this area was limited since the question was seldom beyond whether ST affects performance and findings barely showed why, or how ST may work.

An earlier attempt at examining this concept started when researchers found evidence that positive ST influenced athletic performance. ST was later on examined with respect to its multidimensionality; the relevant studies revealed that ST improved athletes’ attentional focus, assisted them to manage their efforts throughout the activity, and most importantly allowed for more disciplined emotional reactions (Theodorakis et al., 2008).

Afterwards, ST intervention was researched in depth according to 4 classes (Theodorakis et al., 2012): specific tasks in lab or field contexts such as cycling tasks (Hamilton et al., 2007), performance on different sports such as basketball (Perkos et al., 2002),

performance in non-competitive environment, and performance in competitive contexts (Schuler & Langens, 2007; Hatzigeorgiadis et al., 2014).

As Hatzigeorgiadis, Galanis, Zourbanos and Theodorakis (2014) suggested, interventions in strategic self-talk may involve different variables related to performance which can be perceived as performance classifications and these are (1) motor tasks in lab or field settings, (2) the components of different sport skills (3) non-competitive performance settings and finally (4) sport performance in competitive settings. It is worthy to mention here that two important reviews for the effectiveness of strategic self-talk were published in 2011 and both of them suggested statistically significant performance improvements (Tod, Hardy & Oliver, 2011) with a moderate effect size of the strategic self-talk interventions (Hatzigeorgiadis, Zourbanos, Galanis & Theodorakis, 2011).

Moreover, a wide array of research approached the topic through the type of ST whether it's motivational or instructional (Weinberg, Miller & Horn, 2012), positive or negative, assigned or self-generated, spontaneous or goal directed (Latinjak et al., 2019) with respect to several variables such as athlete age, skill level, psychological state, confidence & attitude, competition, task precision/type, type of sports, etc. noting that the variables are still broad and fertile for extensive research (Zinsser et al., 2006; Tod et al., 2011; Theodorakis et al., 2012; McCormick et al., 2015).

The studies tackling the hypothesis of instructional versus motivational ST effect on performance revealed different findings. For instance, a study about the effect of ST on female cross-country distance runners, implemented motivational statements repeated by a facilitator such as "you're the definition of speed" or instructional statements such as "run through the finish line"; the experiment was performed only 5 min prior to running and it revealed that instructional ST had more influence on performance (Donohue et al., 2001). However, that study had limitations of a low number of participants and is therefore not very conclusive (Miller & Donohue, 2003).

Similarly, Weinberg, Miller and Horn (2012) were of the first to investigate ST through an endurance task on the field (opposing to laboratory strength and fine motor tasks). As they examined the combinations of instructional and motivational ST with the nature of ST, they reiterated the positive effect of ST on performance in general, but they found out that instructional ST served better in precision needing tasks whereas the

motivational ST was better for endurance. On the other hand, a recent study revealed that motivational ST had no effect on performance (McCormik et al., 2018) excluding the testing for instructional ST (Barwood et al., 2015).

A relevant explanation for the difference in effect on performance is that motivational ST is generally used to boost confidence and to set a positive mood whereas instructional task-relevant statements improved performance through attention, focus and determination (Hardy, Jones & Gould, 1996). Thus, not only performance was enhanced due to motivational and instructional ST, but also athletes had more confidence and focus on different tasks. Both motivational and instructional ST fine-tuned the psychological shapes of the athletes noting that, in general, motivational ST was more effective in the tasks demanding strength whereas the instructional had a better influence on the motor tasks (Hatzigeorgiadis et al., 2008).

The attempt to conceptualize ST according to its valence, i.e. either positive or negative, lead to findings exposing the null effect of negative ST on performance, regardless of whether the ST was instructional or motivational (Tod et al., 2011). Yet, another research indicated that negative ST was expected to cause harm as opposing to positive ST that aids performance (Zinsser et al., 2010). On another note, Kendall & Treadwell (2007) researched the topic from anxiety reducing perspective and they found out that reducing negative ST resulted in less anxiety for athletes.

Besides valence, the question of whether the ST was better if assigned or self-generated, one study indicated that there was no effect on the results (Weinberg et al., 2012) noting that the experiment was executed on the day of the event and subjects had no training using ST. Therefore, and according to Zourbanos et al. (2013), subject athletes should receive proper training in ST and should be encouraged to develop their own statements for more accurate results.

After addressing valence and type, ST was most recently investigated with respect to its nature, whether spontaneous or goal oriented -also known as organic or strategic-, proposing new conceptualization of ST to promote a better understanding of ST in future research (Latinjak et al., 2019). Spontaneous or organic ST serves the athlete in managing his emotions and beliefs, whereas the goal oriented ST's main aim is to solve problems and achieve progress; for example, negative ST, such as "that was crap", was implemented by

athletes on purpose to enhance their performance (Latinjak et al., 2018). Furthermore, the concept of goal-oriented ST was proposed by Latinjak et al. (2017) to awaken the coach within the athlete that accompanies him throughout his performances.

Aside from its valence, type or nature, the context in which ST occurs was also scrutinized. For instance, competitive situations are substantially different than training settings regarding environment, coach behavior, opponents, personal value of the event, and the audience attending. According to the study researched by Zourbanos et al. (2013) on young swimmers during a competition, ST proved to be more effective in a competition than in a usual training session. Moreover, in another study, it was found that ST was used as a coping mechanism for non-professional runners during a marathon race as they were experiencing psychological distress throughout the race (Schuler and Langens, 2007).

Approaching the topic from the perspective of athlete skill level, some scholars found evidence that ST influenced performance for novices and young athletes while no evidence was found while researching competitive adult athletes (Tod et al., 2011). As to task precision, some studies indicated that ST had significant effect on performance with respect to tasks demanding technical skills and accuracy opposing to tasks demanding endurance and strength (Hatzigeorgiadis et al., 2011). Further research combined task precision with instructional versus motivational type of tasks exposing thought provoking findings. For instance, instructional ST was found to be more effective on fine tasks (Theodorakis et al., 2000) since, and according to Zourbanos et al. (2013) instructional intervention regulates attentional process while motivational ST is more beneficial to inspire athletes in tasks requiring long endurance.

The pursuits to interpret ST and its effect on performance allowed for more specific examination such as studying endurance athletes while completing either marathons or ultramarathons. McCormick et al. (2018) attempted to study motivational ST effect on 29 runners completing a 60-mile overnight ultramarathon and the findings indicate that, unlike previous research, motivational ST did not affect performance. On the other hand, Van Raalte et al. (2015) 's research testing ST on 483 marathon runners (elite and non-elite) revealed that 88% of the runners reported that they implement a rich mixture of motivational ST frequently while competing in addition to spiritual ST and mantras.



According to recent research, strategic self-talk interventions and techniques can lead to the improvement of endurance performance. It is important to mention at this point that in strategic self-talk strategies, researchers and sport psychologists may involve either motivational self-talk cues or instructional ones or even both of them, since as Hatzigeorgiadis et al. (2014) clarify, they can serve different purposes.

More specifically, motivational cues aim to increase confidence levels. In that case, Blanchfield et al (2014), proved that by practicing strategic self-talk with motivational cues helped athletes performing exhausting endurance exercises for a longer duration but in fixed intensity and Wallace et al (2017), confirmed those findings by examining the effect of strategic self-talk under heat conditions for endurance athletes. Hatzigeorgiadis et al (2018) added to these findings by proving that motivational cues in strategic self-talk helped athletes complete more work in a fixed duration and Barwood et al (2015) added the effect on a quicker self-paced time trial. The findings of Hardy, Thomas and Blanchfield (2019) who resorted the significance of how motivational cues are spoken can affect endurance performance either by using first or second person to speak to the self.

On the other hand, strategic self-talk strategies using instructional cues aim to provide direction for action as Hatzigeorgiadis et al (2014) suggest and this is why it is considered as a valuable strategy for endurance performance. Considering the value of this strategy and the lack of research to support it, there is a great need for future investigation in this field. Hatzigeorgiadis et al (2014) support that instructional cue words could mostly benefit novice performers or athletes like triathlon athletes who move from one sport to another (transition) and in different ways, such as controlling their technique or pace or even moving their attention to relevant cues in the environment.

Taking into consideration all the above and according to Theodorakis et al (2012), there is a major lack of studies testing the effectiveness of self-talk strategies on competitive performance. This fact was the motive for this research to take place and clarify the effects of self-talk on competitive performance and specifically endurance performance. As McCormick et al (2019) define, endurance sports are the ones where “a person performs continuous, dynamic and whole- body exercise over middle or long distances”. In this thesis paper, the interest focuses on the field of self-talk in running performance and especially in a competitive environment. In real competitive settings, demands are different

than training and can be linked with many factors such as the environment, coach, teammates, opponents, spectators, how important the occasion is for the athlete and subsequent cognitive and affective responses. Because of this complexity, research in competitive settings is limited but with great importance.

## **METHODS**

### **Participants**

Originally, 53 runners registered to participate in the 2000m baseline time trial as part of their yearly running fitness test. Participants were runners from different ages and at different levels. However, 22 (12 males, 10 females) agreed to commit to the 5-week running training program designed by their coach. The runners were randomly assigned Cas experimental (n = 10 runners) and control (n = 12 runners). For the 22 runners who were included in the study, the mean age was 31.40 (SD = 6.41; ranging from 20 to 44) years, the mean running experience was 4.22 (SD = 1.71) years, and the mean competitive experience was 3.45 (SD = 1.53) years. They were training on average 5.68 days per week for 8.27 hours per week. Finally, none of the participants had prior experience of psychological skills training.

### **Procedures and Intervention**

Initial contact was made via telephone with the running club management and coaches. Subsequently, face to face meetings were scheduled during which the coaches were briefed about the purposes of the study and provided their consent for the implementation of the intervention. Then, runners of the club were reached through social media and were informed about the race and the training programme. Upon agreement, a date for the baseline time trial was scheduled. On the day of the baseline assessment, participants were informed about the research study and were asked to express their interest. Those who agreed to participate signed informed consent and were subsequently assigned randomly into intervention and control groups.

Times for the baseline and final trials were recorded. Following the baseline trial, participants of both groups were asked to declare their time-goal for the next trial to be held 5 weeks later. In-between the two trials the intervention took place.

### ***Experimental Group***

An overview of the idea of self-talk and the planned implementation of the intervention was quickly presented to participants at the first meeting. They were also told how important it was for them to show up for all of their scheduled training sessions. Three out of the five training sessions per week included a practice of supervised self-talk throughout the primary running portion. However, the remaining portions of the session and any further training sessions the runners attended over the week were encouraged to use self-talk if they so wished. For the five weeks intervention, a daily schedule was created for each runner for these three supervised sessions each week.

Each session began with a group briefing on the objectives and topics to be covered. The customized strategy was then explained to each runner immediately before training began, and they were reminded of it once more just before the main running section started. The use of cue words, their frequency and timing, and the purpose of each cue were all explained to the participants. Additionally, immediately before to the start of the major section, self-talk cue words were discussed. Participants were asked about how often they used their cues after the main section of each session, as directed at the beginning. From start to finish, the same researcher oversaw all intervention sessions and gave the runners guidance.

The program's ultimate goal was for the participants to thoroughly understand, study, and practice the self-talk approach so they could design their own efficient self-talk competition strategy. The first two weeks were spent with individuals practicing positive self-talk. Technical elements of each runner's form that may be improved via instructional self-talk were identified at this period in cooperation with the coach. The objective was to create effective instructional self-talk signals for each runner to use during the next three weeks. The researcher and coach created specially tailored instructional self-talk for each runner based on these interactions. The next week (Week 3) was used to practice using these self-talk cue words.

Following that, for the last two weeks (Weeks 4-5), runners worked on a variety of instructional and motivational cues. They were continually told to identify the cues they thought would be most helpful, whether they came from the ones they had previously used or from new ones they thought would be most helpful, throughout this time. After these four weeks, runners were asked to create a self-talk competition strategy and given combinations they may use while competing. They were also instructed to adopt a self-talk strategy during the time leading up to the time trial. During the last two weeks (Week 4-5), runners put their self-talk strategies to work.

### ***Control Group***

Participants in the control group were also told that their performance in the two time-trials would be recorded for the purpose of evaluating the development that they had made over the course of the study. They were also reminded that it is essential that they show up to each of the training sessions in accordance with the schedule that was provided to them. Following the completion of the research project, individuals from the control group were given a debriefing and given the opportunity to participate in the intervention program.

## **RESULTS**

### **Control measures and baseline differences**

A number of control measures were analyzed to test for potential differences between the two groups. In particular, one-way MANOVA was conducted to test for differences in years training, years competing, training days per week, training hours per week, and training sessions attended during the intervention. The analysis revealed a no-significant multivariate effect,  $F(6, 15) = 0.32, p = .92$ . Examination of the univariate statistics showed no significant differences in any of the assessed variables; for years training,  $F(1, 22) = 0.45, p = .51$ ; for years competing,  $F(1, 22) = 0.46, p = .51$ ; for training days per week,  $F(1, 22) = 0.03, p = .86$ ; for training hours per week,  $F(1, 22) = 0.37, p = .55$ ; for sessions attended during the intervention,  $F(1, 22) = 0.82, p = .38$ . The descriptive statistics for the control measures appear in Table 1.

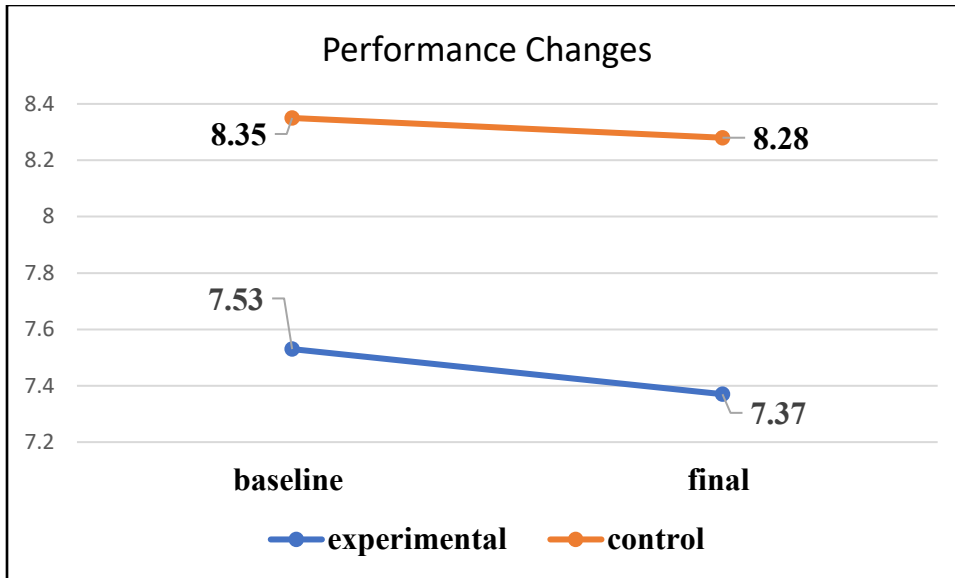
Independent-samples t-test was conducted to test for differences in performance for the baseline trial. The analysis for baseline trial performance showed a non-significant effect,  $t(20) = 1.88, p = .07$ .

**Table 1. Descriptive statistics for the control measures per group.**

	<b>Control</b>	<b>Experimental</b>
	<b>Mean <math>\pm</math> SD</b>	<b>Mean <math>\pm</math> SD</b>
Years training	4.00 $\pm$ 1.85	4.5 $\pm$ 1.58
Years competing	3.25 $\pm$ 1.54	3.70 $\pm$ 1.56
Training days per week	5.67 $\pm$ 0.49	5.70 $\pm$ 0.48
Training hours per week	8.00 $\pm$ 1.70	8.6 $\pm$ 0.69
Training sessions attended	26.00 $\pm$ 2.41	26.8 $\pm$ 1.54

### **Performance changes**

A 2-way mixed model ANOVA with one dependent factor (trial: baseline/final) and one independent factor (group: experimental control) was conducted to test for differences in performance changes between the control and experimental groups. The analysis showed a significant trial effect,  $F(1, 20) = 32.22, p < .001$ , and a marginal trial by groups interaction  $F(1, 20) = 4.01, p = .059$ . Examination of the pairwise comparison as per trial, showed that both the experimental groups ( $p < .001$ ) and the control group ( $p = .01$ ) improved their performance; nevertheless, the effect was larger for the experimental group. Accordingly, examination of the pairwise comparison as per group, showed that for the final trial performance of the experimental group was marginally superior of that of the control group ( $p = .054$ ). The pattern of performance changes for the two groups across trial is presented in Figure 1.



*Figure 1. Changes in performance across trial per study group.*

## DISCUSSION

The purpose of the present thesis was to examine and add to the limited research in the field of the effectiveness of strategic self-talk in running performance in a competitive setting. In order to investigate this effectiveness, a 5-week self-talk intervention in intermediate level runners competing a middle-distance running event, took place. As far as the researchers in this study are concerned, this thesis is innovative since it is the only one to examine the effect of self-talk intervention both in running and in real settings. The results revealed that the mean score for both groups' performance improved which indicates that all athletes made use of their training, whether because of using self-talk cues or due to simple training.

Various studies reveal that self-talk plans are effective for improving sport performance. This thesis confirms the findings of the literature since the group who participated in the intervention plan improved their performance while competing after practicing self-talk cues both compared to their baseline trial but also compared to the control group since improvement was of a larger effect for the experimental group. It is worth noting that control group also showed improvement to the final trial compared to the baseline one.

This finding could be attributed to the nature of Lebanese nationalities. Lebanese people are by nature competitive and Lebanese athletes are an example of this competitive nature. The control group followed a similar rigid training as the self-talk group and were able to improve their performance. However, their improvement was slightly less than that of the self-talk group as mentioned before. This finding could also be attributed to Hawthorne effect since the participants in the control group were informed that their development would be evaluated so it is possible that this increased their motives to show a better performance.

In line with several previous studies such as those of Hatzigeorgiadis et. al. (2009), (2011) and (2014), this study's results concluded that athletes who practice self-talk improve their tasks. In this study, it was running a 2000m race. The experimental group self-talk trained consistently and used self-talk strategies during their training as self-regulating, instructional, and motivating cue words to improve their performance.

The runners' strict adhering to their self-talk strategies could be due to their interest in the study since it is one that, to the knowledge of the research, has not been done before in Lebanon. Thus, these runners knew that they are part of an original novel activity. The same attitude applies to the control group. Their performance could be attributed to the fact that they knew they were participating in a new study in Lebanon, and they were committed to it; thus, they practiced every day as much as the experimental group.

The data obtained in this study establish previous findings concerning the efficiency of self-talk on sports activity in a setting that is not competitive. The amount of improvement in terms of statistical numbers compared to the control group was low. Yet, for highly dedicated runners, this minimal difference might be highly valuable such as for highly competitive athletes and professional athletes looking for that additional margin to win as in agreement with Barwood et al's (2015) study who proved that strategic self-talk strategies help people complete a self-paced time quicker. In the case of this thesis, the improvement showed in the 2000m race.

Moreover, as mentioned earlier, the literature is limited in examining self-talk interventions in competitive settings. Even so, the findings of this thesis add to the previous studies that strategic self-talk interventions can improve competitive performance.

Landin's and Hebert's study in 1999 was the first testing self-talk in naturalistic field settings and even though the results were promising, the number of occasions was limited in order to provide a significant effect.

Schuler and Langens (2007) also examined the effectiveness of self-talk cues in marathon athletes and the results were promising in reducing the psychological crisis they could face in the 30<sup>th</sup>km running a marathon. Unlike this paper though, the researchers did not follow an intervention plan other than this, they asked the athletes to use self-talk cues they were familiar with.

Of great importance is the study of Hatzigeorgiadis et al (2014) who examined a self-talk intervention on competitive sport performance in young swimmers proving its effect in accordance with the results of the present thesis. It is worth noting at this point that in the above study, the researchers proved that in competition athletes prefer to use motivational cues which is something not clarified for the needs of the specific thesis. It would be interesting though, this factor to be examined in this setting in future research. Since the participants of this study were intermediate runners and not elite ones, it could be justified why they used both instructional and motivational cues during their training.

To sum up, since Hardy, Thomas and Blanchfield (2019), proved that there is an effect in which the person, athletes talk or refer to themselves, as a future research suggestion it would be interesting to check how runners refer to themselves in competitive settings (through first person "I" or second person "you"). To move on to future studies though and add to the findings of this thesis, a lot of limitations and clarifications should be taken into consideration.



## Limitations

The use of self-talk techniques in sports, especially running, has recently drawn a lot of attention in the literature on sports psychology. There are restrictions on the effectiveness of self-talk, especially in running, despite studies showing certain advantages of it, including greater focus, higher motivation, and enhanced performance (Hatzigeorgiadis et al., 2011; Tod, Hardy, & Oliver, 2011).

While self-talk has been found to improve motivation, concentration, and confidence (Hatzigeorgiadis et al., 2014; Van Raalte, Brewer, Rivera, & Petitpas, 1994), its impact on running performance can be influenced by several factors, such as the content of the self-talk, the timing of the intervention, and the individual's ability to effectively employ self-talk strategies (Hardy, Hall, & Hardy, 2005; Hardy, Gammage, & Hall, 2001). For instance, a person's ability to create and use tailored, situation-specific self-talk signals may affect how successful self-talk is used (Weinberg, Miller, & Horn, 2012).

Additionally, there are restrictions associated with the setting in which self-talk is used. According to research, the impact of self-talk may vary depending on whether an individual is training or competing (Zourbanos et al., 2013). The effect of self-talk, for instance, can be more noticeable in training situations and less effective in competitive situations when outside pressure and contextual factors might have a big impact (Schüler & Langens, 2007).

Although self-talk has been utilized well with new and young athletes, there isn't enough data to say if it works as well for competitive, experienced athletes (Tod et al., 2011). This could be because these athletes already have coping mechanisms and mental training that might restrict the further advantages of self-talk.

Finally, the effectiveness of self-talk may vary among athletes depending on their personality attributes and psychological make-up (Hardy et al., 1996). For instance, those with greater trait anxiety levels could not benefit from self-talk as much as people with lower anxiety levels (Kendall & Treadwell, 2007). The universal use of self-talk in improving running performance is therefore constrained by the fact that, although having potential advantages, it is not consistently successful across all people and circumstances.

Coming into conclusion, all the above should be considered for future research to clarify the results of the limited research in self-talk interventions in endurance sports and especially in competitive settings where the demands are even more complex than training. Though, the results of the above thesis are promising and add to the findings of the literature, there is a great need for further investigation in this field.

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