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The Moderating Effects of Self-Talk Content on Self-Talk Functions

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The purpose of the study was to examine whether different types of self-talk serve different functions. Twenty-one female swimming class students were initially tested on an experimental water polo precision task. After a three-day program during which participants practiced self-talk on swimming drills, they were tested again on the experimental task, using attentional and anxiety control self-talk cues. In addition, participants completed a questionnaire assessing perceived functions of self-talk, for each of the two self-talk cues that were used. Repeated measures multivariate analysis of variance (MANOVA) revealed that according to participants' perceptions the anxiety control self-talk cue had greater impact on anxiety control than the attentional self-talk cue ($p < .01$), whereas effects for attention, effort, confidence, and automaticity were similar when using attentional and anxiety control cues. Furthermore, repeated measures MANOVAs for each self-talk cue revealed that both cues mostly assisted concentration to the task ($p < .01$). The results partially support that the use of different types of self-talk may serve different functions depending on the content of the employed cues.

In recent years the study of self-talk (ST) has attracted a significant amount of research interest. ST has been described as a "multi-dimensional phenomenon concerned with athletes' verbalizations that are addressed to themselves" (Hardy, Hall, & Hardy, 2005, p. 905). Such verbalizations allow individuals to interpret feelings and perceptions, regulate cognitions, and give themselves instructions and reinforcement (Hackfort & Schwenkmezger, 1993). Contemporary research has identified two broad dimensions with regard to the purposes ST serves, instructional and motivational (Zinsser, Bunker, & Williams, 2001). Instructional ST refers to statements related to attentional focus, technical information, and tactical choices, whereas motivational ST refers to statements related to confidence building, effort input, and positive moods. Numerous studies have examined the impact of ST on task performance and the results suggest that ST is an effective, performance enhancing, cognitive strategy (e.g., Johnson, Hrycaiko, Johnson, & Halas, 2004; Landin & Hebert, 1999). Although the effectiveness of ST has received, particularly in experimental research (e.g., Mallett & Hanrahan, 1997; Theodorakis, Weinberg, Natsis, Douma & Kazakas, 2000; Van Raalte et al., 1995), considerable support, there is a dearth of research regarding the way ST operates. Hardy et al. (2005) developed the Self-Talk Use Questionnaire, an instrument to explore the use of ST in sport based on previous qualitative data (Hardy, Gammage, & Hall, 2001). The instrument assesses *where*, *when*, *what,* and *why* ST is used. A crucial question that therefore remains to be explored

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is *how* ST functions, that is; What are the mechanisms and the processes underlying the way ST operates?

Landin (1994) noticed that the effectiveness of ST depends, among other factors, on the nature of the task. Johnson et al. (2004) suggested that the idea of ST is that focusing on the desired thought leads to the desired behavior. In other words, ST is an instruction to initiate or perform an action or a sequence of actions. In relation to these remarks, Hatzigeorgiadis, Theodorakis, and Zourbanos (2004) argued that the relative significance of the task-element highlighted by ST to performance is crucial in determining how effective the use of ST can be for each task. A careful examination of experimental studies employing several types of ST on various tasks, suggests that not all types of ST are equally effective for all tasks.

Results from experimental studies have shown that the use of *certain ST cues* can be more effective for *some tasks* than for *others*. Theodorakis et al. (2000) examined the effectiveness of ST on four experimental tasks. In two of the tasks, a passing accuracy test in soccer and a serving accuracy test in badminton, the use of motivational ST did not have an effect on performance. In contrast, the use of motivational ST was effective for the other two tasks, a sit-up endurance test and a knee extension power test. Considering that the motivational ST cue was the same for all tasks, it can be assumed that the use of that particular cue was more suitable for gross tasks than for accuracy tasks. Perkos, Theodorakis, and Chroni (2002) examined the effectiveness of a ST intervention program on basketball skills. The results revealed that instructional ST was effective for a dribbling and a passing test, but not for a shooting test. The researchers attributed the lack of effect for the shooting to the complexity of the task, and the suitability of the selected cues in relation to the task.

In addition, there is evidence that *some ST cues* can be more effective than *other ST* cues in *certain tasks*. Hatzigeorgiadis et al. (2004) examined the effectiveness of instructional and motivational ST on a precision and a power task in water polo. They reported that for the precision task the use of instructional ST was more effective than motivational ST, whereas for the power task only the use of motivational ST was effective. Similarly, Theodorakis et al. (2000) reported that in two accuracy tests the use of instructional ST was more effective than the use of motivational ST.

A plausible explanation for the above findings is that ST may serve different functions depending on the content of ST and the nature of the performed task. Several researchers have made speculations regarding the way ST functions, that is the mechanisms through which ST effects occur. Landin (1994) supported an attentional interpretation of ST effects, indicating that ST can be used to enhance attentional focus and direct or redirect attention to task-relevant cues. Finn (1985) and Zinsser et al. (2001) suggested that ST serves to regulate effort and enhance confidence, whereas Hardy, Jones, and Gould (1996) speculated that ST can also be effective in controlling anxiety and triggering appropriate action.

Preliminary evidence regarding the functions of ST has evolved from studies questioning participants about their perceptions on ST effectiveness. Van Raalte, Brewer, Rivera and Petipas (1994) in a field study with junior tennis players, asked participants to identify how ST affected their performance. Participants' responses highlighted the motivational and calming effects of ST. Landin and Hebert (1999) examined the effectiveness of ST using a single-subject, multiple baseline design with skilled tennis players. After implementing an effective ST intervention program, they interviewed participants regarding the functions of ST. Participants reported that the use of ST increased their confidence, helped them gain and maintain appropriate attentional focus, and facilitated performance through automatic execution. In a similar intervention study with female soccer players, Johnson et al. (2004) reported that participants perceived that ST increased their confidence and helped them focus their attention on relevant cues. Perkos et al. (2002), following an effective ST intervention program with novice basketball players,

asked participants to indicate whether ST helped them increase their confidence, enhance concentration, and control anxiety, by answering a brief questionnaire. The highest scores were revealed for concentration, followed by confidence and anxiety control.

In a study exploring the attentional function of ST, Hatzigeorgiadis et al. (2004) assessed the frequency of interfering thoughts during execution on two water polo tasks. Two experimental groups and one control group were tested twice. In both experiments it was revealed that participants in the ST conditions reported fewer interfering thoughts after the experimental assessment, when ST was used, in comparison to the initial assessment, whereas no differences were detected for the control group. The authors suggested that the use of ST reduces the occurrence of interfering thoughts, thus enhancing concentration to the task.

In a subsequent preliminary investigation Hatzigeorgiadis (2006) examined the perceived effects of ST on confidence, effort, anxiety control, attention, and automaticity. Physical education students participated in an experiment involving a swimming task. After receiving appropriate training, participants were asked to choose an instructional (technical instruction) and a motivational ST cue (from the ones they had practiced), which they subsequently used during the execution of the task. On completion, participants were asked to report their perceptions regarding the perceived functions of ST. The results revealed that according to participants' perceptions both types of self-talk helped them mainly to improve their attention to the task. Moreover, it was reported that the motivational self-talk cue had greater impact on effort, than the attentional self-talk cue, whereas effects for attention, confidence, anxiety control, and automaticity were similar when using attentional and motivational cues.

The purpose of the present study was to extend this line of research and explore whether ST content moderates the perceived functions of ST in an experimental task, involving throwing a water polo ball at a target. Two different types of ST were tested, one involving an attentional instruction and one involving an anxiety control instruction. The study examined differences in reported ST functions within and between the two ST types that were used. In particular, differences in ST functions when using attentional ST, differences in ST functions when using anxiety control ST, and differences in ST functions when comparing attentional and anxiety control ST were examined. In addition to participants' perceptions, the functions of ST were further examined through measures pertaining to the actual functions.

Overall, it was expected that differences in ST functions would be cue-specific. Regarding the within-cues comparisons, it was hypothesized that (a) when using the attentional cue, participants would score higher on the attentional function than the others, and (b) when using the anxiety control cue they would score higher on the anxiety control function than the others. Regarding the between-cues comparisons, it was hypothesized that (a) participants would score higher on the attentional function when using the attentional cue than when using the anxiety control cue, and (b) participants would score higher on the anxiety control function when using the anxiety control cue, than when using the attentional cue. Furthermore, it was expected that no differences in the remaining ST functions would emerge when using the attentional or the anxiety control ST cue.

METHOD

Participants

A total of 21 female swimming class students of physical education and sport sciences volunteered to participate in the study. Their mean age was 20.4 years ($SD = .92$). Participants at the time of the experiment had been taking swimming classes twice a week for a period of five months, but had no prior experience in water polo. To ensure that participants could

comfortably execute the task, a minimum performance requirement was used, that was hitting the target at least once per set on average for the initial measure. All participants satisfied the criterion.

Measures

Performance

Performance was assessed as a condition to subsequently assess ST functions. The performance test in the experiment involved hitting two targets (35 × 50 cm each) placed at the top corners of a water polo post, a task previously used by Hatzigeorgiadis et al. (2004), who reported satisfactory test-retest reliability ($r = .72$). Participants were asked to perform sets of six throws, three at each target interchangeably. The total of successful throws was the score for the set. All throws were executed from a spot opposite the center of the post, behind a lane rope. Participants could not stand on their feet (they were treading water) and were not allowed to rest on the lane rope at the time of execution. Following the procedures from Hatzigeorgiadis et al. (2004) the distance for the throw was set at four meters.

Functions of ST

To assess the functions of self-talk the Functions of Self- Talk Questionnaire (FSTQ; Hatzigeorgiadis, 2006; Hatzigeorgiadis, Theodorakis, & Chroni, 2007) was administered. The instrument consists of 25 items and comprises five ST functions, namely confidence (e.g., *The use of this self-statement made me* feel more confident on my abilities), automaticity (e.g., . . . execute automatically), effort (e.g., . . . try harder), anxiety control, (e.g., feel more relaxed), and attention (e.g., . . . concentrate on what I had to do). Participants were asked to respond on a 5-point scale (1 = not at all, 5 = very much). Preliminary evidence has provided support for the psychometric integrity of the instrument (Hatzigeorgiadis, Theodorakis, & Chroni, 2007). Confirmatory factor analysis supported the hypothesized 5-factor solution (Non-Normed Fit Index: .94; Comparative Fit Index: .95; Incremental Fit Index: .95; Standardized Root Mean Squared Residual:.04; Root Mean Square Error of Approximation: .05). Examination of Cronbach's alphas supported the internal consistency of the subscales (alphas ranging from .76 to .87). Cronbach's alpha coefficients for this study ranged from .80 to .96 (Table 1).

Table 1
Cronbach's Alphas for All Variables

	Day 1 Trial 1—Trial 2	Day 5 Trial 1—Trial 2
FSTQ		
Effort		.90 –.93
Confidence		.92 –.96
Automaticity		.92 –.94
Anxiety control		.80 –.85
Attention		.91 –.93
Check inventory		
Confidence (CSAI-2)	.91 –.93	.94 –.95
Cognitive interference (TOQS)	.75 –.76	.67 –.68
Automaticity (TOPS)	.79 –.89	.64 –.83
Effort (M-COPE)	.87 –.88	.89 –.95
Cognitive anxiety (CSAI-2)	.85 –.91	.88 –.93
Somatic anxiety (CSAI-2)	.75 –.95	.81 –.87

Note: FSTQ = Functions of Self–Talk Questionnaire.

Check for ST Functions

To cross-examine the functions of ST, an inventory comprising subscales from several instruments was composed. In particular, the cognitive and somatic anxiety and the confidence subscales from the Competitive State Anxiety Inventory-2 (CSAI-2; Martens, Burton, Vealey, Bump, & Smith, 1990), the automaticity subscale from the Test of Performance Strategies (TOPS; Thomas, Murphy, & Hardy, 1999), a cognitive interference scale from the Thought Occurrence Questionnaire for Sport (TOQS; Hatzigeorgiadis & Biddle, 2000) previously used for experimental purposes by Hatzigeorgiadis et al. (2004) , and the effort increase subscale from the Modified-COPE Inventory (M-COPE; Eklund, Grove, & Heard, 1998) were used. Participants were asked to retrospectively recall their cognitions and reactions during the execution and respond on a 5-point scale (1 = not at all, 5 = very much). A single response format was used for all scales, as these were included in a single form. Cronbach's alpha coefficients ranged from.64 to .95 (Table 1).

Procedure

Initial Assessment (Day 1)

The first day, on arrival at the swimming pool for the initial assessment, participants were briefed about the experiment and asked not to discuss this information with other students. Participants were informed that the experiment would last five consecutive days and were ensured that they could withdraw without penalty if they were unable to assign the amount of time necessary. They were also informed that at the end of the experiment, class credit would be given. Informed consent and demographic variables were obtained from participants before the beginning of the experimental procedures. Subsequently they were asked to get ready to perform the test and they were allowed five minutes to warm-up in the swimming pool. During warming-up they were not allowed to execute throws. After the warm-up they were given instructions regarding the technique of the throw, following the procedure described in Hatzigeorgiadis' et al. (2004), and a research assistant demonstrated the execution. Participants performed two trials consisting of three sets of six throws. The first set of each trial was used for participants to get used to the throw and the distance, whereas the second and the third were evaluated. Two minutes of rest were allowed between each set. After executing the first trial, they were immediately asked to complete the check inventory assessing cognitions and reactions during the execution. After completing the questionnaire, participants repeated the same procedures for the second trial and completed the questionnaire with regard to the second execution. Despite the reliance of the thought sampling method on memory and the ability of individuals to be aware of the several thoughts they experienced, self-report by retrospective recall was considered the most suitable method. At the end of the session, participants scheduled the time that they could come the next day to begin the intervention phase of the experiment. Participants were tested in pairs (apart from one) and the whole procedure for each pair lasted approximately 40 minutes.

Intervention (Days 2–4)

Considering that ST is a mental strategy, and as such practice can improve its effectiveness, and based on previous research recommendations (e.g., Theodorakis et al., 2000), an intervention phase was designed for participants to get acquainted with the use of ST. Therefore, the three days that followed comprised the intervention phase. The purpose of the intervention was to practice ST without practicing the performance task, to minimize learning effects on performance and isolate to the highest possible degree ST effects. On arrival at the pool on the second day, students were informed that the experiment involved the examination of a mental

strategy, namely ST. A brief presentation of ST was subsequently given and participants were informed that they were going to practice breaststroke drills using ST. For the three days that followed participants performed ten 25-meter repeats on pulling and kicking drills, using various ST cues. The cues involved instructional ST (e.g., stretch), motivational ST (e.g., go), anxiety control ST (e.g., relaxed), and confidence ST (e.g., I can). All types of ST were equally used during the three days. Participants were instructed to repeat the selected cues before or during each movement, depending on the content of the cue (breaststroke is particularly convenient for that purpose because of the cyclic nature of the movements). Before the execution of each repeat an assistant was demonstrating outside the pool how participants should execute and when to use the cue. During the practice sessions all participants used the same cues. Due to the nature of the task and the environmental conditions participants used internal (covert) ST. At the end of each length participants were asked to verbally report on a 10-point scale how frequently (1 = not at all, 10 = throughout the length) they were using the ST cues during the execution (mean scores for the three days were 8.21 ± 1.53, 8.16. ± 1.64, and 8.00 ± 1.57, respectively). Each intervention session was applied to groups of four or five participants, who were executing successively, and lasted approximately 50 minutes.

Experimental Assessment (Day 5)

The experimental assessment took place on the fifth day of the experiment. On arrival at the swimming pool participants were informed that they were going to repeat the procedures of the first day, only this time they were going to apply the ST strategy, which they practiced during the previous days. One ST cue was used for each of the two trials (three sets of six repeats). One ST cue was attentional (ball—target; also used effectively by Hatzigeorgiadis et al., 2004) and the other was anxiety control (calmly). Participants were instructed to use the indicated ST cue just before each throw, and an assistant demonstrated the execution. To overcome ordering effects (learning and tiredness), ten of the participants used the attentional ST for the first trial, whereas the other eleven used the anxiety control ST for the first trial. After the completion of each set participants were asked to verbally report on a 10-point scale the degree to which they used the indicated ST cue (1 = not at all, 10 = before every shot). After the completion of the first trial, participants completed the check inventory on cognitions and reactions during the execution, and the FSTQ. Subsequently they performed the second trial and completed the same instruments with regard to the second trial. Participants were tested in pairs (apart from one) and the whole procedure for each pair lasted approximately 40 minutes.

RESULTS

Manipulation Check: Performance Enhancement

To check the degree to which participants used the suggested ST cue, mean scores were calculated. The analysis revealed high mean scores (9.19 ± 1.33 and 9.52 ±.81, for attentional and anxiety control ST cues, respectively) suggesting that participants did use the ST cues that were instructed consistently.

To examine whether performance improved, differences between initial and experimental assessments were examined. A paired-samples *t*-test on the total scores of Day 1 and Day 5, revealed significant performance improvement with a large effect size, $t\,(20) = 5.95$, $p < .01$, $\eta^2 = .69$ (magnitude of increase 46.7%). To explore whether performance improved more when using either of the two ST cues, a paired-samples *t*-test on the scores of the two trials of Day 5 was performed. The analysis revealed that there were no significant differences in performance

Table 2
Comparisons Between Day one and Day Five

	Day 1	Day 5	F	η^2
Performance	8.05 (± 2.46)	11.81 (± 3.08)		
Check inventory			3.75*	.60
Confidence (CSAI-2)	2.66 (±.89)	2.88 (±.96)	1.92	.09
Cognitive interference (TOQS)	1.94 (±.67)	1.55 (±.49)	10.06**	.34
Automaticity (TOPS)	2.26 (±.59)	1.81 (±.36)	12.96**	.39
Effort (M-COPE)	2.82 (±.64)	3.05 (±.71)	5.31*	.21
Cognitive anxiety (CSAI-2)	2.10 (±.83)	1.89 (±.83)	4.59*	.19
Somatic anxiety (CSAI-2)	1.74 (±.74)	1.50 (±.45)	3.59	.15

*p ≤ .05, **p < .01

between the two self-talk cues, $t\ (20) = .65$, $p = .52$. Descriptive statistics for performance on Day 1 and Day 5 are presented in Table 2. Descriptive statistics for performance on Day 5 for the instructional and anxiety control ST cues are presented in Table 3.

Functions of ST

Descriptive statistics for the ST functions (FSTQ) are presented in Table 3. For both ST cues, the highest scores were revealed for the attention function, followed by the effort function. The confidence function was next for the attentional ST cue, followed by the anxiety control function, whereas the opposite order was revealed for the anxiety control ST cue. Scores for the automaticity function were below the median point of the scale for both ST cues.

Repeated measures MANOVAs were calculated to test for differences in functions *within* each ST cue. For the attentional ST cue the analysis revealed significant multivariate effect, $F\ (4, 17) = 9.55$, $p < .01$, $\eta^2 = .69$, power = 1.00. Post-hoc contrasts revealed that scores on the attention function were significantly higher than those on effort, $F\ (1, 20) = 5.06$, $p < .05$, $\eta^2 = .20$, power = .57, and confidence, $F\ (1, 20) = 26.79$, $p < .01$, $\eta^2 = .57$, power = 1.00,

Table 3
Comparisons Between Instructional and Anxiety Control Self Talk (ST) Cues

	Instructional ST	Anxiety control ST	F	η^2
Performance	5.76 (± 1.55)	6.05 (± 2.09)		
FSTQ			3.17*	.50
Effort	3.49 (±.97)	3.37 (±.82)	.63	.03
Confidence	3.18 (± 1.05)	3.22 (±.79)	.05	.01
Automaticity	1.94 (±.90)	1.90 (±.80)	.10	.01
Anxiety control	2.84 (±.68)	3.25 (±.74)	11.36**	.36
Attention	3.80 (±.82)	3.81 (±.81)	.01	.01
Check inventory			2.65*	.52
Confidence (CSAI-2)	2.81 (± 1.10)	2.95 (±.92)	1.09	.05
Cognitive interference (TOQS)	1.60 (±.50)	1.50 (±.53)	1.37	.06
Automaticity (TOPS)	1.83 (±.40)	1.80 (±.41)	.11	.01
Effort (M-COPE)	3.06 (±.86)	3.04 (±.74)	.01	.01
Cognitive anxiety (CSAI-2)	2.03 (±.96)	1.74 (±.77)	6.07*	.23
Somatic anxiety (CSAI-2)	1.60 (±.57)	1.40 (±.42)	4.75*	.19

*p ≤ .05, **p < .01

which were significantly higher than those on anxiety control, F (1, 20) = 16.20, $p < .01$, $\eta^2 = .45$, power = .97 and F (1, 20) = 40.74, $p < .01$, $\eta^2 = .67$, power = 1.00, respectively, which were significantly higher than those on automaticity, F (1, 20) = 30.24, $p < .01$, $\eta^2 = .60$, power = 1.00. For the anxiety control ST cue, the analysis revealed significant multi-variate effect, F (4, 17) = 14.23, $p < .01$, $\eta^2 = .77$, power = 1.00. Post-hoc contrasts revealed that scores on the attention function were significantly higher than scores on effort, F (1, 20) = 9.15, $p < .01$, $\eta^2 = .31$, power = .82, anxiety control, F (1, 20) = 7.04, $p < .05$, $\eta^2 = .26$, power = .71, and confidence, F (1, 20) = 7.68, $p < .05$, $\eta^2 = .28$, power = .75, which were significantly higher than those on automaticity, F (1, 20) = 28.52, $p < .01$, $\eta^2 = .59$, power = 1.00, F (1, 20) = 41.14, $p < .01$, $\eta^2 = .67$, power = 1.00, and F (1, 20) = 30.07, $p < .01$, $\eta^2 = .60$, power = 1.00, respectively.

To test for differences in ST functions *between* the two ST cues, repeated measures MANOVA was performed. The analysis revealed significant multi-variate effect, F (5, 16) = 3.17, $p < .05$, $\eta^2 = .50$, power = .74. Examination of the univariate effects revealed that significant differences existed only for the anxiety control function, F (1, 20) = 11.36, $p < .01$, $\eta^2 = .36$, power = .89. In particular, participants scored higher on the anxiety control function when using the anxiety control ST, than when using the attentional ST cue.

Check of ST Functions

Results from the above analyses indicate that participants perceived that the ST cues they used enhanced attention, effort, confidence, and anxiety control, but not automatic execution. To cross-examine these functions, scores on five respective dimensions (cognitive interference, effort, confidence, anxiety, and automaticity) assessed on Day 1 and on Day 5 were contrasted. Repeated measures MANOVA revealed significant multivariate effect, F (6, 15) = 3.75, $p < .05$, $\eta^2 = .60$, power = .85. Examination of the uni-variate effects revealed significant effects (in order of size) for automaticity, F (1, 20) = 12.96, $p < .01$, $\eta^2 = .39$, power = .93, cognitive interference, F (1, 20) = 10.06, $p < .01$, $\eta^2 = .34$, power = .86, effort, F (1, 20) = 5.31, $p < .05$, $\eta^2 = .21$, power = .59, cognitive anxiety, F (1, 20) = 4.59, $p < .05$, $\eta^2 = .19$, power = .53, and a near significant but considerable effect for somatic anxiety, F (1, 20) = 3.59, $p = .07$, $\eta^2 = .15$, power = .44. In contrast, the effect for confidence was not significant, F (1, 20) = 1.92, $p = .18$, power = .26. Examination of the means revealed that on Day 5, when ST was used by participants, scores on automaticity, cognitive interference, and anxiety dropped, whereas scores on effort increased (Table 2), providing fair support for the results obtained through the FSTQ.

Finally, a repeated measures MANOVA was calculated to test for differences in the check inventory between the two ST cues. The results revealed a significant multi-variate effect, F (6, 15) = 2.65, $p = .05$, $\eta^2 = .52$, power = 68. In accordance with the analysis for the FSTQ, examination of the uni-variate effects indicated that significant difference existed only for anxiety, cognitive, F (1, 20) = 6.07, $p < .05$, $\eta^2 = .23$, power = .65, and somatic, F (1, 20) = 4.75, $p < .05$, $\eta^2 = .19$, power = .55. In particular, cognitive and somatic anxiety scores were lower when using the anxiety control cue, than when using the attentional cue (Table 3).

DISCUSSION

The purpose of the present study was to explore the functions of ST and in particular to examine whether ST content moderates the perceived functions of ST in an experimental task. After receiving appropriate training, participants were tested on an experimental task using

two ST cues, one attentional and one anxiety control. In brief, the results suggest that for the task that was performed, a precision task at which participants had no previous experience, the major function of the employed ST cues according to participants' perceptions was the enhancement of attention. Participants also reported that the attentional cue had an impact on effort and confidence and a smaller effect on anxiety control, whereas the impact of the anxiety control cue was similar for effort, confidence, and anxiety control. Finally, participants reported that both cues decreased automatic execution.

As identified above, the results revealed that participants perceived that the use of these particular ST cues mostly and equally assisted their attention to the task. Further support for this notion was provided through decreases on frequency of interfering thoughts, when using the ST cues. A consideration regarding the manipulation check protocol of this study is the possibility that participants generated and used their own ST cues, in addition to the ones that were instructed, which cannot be ruled out. Furthermore, it is also likely that the experimental conditions did not evoke high levels of anxiety, which might have decreased the effect of the anxiety control cue on the anxiety control function. Nevertheless, results from other studies seem to coincide with the present findings regarding the attentional function. Similar results were reported by Hatzigeorgiadis (2006) in a similar experimental study examining the perceived functions of instructional and motivational ST. In particular, it was found that for both ST cues athletes reported the attentional function as the primary facilitative function. Finally, support for the attentional effects of ST irrespective of ST type has been provided by Hatzigeorgiadis et al. (2004), who found that the use of ST deteriorated the frequency of interfering thoughts in a similar fashion when using instructional and motivational ST. Taken together, the above results seem to suggest that the use of ST reduces interfering thoughts irrespective of the content of ST, and that might explain why the attentional and the anxiety control-cues in the present study had a similar impact on frequency of interfering thoughts and subsequently the attentional function.

From a theoretical perspective, the present findings are in line with Landin's (1994) propositions, who argued that ST effects are linked to attention and information processing, supporting that verbal cues may help individuals, in particular beginners, search for the correct task stimuli. Similar reasoning was presented by Hardy (2006), who, based on Nideffer's (1993) attentional model, argued that the use of ST could serve to maintain appropriate focus for a specific task, but also to switch attentional focus to appropriate cues. Finally, the results of the study seem to relate to Easterbrook's (1959) attentional narrowing hypothesis. Easterbrook postulated that in simple tasks, where few cues are relevant to the execution, the narrowing of attention can facilitate performance, particularly for novices. Considering Easterbrook's suggestions, it could be argued that the use of ST may help in narrowing attention to task-specific cues. This hypothesis seems to be supported from the finding that participants reported fewer interfering thoughts when using ST.

Another interesting finding is that when using the selected ST cues, participants reported decreased automatic execution. Hardy et al. (1996) suggested that ST can be used to trigger automatic execution. However, Landin and Hebert (1999) noticed that to produce automaticity effects, participants should be accustomed with the task, because automatic execution is achieved through expert execution. Thus, in relation to the present study, decreases in automaticity were reasonable. First, the task was novel for participants and therefore, due to lack of familiarity, automatic execution could not be sought. Second and most important, the purpose of the cues was to increase awareness, in relation to the execution (attentional cue) and in relation to anxiety states (anxiety control cue), rather than to trigger automatic execution. Therefore, that automatic execution decreased, supports the specificity of the effects ST can have depending on its content. Nevertheless, it should be mentioned that the automaticity effect

could not be fully supported from the FSTQ. Scores on the automaticity scale were towards the respective direction (below the median point of the scale, towards the 'not at all' end), however reverse effects could not be identified, and this might be an issue for consideration regarding the response format of the FSTQ.

The idea that different ST cues may have different effects was further supported through results regarding the anxiety control function of ST. In particular, it was reported that the anxiety control ST cue was more effective for anxiety control than the attentional ST cue. In contrast, attentional and anxiety control ST cues were reported to have similar effects for automaticity, confidence, and effort. That similar effects were reported for these functions, which were not specifically addressed by the cues that were employed, further supports the specificity of ST functions in relation to its content. At this point, a possibility for a response bias regarding the anxiety control cue should be discussed. The anxiety control cue contained a more direct message with regard to its hypothesized function than the attentional cue. Thus, the use of the anxiety control cue may have influenced athletes' reports regarding anxiety, due to the relevance of the ST cue, but not anxiety itself. This sort of bias could not be controlled because the selection of appropriate ST cues is more important than the potential bias threat, but also because more direct measures of actual anxiety could not be applied. Nevertheless, indirect evidence seems to rule out this possibility because (a) despite this correspondence, participants reported that the anxiety cue had a greater impact on attention than on anxiety control, and (b) similar effects regarding the attentional function were reported when using the attentional and the anxiety control cues.

Correspondence between FSTQ scores and the check inventory provided adequate support for the reported ST functions. In particular, in considering the results from the check inventory when comparing initial and experimental assessments, greater effects were identified for automaticity, cognitive interference, and effort, whereas smaller effects were evident for anxiety. Accordingly, participants reported that ST increased attention and effort, but not automatic execution. One function that was not confirmed was confidence. In particular, participants reported that the use of ST helped them increase their confidence, however, this was not evident in the check inventory, where the increases in confidence scores between initial and experimental assessments were not significant. One possible explanation is that the measure of confidence was not sensitive enough to detect changes reflected in participants' perceptions regarding the effects of ST. Finally, in accordance with results regarding FSTQ scores for the two ST cues, anxiety scores were lower when using the anxiety control ST cue, than when using the attentional cue, whereas no differences were identified for any of the other assessed dimension, when comparing the two ST cues.

A limitation that should be acknowledged is the lack of control group, which would strengthen our confidence regarding the performance effect. The effectiveness of ST is well-documented especially in experimental research in various tasks. Furthermore, Hatzigeorgiadis et al. (2004) using the same task that was used in this study found significant performance improvements for participants using instructional and motivational ST, but not for participants of a control group. Nonetheless, the main purpose of the study was to explore whether different ST cues serve different functions, that is to compare different ST cues and their functions, and not whether ST is effective. Therefore, the issue of performance, which was only used as a condition to examine ST functions, does not seem fundamental for the purposes of the study. A final issue to address concerns the lack of desired statistical power to detect potential differences in some of the comparisons that were made, due to the size of the sample. Given that this was an intervention study, the size of the sample can be considered adequate. Further studies are warranted to replicate and extend the findings and enhance our confidence regarding the accuracy of the present results.

From an applied perspective, the results of the present study draw attention to the designing of ST plans from coaches and sport psychology consultants. Acknowledging that different ST cues could serve different functions, the selection of appropriate ST cues should be based on careful consideration of the demands of the task and the needs of the individual, and in relation to what is required to be achieved. Future research could test several other types of ST cues and the way they function. It would be particularly interesting to examine ST functions when different cues, such as cues referring to confidence, effort, and automatic execution, and tasks with varying performance requirements are employed.

Overall, the present study attempted to advance research regarding the functions through which ST operates. The results partially supported that different types of ST can serve different functions depending on the content of the selected cues, however attentional effects seem to be the strongest, at least in novel tasks. Considering that the present study is, to our knowledge, among the first to examine experimentally functions of ST, the results provide valuable information towards the better understanding of ST.

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