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# The relationship between self-talk and affective processes in sports: a scoping review

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**Abstract**

A perspective on self-talk introduced in the literature distinguishes between organic self-talk and strategic self-talk. Based on this perspective, the purpose of the present scoping review was to (a) give a comprehensive overview of studies investigating the relationship between organic self-talk and affective processes and (b) review the effectiveness of strategic self-talk to regulate affective processes. A systematic search was conducted with the databases PubMed, Scopus, Web of Science, PsycINFO, and SPORTDiscus. As a result, 44 articles with 46 relevant studies were included for an in-depth analysis. Thirty studies focused on organic self-talk and 15 on strategic self-talk, while one study focused on both. With regard to organic self-talk, the results indicate a relatively consistent concurrence of the valence of self-talk and affective processes. In addition, various functions of self-talk relate to emotion regulation. For strategic self-talk, intervention studies, which were limited to the regulation of anxiety, revealed mixed effects. Based on the results, we discuss how the integration of various established theories in sport psychology in the new self-talk perspective might facilitate a more systematic approach when studying the relationship between self-talk and affective processes.

*Keywords:* Organic self-talk; strategic self-talk; emotion; mood; dual-theory

## Introduction

Self-talk is a construct that has gained in popularity in recent years in sport psychology. This popularity is not surprising because (a) athletes' self-talk can provide important insights into the psychological challenges they face during sport competitions and, relatedly, (b) at the same time, athletes can also use self-talk as a self-regulation strategy to cope with these psychological challenges. The popularity of self-talk is reflected, for example, in the fact that there have been several published reviews of self-talk in recent years (Hardy, 2006; Hatzigeorgiadis et al., 2011; Latinjak, Hatzigeorgiadis, et al., 2019; Tod et al., 2011; Van Raalte et al., 2016). Chronologically, the first review provided a working definition of self-talk that helped distinguish self-talk from other similar constructs (e.g. mental images) and set the stage for the following research (Hardy, 2006). The following two reviews pointed to the potential of self-talk interventions for enhancing sport performance, indicating the potential of self-talk for self-regulation and explaining the popularity of self-talk in the applied field (Hatzigeorgiadis et al., 2011; Tod et al., 2011). Finally, in line with dual-process approaches (e.g. Christoff, 2012; Kahneman, 2011), the most recent two reviews introduced new perspectives on self-talk with the goal to promote more theory-based research (Latinjak, Hatzigeorgiadis, et al., 2019; Van Raalte et al., 2016).

The present article is based on the self-talk conceptualization provided by the review of Latinjak, Hatzigeorgiadis et al (2019; p. 16):

'Self-talk takes form in verbalizations addressed to the self, overtly or covertly, characterized by interpretative elements associated to their content; and it either (a) reflects dynamic interplays between organic, spontaneous and goal-directed, cognitive processes or (b) conveys messages to active responses through the use of predetermined cues developed strategically, to achieve performance related outcomes.'

Consistent with the working definition of self-talk in Hardy's review (2006), this conceptualization emphasizes that self-talk takes the form of verbalizations, that the sender of these verbalizations is also the receiver, and that the classification of self-talk depends on its interpretation. Moreover, the conceptualization contains a distinction between organic and strategic self-talk as two different self-talk entities reflected in the literature (Latinjak, Hatzigeorgiadis, et al., 2019). While the origin of strategic self-talk is based on the usage of predetermined cue words with the goal of performance enhancement and/or self-regulation, the origin of organic self-talk refers to athletes' innate thoughts before, during, and after their sport involvement.

Examining the relationship between different psychological constructs is important for understanding athletes' performance (Tenenbaum et al., 2009). In particular, the relationship between cognitive processes, like self-talk, and affective processes is considered to be at the heart of psychological inquiry (Ellis, 2003). For this reason, complementary to the existing reviews on self-talk, the focus of the present review is on the relationship between self-talk and affective processes. The umbrella term 'affective processes' is used to cover different constructs such as core affect, emotions, and moods (Ekkekakis, 2013). Core affect refers to the raw feeling in a given moment, resulting from the two dimensions valence and arousal (Russell, 2009). Emotions refer to more differentiated states, such as anxiety or happiness viewed as psycho-physiological responses to a relevant stimulus (Russell, 2009). Moods can also be differentiated into various states such as vigor or tension. However, compared to emotions, they are often without a clear cause, less intense, and longer lasting (Beedie et al., 2005). Importantly, the present review is based on the aforementioned distinction between organic and strategic self-talk and the relationship of these two self-talk entities with affective processes.

### *Organic self- talk*

In organic self-talk, many studies have used the valence and functions of self-talk as classification systems (Hardy et al., 2018). Regarding valence, studies have typically focused on whether the content of self-talk is positive, negative, or neutral (Van Raalte et al., 1994; Zourbanos et al., 2009). Since affective processes can also be classified by their valence (e.g. Russell & Barrett, 1999), research on self-talk valence has revealed its inherent links to the valence of affective processes (Van Raalte et al., 2016). Studies investigating the functions of self-talk have assessed the purposes self-talk serves, distinguishing, for example, between motivational and instructional self-talk (Hardy, Gammage, et al., 2001). Considering the general potential of self-talk for emotion regulation (Theodorakis et al., 2008), it seems interesting to understand how the different self-talk functions are related to emotion regulation. Besides focusing on the valence and functions of self-talk, it is important to note that there are also other more specific self-talk classifications. For example, Zourbanos et al. (2009) revealed subcategories within positive (e.g. confidence self-talk) and negative self-talk (e.g. worries self-talk), while Van Raalte et al. (2015) identified self-talk categories like associative, dissociative, or spiritual self-talk.

Numerous theoretical frameworks distinguish between psychological processes characterized by cognitive control and psychological processes that are more automatic in nature (e.g. Christoff, 2012; Kahneman, 2011; Smith & DeCoster, 2000; Strack & Deutsch, 2004). In line with these dual-process approaches, a rather new self-talk perspective suggests that organic self-talk can be divided into spontaneous self-talk, a more

uncontrolled type of self-talk, and goal-directed self-talk, a more controlled type of self-talk (Latinjak, Hatzigeorgiadis, et al., 2019). In particular, on the one hand, spontaneous self-talk refers to unintended and non-instrumental self-talk statements that come to mind unwillingly in response to stimuli in an ongoing context. On the other hand, goal-directed self-talk refers to self-talk statements intentionally used to make progress on a task or to solve a problem (Latinjak et al., 2014). This classification bears similarity to the perspective in the review of Van Raalte et al. (2016), distinguishing between System 1 self-talk, a more intuitive type of self-talk, and System 2 self-talk, a more rational type of self-talk. Moreover, studies have revealed subcategories within spontaneous and goal-directed self-talk (Boudreault et al., 2018; Latinjak et al., 2014). Interestingly, some of these subcategories, such as worry or instructional self-talk, are similar to previous self-talk classifications, whereas other subcategories, such as rumination or performance pressure, are more novel (Boudreault et al., 2018).

Relevant for this review, the distinction between spontaneous and goal-directed seems useful to investigate the relationship between self-talk and affective processes. The content of spontaneous self-talk is often about evaluating performance ('that was bad') or predicting outcomes ('I will win') implying emotional connotations (Latinjak et al., 2014). The inherent relationship between spontaneous self-talk and affective processes is further suggested by the identification of valence as a main dimension of spontaneous self-talk ranging from negative self-talk ('that was bad') to positive self-talk ('great shot'; Latinjak et al., 2014). This characteristic of spontaneous self-talk shows an apparent similarity to the structure of core affect with the valence dimension underlying affective processes (Russell & Barrett, 1999). The structural similarity between spontaneous self-talk and affective processes is also in line with various emotion theories, such as appraisal theories (e.g. Lazarus, 1991; Scherer, 2009) or constructionist theories (e.g. Barrett, 2016; Russell, 2009), emphasizing the role of cognitive processes in emotions. Moreover, considering valence as a main dimension of spontaneous self-talk, it has been suggested that self-talk classifications that focus on the valence of self-talk (e.g. Van Raalte et al., 1994; Zourbanos et al., 2009) primarily reflect spontaneous self-talk (Latinjak, Hatzigeorgiadis, et al., 2019).

Affective processes can both positively as well as negatively influence goal attainment in sports (Hanin, 2007). Since goal-directed self-talk tries to support one's goal attainment, it is not surprising that emotion regulation is seen as a key function of goal-directed self-talk (Latinjak et al., 2014). In particular, it is assumed that athletes can use goal-directed self-talk to deal with emotions brought into awareness through spontaneous self-talk (Latinjak, Hatzigeorgiadis, et al., 2019). At the same time, goal-directed self-talk may also proactively help to prevent dysfunctional emotions or elicit functional emotions (Van Raalte et al., 2016). The idea that goal-directed self-talk can help regulate emotions at different stages of their development is also consistent with the process model of emotion regulation (Gross, 1998). Moreover, because goal-directed self-talk, in contrast to spontaneous self-talk, can be classified according to its functions rather than its valence (Latinjak et al., 2014), it has been suggested that self-talk classifications that focus on the functions of self-talk (e.g. Hardy, Gammage, et al., 2001; Theodorakis et al., 2008) primarily reflect goal-directed self-talk (Latinjak, Hatzigeorgiadis, et al., 2019).

It is important to acknowledge that dual-process approaches, underlying the distinction between spontaneous and goal-directed self-talk, have been criticized for their simplification (e.g. Melnikoff & Bargh, 2018). In reality, spontaneous self-talk may also have some controlled aspects, while goal-directed self-talk may also be influenced by spontaneous emotional aspects. For this reason, it has been suggested that the differences between these two types of self-talk should be understood as proportional rather than categorical (Latinjak & Hatzigeorgiadis, 2021). Moreover, it is important to consider that the same self-talk statement can be deemed spontaneous or goal-directed (Latinjak, Hatzigeorgiadis, et al., 2019). For example, the self-talk statement 'You can play so much better' can express

a spontaneous reaction towards a mistake, but it can also be used to increase motivation. Thus, from a methodological point of view, when classifying self-talk, it is important to not only consider the pure content of self-talk, but also other aspects such as athletes' underlying motivation or the automaticity of one's self-talk. Despite these potential limitations, it should be noted that this classification has proven useful for the organization of research (e.g. Boudreault et al., 2018; Fritsch et al., 2020; Latinjak et al., 2014) and for application in practice (e.g. Latinjak, Font-Lladó, et al., 2016; Latinjak, Hatzigeorgiadis, et al., 2019).

### *Strategic self-talk*

The key characteristic of strategic self-talk is that, prior to the sport involvement, cue words are deliberately chosen either by the athletes themselves or by the coach/sport psychologist. These cue words are then used by the athletes during their sport involvement (Latinjak, Hatzigeorgiadis, et al., 2019). Typically the content of such cue words is classified into motivational (e.g. 'you can do this') or instructional self-talk (e.g. 'keep your elbow higher'; Theodorakis et al., 2000). Although these example show that the content of strategic self-talk can be similar to that of organic goal-directed self-talk, the difference is that organic goal-directed self-talk statements are not based on a predetermined plan, but are elaborated intuitively by an athlete in a given situation. Based on cognitive behaviour approaches (e.g. Beck, 1976; Ellis, 2003), a central idea of strategic self-talk is that through regulating one's self-talk, with the use of cue words, it is possible to change one's feelings and behaviour and, therefore, ultimately also performance. In sport psychology, studies have examined the effectiveness of strategic self-talk through interventions, with the meta-analysis of Hatzigeorgiadis et al. (2011), including 32 studies, showing a moderate positive effect (ES = .48) on sport performance. Given this relatively robust evidence for the effectiveness of strategic self-talk, there is a growing research interest in the mechanisms that may explain the effect of strategic self-talk on sport performance. With relevance to this review, the effect of strategic self-talk on affective processes has been put forward as a main mechanism (Hardy, Oliver, et al., 2009).

### *Purpose of the present review*

The link between cognitive and affective processes is considered fundamental within psychological research (Ellis, 2003). For this reason, a review of the available literature on the relationship between self-talk as a cognitive construct and affective processes seems useful for contributing towards a better understanding of mental aspects in athletes' performance. The recent theoretical perspective distinguishing between strategic and organic self-talk provides an innovative perspective for the purpose of such a review (Latinjak, Hatzigeorgiadis, et al., 2019). The results of this review can help identify patterns in the literature and reveal new research questions (Booth et al., 2016). For instance, for organic self-talk, it seems fruitful to assess to which extent the results of studies that are not based on the distinction between spontaneous and goal-directed self-talk correspond with results of studies that used this classification (Latinjak, Hatzigeorgiadis, et al., 2019). This contribution towards more theory-based approaches of self-talk is important for establishing a clearer definition of the different self-talk constructs allowing to define testable hypotheses (Hardy, 2006).

The self-talk approach distinguishing between organic and strategic self-talk implies a variety of interconnected ways in which self-talk and affective processes may be related. Thus, the broad approach taken in scoping reviews was selected for the purposes of this review (Tricco et al., 2018). The specific objectives of the present scoping review were to: (a) provide a comprehensive overview of studies that assessed the relationship between organic self-talk and affective processes; (b) explore the available evidence regarding the potential of strategic self-talk to regulate affective processes.

## Methods

We conducted the scoping review in accordance with the PRISMA Extension for Scoping Reviews (PRISMA-ScR; Tricco et al., 2018).

Furthermore, we registered a protocol prospectively through the website of the Open Science Framework (https://osf.io/pevma/) on 16 July 2020 (updated on 9 March 2021). Following the guidelines of Sandelowski et al. (2006) we opted for an integrated design that allows the synthesis of studies not by method (i.e. quantitative methods and qualitative methods), but by findings addressing the same aspects of a targeted phenomenon.

The review involved a team of five authors who had different responsibilities during the different stages of the review. The first author, who had published on the relationship between self-talk and affective processes, and the second author, who had experience in publishing systematic reviews, were responsible for the identification of the articles, data charting, and data synthesizing. The other three authors had over ten years of experience in publishing empiric research, review articles and book chapters in the field of self-talk and/or affective processes. They contributed with critical comments from their different perspectives to improve the design of the review process, to solve disagreements during the analysis of articles, and to reflect on different interpretations of the review findings.

### *Inclusion and exclusion criteria*

Empirical studies written in English, published in a peer-review journal, and providing insights about the relationship between self-talk and affective processes within the context of sport were included. The term sport referred to motor body movements occurring within the context of a competitive and rule-based activity (Rejeski & Brawley, 1988), thus excluding studies on coaches, referees or spectators. Given the often blurred boundaries between self-talk and other constructs such as mental images or daydreams (Hardy, 2006), studies were only included when self-talk referred to verbalizations addressed to the self (Latinjak, Hatzigeorgiadis, et al., 2019). With regards to affective processes, studies were included when referring to core affect, moods, or emotions (Ekkekakis, 2013). Quantitative studies were included when either both constructs, self-talk and affective processes, were measured or one construct was manipulated and the other one was measured. Studies that combined self-talk with other mental strategies (e.g. imagery) were excluded, because we were interested in the pure effects of self-talk. Finally, studies that included individuals with mental illnesses were not included, because such illnesses could bias both affective as well as cognitive processes (Ellis, 2003).

### *Search strategy*

The databases PubMed, Scopus, Web of Science (core collection), PsycINFO, and SPORTDiscus were consulted on 16 July 2020 without restrictions for the starting date of the search. The search term (available in the supplementary file 1) for self-talk was based on a previous review on self-talk (Hatzigeorgiadis et al., 2011). For affective processes, the search term covered emotions, affect, and moods (Ekkekakis, 2013), including those emotions (i.e. anxiety, anger, excitement, dejection, happiness) identified as the most relevant to sport performance (Jones et al., 2005). Because search strategies exclusively relying on databases have shown to be non-exhaustive (Hopewell et al., 2010), we checked the reference list of all selected articles for further relevant studies. Finally, we sent an e-mail to all first authors of the identified articles and asked whether they were aware of other relevant articles within this area of research.

### *Identification of articles*

The process of the study selection is shown in Figure 1. All references retrieved from the databases were exported to the software Endnote, where all duplicates were removed. In a first step, the first two authors independently reviewed all titles and abstracts (n = 5799) against inclusion and exclusion criteria. Studies that were excluded by both authors did not pass to the next stage. In light of the large amount of remaining full-texts (n = 310), they were initially reviewed for their potential inclusion by only the first author. Subsequently, the full-texts (n = 107) considered potentially eligible for inclusion were also independently reviewed by the second author. In case the authors could not find an agreement, the fifth co-

author of the research team was consulted. The reason for exclusion of studies that were read in full text are listed in the supplementary file 2. Including the articles identified through other sources (n = 3), 44 articles were ultimately selected.

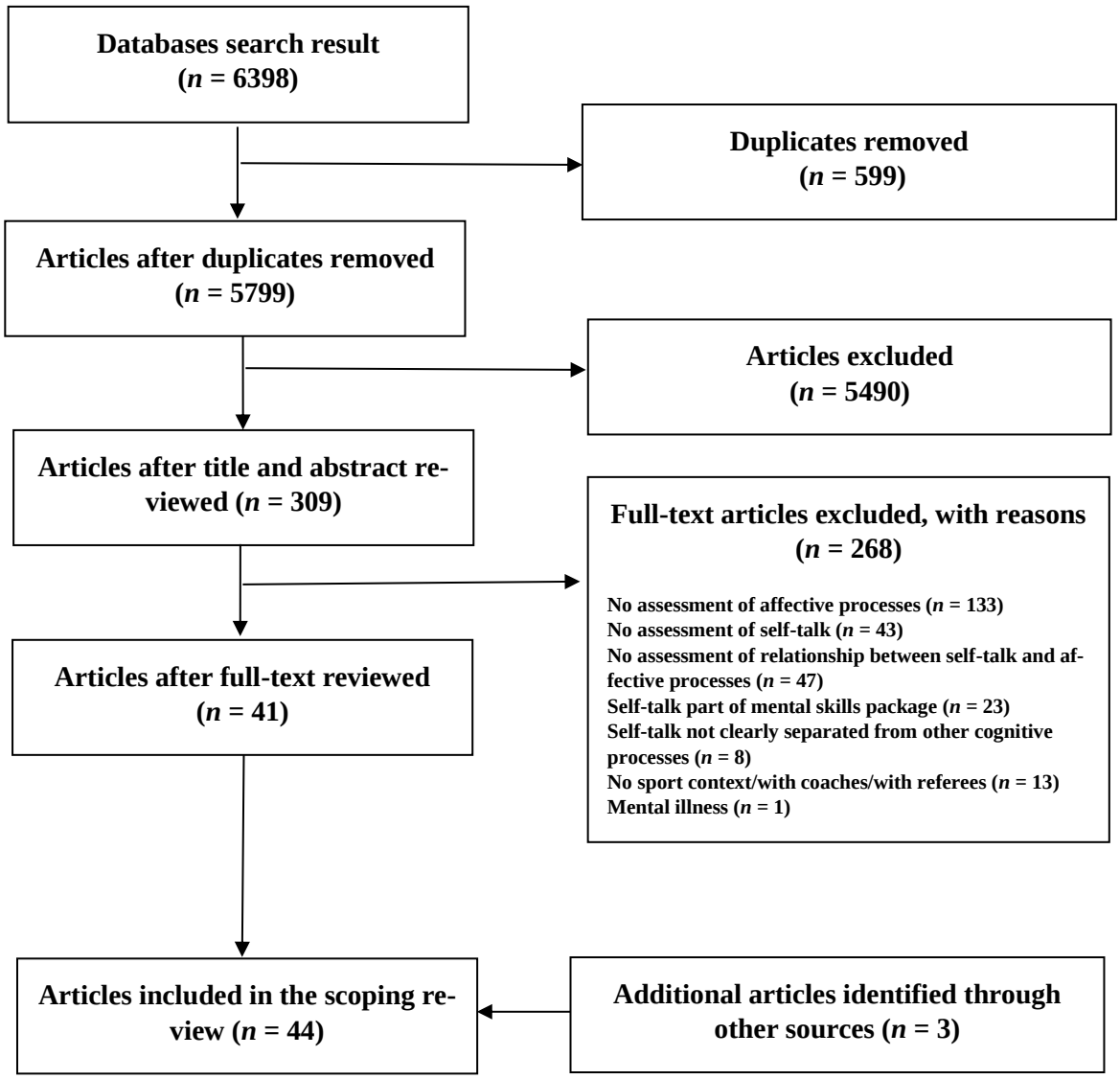


**Figure 1**. Study selection flow diagram.

**Table 1.** Findings on the relationship between organic self-talk and affective processes.

| Study | Theoretical framework | Participants | General purpose of study | Research design and methods | Main results with regards to the relationship between self-talk and affective processes |
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| Bernier et al. (2016); France | Nondichotomous framework of attentional foci | Figure skaters<br>*n* = 8 (4 female) ;<br>Age = 20.7 ± 1.79 ;<br>Level = Expert | Exploration of attentional foci and their temporal patterns in expert figure skaters. | Self-confrontation interviews based on footage of competitive performance | In real competition situations, experienced emotions were reported to be expressed through self-talk. |
| Boudreault et al. (2018); Canada | Spontaneous/goal-directed self-talk | Tennis players<br>*n* = 6 (3 female) ;<br>Age = 14-18 ;<br>Level = Among top 10 in Quebec | Examination of content of tennis players' self-talk in relation to emotions during key events in matches. | Semi-structured interviews within 30 minutes after a competitive match | Five categories of spontaneous self-talk (positive emotion expression, worry, rumination, performance pressure, and disengagement) and three categories of goal-directed self-talk (motivational, instructional, and emotional control) were identified in relation to emotions. |
| Boudreault et al. (2019); Canada | Spontaneous/goal-directed self-talk | Tennis players<br>*n* = 2 (1 female) ;<br>Age = 14 and 15 ;<br>Level = Junior-elite | Examination of content of tennis players' and their parents' self-talk in relation to emotions felt during matches. | Semi-structured interviews in relation to three competitive matches within 30 minutes after the third match | The valence of spontaneous self-talk was related to the valence of emotions (e.g., negative self-talk to anxiety). Goal-directed self-talk was reported to be used to deal with spontaneous self-talk and associated emotions. |
| Burton et al., (2013);<br>United States | N/A | Football players<br>*n* = 214 (214 female) ;<br>Age = 14.6 ;<br>Level = State to regional | Assessment of relationship between perceived self-talk frequency and effectiveness and other psychological variables. | Cross-sectional design; Sport Anxiety Scale; Soccer Self-Talk Practices Questionnaire | Trait somatic anxiety/trait worry correlated with negative self-talk frequency ($r$ = .23**/$r$ = .29**), and self-talk performance impact frequency ($r$ = .09/$r$ = .21**), but not with positive self-talk frequency ($r$ = .00/$r$ = .02). |
| Cheng & Hardy (2016, Study 2);<br>Taiwan | Three-dimensional model of anxiety | Sport students from various sports<br>*n* = 370 (142 female) ;<br>Age = 20.6 ± 1.7 ;<br>Level = Regional to international | Assessment of the three-dimensional model of performance anxiety by relating it to perfectionism, self-talk, and coping. | Cross-sectional design<br>Chinese Three-Factor Anxiety Inventory; Chinese Self-talk Inventory | Regulatory anxiety dimension was predicted by motivational self-talk ($\beta$ = .36**) and instructional self-talk ($\beta$ =.24**), but not by negative self-talk ($\beta$ = -.03). Cognitive anxiety was predicted by negative self-talk ($\beta$ = .44**), but not by motivational self-talk ($\beta$ = .00), and instructional self-talk ($\beta$ = .13). Physiological anxiety was predicted by negative self-talk ($\beta$ = .35**), motivational self-talk ($\beta$ = -.24**), and instructional self-talk ($\beta$ = .16*). |
| Conroy (2004);<br>United States | Multidimensional, hierarchical model of fear of failure | Students engaged in recreational physical activity<br>*n* = 440 (234 female, 2 did not report their gender) ;<br>Age = 20.51 ± 1.92 ;<br>Level = N/A | Assessment of the relationship between fear of failure and self-talk while failing, achievement goals, as well as contextual motivation. | Cross-sectional design<br>Performance Failure Appraisal Inventory; SASB Intrex Introject Questionnaire | Partial correlations showed that (a) fear of experiencing shame and embarrassment correlated with the self-talk dimensions of self-affirm ($r$ = -.13*), self-blame ($r$ = .20*), and self-attack ($r$ = .10*); (b) fear of devaluing one's self-estimate correlated with the self-talk dimension of self-blame ($r$ = .17**); (c) fear of having uncertain future correlated with the self-talk dimensions of self-blame ($r$ = .15**), self-attack ($r$ = .19**), and self-neglect ($r$ = .19**); (d) fear of important others losing interest correlated with the self-talk dimensions of active self-love ($r$ = -.15**), self-protect ($r$ = -.15**), and self-neglect ($r$ = .17**); (e) fear of upsetting important others correlated with the self-talk dimension of self-affirm ($r$ = -.15**). Non-significant effects are not reported here. |

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| Conroy & Metzler (2004); United States | Structural analysis of social behavior | Students engaged in recreational physical activity<br>*n* = 440 (234 female, 2 did not report their gender) ;<br>Age = 20.5 ± 1.9 ;<br>Level = N/A | Assessment of the relationship between self-talk and situation-specific performance anxieties. | Cross-sectional design<br>Performance Failure Appraisal Inventory; Fear of Success Scale; Sport Anxiety Scale; SASB Intrex Introject Questionnaire in four conditions: self-talk while failing, self-talk while succeeding, feared self-talk when performing, and wished self-talk when performing | Partial correlations showed that (a) while failing: fear of failure correlated with the self-talk dimensions of self-blame ($r$ = .33**), and self-neglect ($r$ = .14*), and sport anxiety with the self-talk dimensions of self-emancipate ($r$ = -.14*) and self-attack ($r$ = .19*); (b) while succeeding: fear of failure correlated with the self-talk dimension of self-control ($r$ = .19**), and sport anxiety with the self-talk dimension of self-control ($r$ = .16*); (c) for feared self-talk when performing: fear of failure correlated with the self-talk dimension of self-control ($r$ = .18**), and sport anxiety with the self-talk dimension of self-blame ($r$ = .37**); for wished self-talk when performing: fear of failure correlated with the self-talk dimension of self-control ($r$ = .18**). Non-significant effects are not reported here. |
| Conroy & Coatsworth (2007); United States | Multidimensional, hierarchical model of fear of failure; Structural analysis of social behavior | Students of summer swim league<br>*n* = 165 (99 female) ;<br>Age = 11.17 ± 2.21 ;<br>Level = N/A | Assessment of the impact of coaches' behavior on athletes' fear of failure by regarding their self-talk and satisfaction of psychological needs. | Longitudinal design; short form of Performance Failure Appraisal Inventory; Single-items for self-affirmation, self-protection, self-control, and self-blame | In the initial measure, fear of failure was predicted by the self-talk dimensions of self-control ($\beta$ = .29*), and self-blame ($\beta$ = .29**), but not of self-affirmation ($\beta$ = -.04) and self-protection ($\beta$ = -.03). Considering the changes from initial to final measure six weeks afterwards, changes of fear of failure were predicted by changes in the self-talk dimension of self-blame ($\beta$ = .74**), but not by changes in the self-talk dimensions of self-affirmation ($\beta$ = -.22), self-protection ($\beta$ = .19), and self-control ($\beta$ = .15). |
| Coulter et al. (2010); Australia | Process model of mental toughness | Soccer players<br>*n* = 6 (0 female) ;<br>Age = 29.3 ± 3.8 ;<br>Level = Elite | Exploration of mental toughness in soccer players. | Semi-structured interviews | Instructional and motivational self-talk were used by mentally tough players to control emotional experience. |
| De Muynck et al. (2020); Belgium | N/A | Tennis players<br>*n* = 120 (39 female) ;<br>Age = 25.22 ± 9.82 ;<br>Level = Low to high national ranking | Assessment of the relationship between self-reported self-talk and self-talk assessed through thinking-aloud during a tennis performance task. In a subsidiary analysis, fear of failure as antecedent and perceived tensions as outcome of self-talk were assessed. | Longitudinal design; Fear of Failure Scale of shortened Achievement Motives Scale; Pressure subscale of Intrinsic Motivation Inventory; Thinking-aloud; Automatic Self-Talk Questionnaire for Sports | Positive self-talk ($\beta$ = .25*) and negative self-talk ($\beta$ = .32**) during tennis matches were predicted by fear of failure before the match. Perceived tension during the match was predicted by negative self-talk ($\beta$ = .70**) during the match, but not by positive self-talk during the match ($\beta$ = .14). |
| Fritsch et al. (2020); Germany | Spontaneous/goal-directed self-talk | Tennis players<br>*n* = 20 (7 female) ;<br>Age = 23.10 ± 4.88 ;<br>Level = Regional to international | Assessment of the relationship between self-talk and emotions experienced as well as outward emotional reactions during competitive tennis matches. | Cross-sectional design; single items for emotion experience and outward emotional reactions; video-assisted self-talk recall | Fixed/random effect model: Intensity of emotions experienced ($\beta$ = -1.40**/$\beta$ = -1.40**) and outward emotional reactions ($\beta$ = -0.79**/$\beta$ = -0.76*) were lower in situations with only goal-directed self-talk compared to situations with only spontaneous self-talk. Intensity of emotions experienced ($\beta$ = -0.46**/$\beta$ = -0.38), but not of outward emotional reactions ($\beta$ = -0.27/$\beta$ = -0.25), was lower in situations with spontaneous self-talk in conjunction with goal-directed self-talk compared to situations with only spontaneous self-talk. |
| Hardy, Gammage et al. (2001); Canada | N/A | Athletes from various sports<br>*n* = 150 (72 female) ;<br>Age = 20.68 ± 1.90 ;<br>Level = N/A | Examination of where, when, what, and why athletes use self-talk. | Open-ended questions in questionnaire | Among other functions, self-talk was reported to be used to psych up, to relax, or to control arousal levels. |
| Hardy, Hall et al. (2001); Canada | N/A | Athletes from various sports<br>*n* = 90 (31 female) ;<br>Age = 16 ± 1.4 ;<br>Level = N/A | Assessment of relationship between self-talk and affect before competitions and practice. | Cross-sectional design; Affect Grid; Self-talk Grid | Partial correlations showed that before practice/competition, valence of self-talk correlated with the valence of affect ($r$ = .25*/$r$ = .35**), but not with the intensity of affect ($r$ = .07/$r$ = .06); the intensity of self-talk correlated with intensity of affect ($r$ = .31**/$r$ = .50**), but not with the valence of affect ($r$ = .03/$r$ = .04). |

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| Hardy et al. (2009); United Kingdom | N/A | Physically active kinesiology students<br>*n* = 73 (27 female) ;<br>Age: 19.81 ± 3.05 ;<br>Level = N/A | Assessment of the effectiveness of a logbook and paperclip technique with the purpose to change negative self-talk. In a subsidiary analysis, antecedents and consequences of negative self-talk were examined qualitatively. | Logbook | Negative emotions (*n* = 4/229) were reported as one of the triggers of negative self-talk. Negative emotions (*n* = 41/211), mixed emotions (*n* = 5/211), and positive affect (*n* = 11/211) were reported as some of the consequences of negative self-talk. |
| Hatzigeorgiadis & Biddle (2008, Study 1); Greece | Control process theory | Cross-country runners<br>*n* = 38 (11 female) ;<br>Age = 22.02 ± 2.33 ;<br>Level = N/A | Assessment of the relationship between anxiety, goal-performance discrepancies, and negative self-talk during running competitions. | Longitudinal design; modified version of Competitive State Anxiety Inventory-2; Performance Worries subscale of Thought Occurrence Questionnaire for Sport | Negative self-talk during competition was correlated with cognitive anxiety intensity (*r* = .34*), cognitive anxiety direction (*r* = -.34*), and somatic anxiety direction (*r* = -.32*), but not with somatic anxiety intensity (*r* = .23), all measured before the competition. |
| Hatzigeorgiadis & Biddle (2008, Study 2); Greece | Control process theory | Cross-country runners<br>*n* = 36 (12 female) ;<br>Age = 23.14 ± 6.46 ;<br>Level = N/A | Assessment of the relationship between anxiety, goal-performance discrepancies, and negative self-talk during running competitions. | Longitudinal design; modified version of Competitive State Anxiety Inventory-2; Performance Worries subscale of Thought Occurrence Questionnaire for Sport | Negative self-talk during competition was correlated with cognitive anxiety intensity (*r* = .34*), and cognitive anxiety direction (*r* = -.37*), but not with somatic anxiety intensity (*r* = .29) and somatic anxiety direction (*r* = -.24), all measured before the competition. |
| Latinjak, Font-Lladó et al. (2016); Spain | Spontaneous/goal-directed self-talk | Orienteerer<br>*n* = 1 (0 female) ;<br>Age = 36 ;<br>Level = Elite | Description of a goal-oriented self-talk intervention. | Semi-structured interviews throughout the self-talk intervention | A positive effect on affective states was reported to be one of the outcomes of the intervention.<br>. |
| Latinjak, Hernando-Gimeno et al. (2019); United Kingdom | Spontaneous/goal-directed self-talk | Athletes from various sports<br>*n* = 4 (4 female) ;<br>Age = 20-40 ;<br>Level = Professional | Assessment of a reflexive self-talk intervention. | Semi-structured interviews before and after the intervention | A better control of emotions was reported to be one of the outcomes of the intervention. |
| Latinjak, Viladrich et al. (2016); Spain | N/A | Athletes from various sports<br>*n* = 263 (62 female) ;<br>Age = 20.30 ± 3.08 ;<br>Level = Regional to international | Validation of the Spanish version of the Automatic Self-talk Questionnaire for Sports | Cross-sectional design; Sport Anxiety Scale-2; Automatic Self-talk Questionnaire in Sports | Cognitive anxiety was correlated with self-talk dimensions of somatic fatigue (*r* = .14*), worry (*r* = .48**), and disengagement (*r* = .35**), but not of motivation, confidence, instruction, anxiety control, and irrelevant thoughts. Somatic anxiety was correlated with self-talk dimensions of somatic fatigue (r= .38**), worry (*r* = .43**), disengagement (*r* = .44**), instruction (*r* = .21**), and anxiety control (*r* = .28**), but not of motivation, confidence, and irrelevant thoughts. No effect sizes were mentioned for non-significant correlations. |
| Latinjak et al. (2014, Study 1); Spain | Spontaneous/goal-directed self-talk | Athletes from various sports<br>*n* = 32 (14 female) ;<br>Age = 19.24 ± 1.51 ;<br>Level = National to international | Assessment of undirected and goal-directed self-talk. | Thought-sampling procedure in relation to situations where sadness, anger, resignation, anxiety, relief, euphoria, confidence, or excitement was experienced | In emotional situations, 466 from 474 self-talk statements were spontaneous, which could then be classified based on valence and time-perspective. |
| Latinjak et al. (2014, Study 2); Spain | Spontaneous/goal-directed self-talk | Athletes from various sports<br>*n* = 55 (10 female) ;<br>Age = 19.73 ± 2.10 ;<br>Level = National to international | Assessment of undirected and goal-directed self-talk. | Thought-sampling procedure in relation to emotional situations where athletes want to improve performance or control emotions | In emotional situations where athletes want to improve performance or control emotions, 1164 from the 1171 self-talk statements were goal-directed, which could then be classified into 7 categories defined by time-orientation and activation: Controlling cognitive reactions, controlling activated states, controlling deactivated states, creating activated states, creating deactivated states, regulating behavior, and focusing on positive predictions. |

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| Latinjak et al., (2017); Spain | Spontaneous/goal-directed self-talk | Athletes from various sports<br>*n* = 87 (25 female) ;<br>Age = 19.66 ± 2.07 ;<br>Level = National | Exploration of self-talk in anger- and anxiety-eliciting sport situations. | Cross-sectional design; thought sampling procedure in relation to anger and anxiety | In anger- and anxiety-eliciting situations, more spontaneous than goal-directed self-talk was reported (no effect size mentioned). Comparing both situations, more goal-directed self-talk was reported in anger-eliciting situations (no effect size mentioned). Spontaneous self-talk was more negative/retrospective in anger- and more positive/anticipatory in anxiety-eliciting situations (partial $\eta^2$ = .158**/partial $\eta^2$ =.264**). In anger-eliciting situations, larger amounts of goal-directed self-talk were reported in relation to controlling cognitive reactions, controlling deactivated states, and regulating behavior, and in anxiety-eliciting situations, larger amounts of goal-directed self-talk were reported in relation to creating activated states, controlling activated states and creating deactivated states (Cramers'V = .384**). |
| Latinjak et al. (2020); Spain | Spontaneous/goal-directed self-talk | Basketball and football players<br>*n* = 30 (0 female) ;<br>Age = 22.77 ± 4.04 ;<br>Level = Regional to national | Exploration of spontaneous self-talk in emotion-eliciting sport situations. | Cross-sectional design; thought sampling procedure in relation to anger, anxiety, excitement, and euphoria. | An interaction between self-talk and emotions (Cramer's V = .760**) was shown. In anxiety, self-talk was mostly anticipatory negative or anticipatory neutral. In anger, self-talk was mostly retrospective negative. In excitement, self-talk was mostly anticipatory positive or anticipatory neutral. In euphoria, self-talk was mostly retrospective positive or anticipatory positive. |
| Martinent et al. (2015); France | Process model of emotion regulation | Table tennis players<br>*n* = 11 (0 female) ;<br>Age = 23.82 ± 5.74 ;<br>Level = National | Assessment of emotion regulation strategies and their effectiveness in table tennis players. | Self-confrontational interviews based on footage of competitive matches | Positive and rational self-talk were reported to be used to deal with anger (*n* = 153 instances and *n* = 44), joy (*n* = 13 and *n* = 2), anxiety (*n* = 39 and *n* = 22), relief (*n* = 0 and *n* = 2), discouragement (*n* = 1 and *n* = 1), hope (*n* = 1 and *n* = 1), disappointment (*n* = 0 and *n* = 2), pride (*n* = 0 and *n* = 1), and disgust (*n* = 0 and *n* = 3). |
| Miles et al. (2013); United Kingdom | N/A | Cricketers<br>*n* = 5 (no information about gender) ;<br>Age = 28.4 ± 7.3 ;<br>Level = Professional | Assessment of self-talk during cricket batting performance. | Self-confrontational interview based on footage of competitive match | Motivational self-talk was reported to regulate increasing levels of anxiety during declining performance. In addition, rational self-talk was reported to help prevent becoming anxious during difficult periods of batting. |
| Miles et al. (2016); New Zealand | Cognitive-motivational-relational theory of emotions | Cricketers<br>*n* = 4 (0 female) ;<br>Age = 21.25 ± 1.5 ;<br>Level = Elite | Exploration of stressors, cognitions, emotions, coping strategies, and behaviors experienced the week before the first competition of the season. | Self-confrontational interviews based on footage of competitive match and stressors identified in reflective diaries | Instructional, motivational and rational self-talk were used to regulate different kinds of emotions (anxiety, sadness, anger) on the days before the competition as well as during the competition. |
| Neil et al. (2011); United Kingdom | Cognitive-motivational-relational theory of emotions | Athletes from various sports<br>*n* = 12 (6 female) ;<br>Age= 23.67 ± 10.32 ;<br>Level= Elite to non-elite | Exploration of stress and emotion processes by focusing on further appraisals and their perceived impact on subsequent performance. | Semi-structured interviews | Anxiety, nervousness, and anger were reported as a result of negative, primarily self-doubting, self-talk. Moreover, self-talk was used to have a facilitative interpretation of anxiety. |
| Neil et al. (2016); United Kingdom | Cognitive-motivational-relational theory of emotions | Cricketers<br>*n* = 3 (0 female) ;<br>Age = 20.5 ± 2.38 ;<br>Level = Semi-professional | In-depth examination of stress and emotion process during cricket performance. | Semi-structured interviews supported by the use of reflective journals | While negative self-talk was reported to be associated with negative emotions, such as anxiety, disappointment, anger, positive self-talk was reported to be associated with positive emotions such as relaxation. In addition, positive and instructional self-talk was reported to be used for maintaining control over negative emotions. |

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| Woodcock et al. (2012); United Kingdom | Individual zone of optimal functioning | Cross-country runner<br>*n* = 1 (1 female) ;<br>Age = 19 ;<br>Level = University | Exploration of the process of working with an athlete to facilitate skills of emotion regulation. | Semi-structured interviews within an action research approach | When performing bad, the athlete had negative self-talk associated with negative/dysfunctional feelings. |
| Zervas et al (2007, phase 3); Greece | N/A | Athletes from various sports<br>*n* = 350 (147 female) ;<br>Age = 20.83 ± 3.07 ;<br>Level = National to international | Development and validation of a questionnaire that assesses cognitive and motivational functions of self-talk. | Cross-sectional design; Competitive Worries Inventory; Self-Talk Questionnaire for Sports | Cognitive/motivational self-talk correlated with performance worries frequency (*r* = -.18*/*r* = -.10), performance worries intensity (*r* = -.16*/*r* = -.06), social evaluation worries frequency (*r* = -.18*/*r* = -.10), and social evaluation worries intensity (*r* = -.17*/*r* = -.10). |
| Zourbanos et al. (2009, stage 4); Greece | N/A | Athletes from various sports<br>*n* = 766 (299 female) ;<br>Age = 17.44 ± 5.18 ;<br>Level = Regional to international | Development and validation of a questionnaire that assesses athletes' automatic self-talk. | Cross-sectional design; Affect State Inventory; Sport Anxiety Scale; Automatic Self-talk Questionnaire in Sports | Cognitive anxiety/somatic anxiety correlated with the self-talk dimensions of confidence (*r* = -.34**/*r* = .00), instruction (*r* = -.05/*r* = .13*) anxiety control (*r* = .06/*r* = .24**), somatic fatigue (*r* = .38**/*r* = .28**), disengagement (*r* = .40**/*r* = .29**), worry (*r* =.50**/*r* = .25**), and irrelevant thoughts (*r* = .14*/*r* = .16*), but not with psych up (*r* = -.12/*r* = .04). Vigor/Tension/Boredom correlated with the self-talk dimensions psych up (*r* = .26**/*r* = -.16*/*r* = -.26**), confidence (*r* = .44**/*r* = -.36**/*r* = -.35**), instruction (*r* = .37**/*r* = -.23**/*r* = -.24**), anxiety control (*r* = .29**/*r* = -.12/*r* = -.22**), somatic fatigue (*r* = -.45**/*r* = .51**/*r* = .50**), disengagement (*r* = -.42**/*r* = .39**/*r* = .40**), worry (*r* = -.54**/*r* = .56**/*r* = .47**), and irrelevant thoughts (*r* = -.40**/*r* = .48**/*r* = .49**). |

Notes: *<.05; **<.01

**Table 2.** Findings on the relationship between strategic self-talk and affective processes.

| Study | Theoretical framework | Participants | General purpose of study | Research design & methods | Main results with regards to the relationship between self-talk and affective processes |
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| Cotterill et al. (2010); United Kingdom | N/A | Golfers<br>*n* = 6 male (0 female) ;<br>Age = 29 ± 2.5 ;<br>Level = Amateur | Exploration of participants' views on their use of pre-performance routines. | Self-confrontational interviews based on footage of competitive matches combined with thinking aloud | In pre-performance routines, self-talk was identified as one strategy that could be used to regulate mood states. |
| Devonport (2006); United Kingdom | N/A | Kickboxers<br>*n* = 3 (1 female) ;<br>Age = 37 ± 9.6 ;<br>Level = Elite | Exploration of the contribution of psychology to the development and maintenance of expert performance in kickboxing. | Semi-structured interviews (one individual; one dual) | Self-talk was reported as a main strategy to control emotions during the competition. |
| Burton et al., (2013);<br>United States | N/A | Football players<br>*n* = 214 (214 female) ;<br>Age = 14.6 ;<br>Level = State to regional | Assessment of relationship between perceived self-talk frequency and effectiveness and other psychological variables. | Cross-sectional design; Sport Anxiety Scale; Soccer Self-Talk Practices Questionnaire | Trait somatic anxiety/trait worry correlated with self-talk strategy frequency ($r$ = .20**/$r$ = .05). |
| Fletcher & Hanton (2001);<br>United Kingdom | Multidimensional anxiety theory including direction of anxiety | Swimmers<br>*n* = 114 (49 female) ;<br>Age = 19.18 ± 2.0 ;<br>Level = Regional to national | Assessment of the differences in intensity and direction of state anxiety as well as self-confidence depending on psychological skills usage in relation to a swimming competition. | Cross-sectional design; Modified version of Competitive State Anxiety Inventory-2; Self-talk subscale of Test of Performance Strategies | More frequent users of self-talk as a strategy had lower scores in cognitive anxiety intensity ($p$ < .05) and higher scores in somatic anxiety direction (p > .05), but there were no differences in cognitive anxiety direction and somatic anxiety intensity. Effect sizes were not mentioned. |
| Freitas et al. (2013); Portugal | N/A | Footballers<br>*n* = 16 (0 female) ;<br>Age = 23-34 ;<br>Level = Elite | Exploration of whether, where, when and why players use different psychological techniques. | Semi-structured interviews | Self-talk was reported as a psychological skill to control stress and anxiety levels. |
| Hanton et al. (2004); United Kingdom | Multidimensional anxiety theory including direction of anxiety | Various individual and team sport athletes<br>*n* = 10 (0 female) ;<br>Age = 26.20 ± 4.95 ;<br>Level = Elite | Examination of elite athletes' perception and causal beliefs regarding the relationship between competitive anxiety, self-confidence and symptom interpretation. | Semi-structured interviews | Self-talk was reported as a strategy to deal with anxiety symptoms before the competition by (a) directing attention to positive things and maintaining high levels of self-confidence, and (b) alleviating negative thoughts by raising activation levels. |
| Hanton et al. (2005); United Kingdom | Multidimensional anxiety theory including direction of anxiety | Various individual and team sport athletes<br>*n* = 6 (0 female) ;<br>Age = 23.3 ± 2.2 ;<br>Level = Elite | Examination of elite athletes' precompetitive thoughts, feelings, and mental strategies underlying debilitative symptom interpretations. | Interviews | Positive self-talk was reported as a strategy to deal with anxiety symptoms, however, it often turned into negative cognitions. |

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| Hatzigeorgiadis et al. (2007); Greece | N/A | Swimming class students<br>*n* = 21 (21 female) ;<br>Age = 20.4 ± 0.92 ;<br>Level = No experience | Assessment of a self-talk intervention using attentional and anxiety-control self-talk statements on different psychological functions in a water polo task. | Quasi-experimental design with 3 self-talk training sessions; Competitive State Anxiety Inventory-2 | An effect of the self-talk intervention was found for cognitive state anxiety ($\eta^2$ = .19*), but not for state somatic anxiety ($\eta^2$ = .15). In addition, the effects were stronger for the anxiety-control than the attentional self-talk statement ($\eta^2$ = .23* for cognitive state anxiety; $\eta^2$ = .19* for somatic state anxiety). |
| Hatzigeorgiadis et al. (2009); Greece | N/A | Tennis players<br>*n* = 72 (36 female) ;<br>Age = 13.47 ± 1.78 ;<br>Level = Regional to National | Assessment of a self-talk intervention using motivational self-talk statements on anxiety and self-confidence in a tennis performance task. | Experimental design with 3 motivational self-talk training sessions and one control group;<br>Competitive State Anxiety Inventory-2 revised | An interaction effect of the self-talk intervention was found for cognitive state anxiety ($\eta^2$ = .07*), but not for somatic state anxiety (no effect size mentioned), with a decrease only in the experimental group. |
| Kanniyan et al. (2015); Saudi Arabia | N/A | Football players<br>*n* = 36 (no information about gender) ;<br>$Age_{IG}$ = 16.4 ± 1.8<br>$Age_{CG}$ = 17.1 ± 1.4 ;<br>Level = School level | Assessment of a positive self-talk intervention on competitive anxiety and self-confidence in junior football players before competition. | Experimental design with 3-5 positive self-talk training sessions per week over 8 weeks and one control group; Competitive State Anxiety Inventory-2 | A reduction of cognitive and somatic state anxiety was found in the experimental group, but not in the control group. Effect sizes were not mentioned. |
| Marshall et al. (2016); Australia | Choking | Golfers<br>*n* = 7 (3 female) ;<br>Age = 59.14 (51-81) ;<br>Level = Amateur | Assessment of a self-talk intervention on anxiety and performance enhancement in the putting of golfers during competitions. | Experimental design with 8 self-talk training sessions including instructional self-talk group, motivational self-talk group and control group;<br>Competitive State Anxiety Inventory-2 revised | No effect of the self-talk intervention on anxiety was found. Effect sizes were not mentioned. |
| Ryska (1998); United States | N/A | Tennis players<br>*n* = 186 (98 female) ;<br>Age = 41 ± 9.47 ;<br>Level = Recreational | Assessment of effectiveness and sources of mental strategies as well as their effect on anxiety and self-confidence. | Cross-sectional design; Competitive State Anxiety Inventory; single item for use of positive self-talk | Positive self-talk correlated with cognitive anxiety (*r* = -.32**) and somatic anxiety (*r* = -.27**). |
| Thelwell et al. (2003); United Kingdom | N/A | Endurance athletes<br>*n* = 4 (0 female) ;<br>Age = 19-21 ;<br>Level = Recreational | Examination of the effectiveness of an intervention package and identification of how the different mental skills were used. | Structured interview | Instructional self-talk was reported to help directing the attention on process goals rather than on irrelevant feelings. |
| Wadey & Hanton (2008); United Kingdom | Multidimensional anxiety theory including direction of anxiety | Various individual and team sport athletes<br>*n* = 15 (9 female) ;<br>Age = 24.3 ± 4.2 ;<br>Level = Elite | Examination of the relationship between basic psychological skills and directional dimension of anxiety. | Semi-structured interviews supported by a booklet | Positive self-talk was reported to increase the level of effort/motivation and to direct the focus on the task when perceiving anxiety symptoms. This, in turn, increased the perceived control over symptoms leading to a facilitative interpretation of anxiety. Moreover, it was emphasized that positive self-talk does not remove anxiety symptoms but help control them. |
| Walter et al. (2019); Germany | Self-talk mechanisms | Athletes from various sports<br>*n* = 117 (55 female) ;<br>Age = 16 ± 1.8 ;<br>Level = Sub-elite to elite | Assessment of a self-talk intervention on anxiety, self-efficacy, volitional skills, and performance in junior athletes. | Experimental design including a group with 1 week of self-talk training with 3 sessions, a group with 8 weeks of self-talk training with 3 sessions per week, and a control group; Competitive Anxiety Inventory with trait and state scales | An interaction effect of the self-talk intervention was found for state anxiety ($\eta^2$ = 0.16*), with pairwise comparisons showing a reduction in somatic anxiety in the one-week self-talk training group, but not in the two other groups. Pairwise comparisons did not show significant differences for cognitive anxiety. An effect of time was found for trait somatic anxiety ($\eta^2$ = .12**) and trait worry ($\eta^2$ = .09**), with a decrease in all groups. |

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| Wood et al., (2017, Study 1); United Kingdom | Rational emotive behavior therapy | Students<br>$n$ = 35 (9 female) ;<br>Age = 20.92 ± 5.62 ;<br>Level = N/A | Assessment of the effects of irrational and rational self-talk statements on cognitions, emotions, and performance. | Experimental counter-balanced design with a lab-based golf putting performance with baseline, irrational self-talk and rational self-talk conditions; State version of the State Trait Anxiety Inventory | No differences in state anxiety were found between the conditions ($\eta^2$ = .01). |

Notes: *<.05; **<.01; $Age_{IG}$ = Age in intervention group; $Age_{CG}$ = Age in control group

### *Data charting*

A table in a Word document was created to determine which study information to extract. This table was used for organic self-talk (Table 1) and strategic self-talk (Table 2). Consequently, the two first authors independently charted the data into the tables. They discussed their results in frequent meetings, while constantly updating the tables in an iterative process. An individualized data extraction table was sent to the first authors of each study to check for accuracy. Twenty-one of the 26 authors responded, with four authors reporting minor inaccuracies referring to the wording in the tables, which were subsequently corrected.

### *Synthesis of results*

Initially, each study was classified as either assessing organic or strategic self-talk. It is important to note that most studies have not been assigned a priori to one of the self-talk entities as they were published before the introduction has been introduced in the literature (Latinjak, Hatzigeorgiadis, et al., 2019). Thus, only those studies in which it was clear that self-talk was a predetermined and deliberate strategy to be used during sport involvement were classified as strategic self-talk. When a study examined different types of self-talk, it could also be classified as both strategic and organic self-talk. For organic self-talk, the results were further classified according to whether or not they used the classification of spontaneous and goal-directed self-talk. Results of studies not based on this classification were extracted into the functions and valence of self-talk, as these are two typical classification systems in sport psychology (Hardy et al., 2018). Moreover, it has been suggested that classifications focusing on the valence of self-talk primarily reflect spontaneous self-talk, while classifications focusing on the functions of self-talk primarily reflect goal-directed self-talk (Latinjak, Hatzigeorgiadis, et al., 2019). Importantly, the same study could have results relevant for both functions and valence of self-talk. This entire procedure was guided by the first author who was helped by frequent critical discussions with the second author.

## Results

The 44 articles were published between 1998 and 2020 and included 46 studies, from which 16 studied strategic self-talk and 31 studied organic self-talk (one study included findings relevant for both strategic and organic self-talk; Burton et al., 2013). The sample size ranged from 1 to 150 in the qualitative studies and from 7 to 766 in the quantitative studies, with a total sample size of 40101 (1749 females; no information about gender for 43 participants). The study participants came from various sports and competition levels, ranging from recreational to elite. Complete characteristics for each study are provided in Table 1 (organic self-talk) and Table 2 (strategic self-talk).

### *Studies on organic self-talk*

In relation to organic self-talk, 9 from the 31 studies were based on the spontaneous/goal-directed self-talk framework. Of the remaining 22, 13 studies included findings on the valence of self-talk, 6 studies on the functions of self-talk, and 3 studies on both the valence and functions of self-talk.

### *Studies on spontaneous/goal-directed self-talk*

In three studies (Latinjak et al., 2014, Study 1; Latinjak et al., 2017, 2020), participants were asked to describe sport-related situations in which they experienced a specific emotion, and in one study (Latinjak et al., 2014, Study 2) in which they tried to regulate their emotions. Subsequently, they were asked to write down their self-talk in these situations. In another study, a stimulated recall procedure was used to assess the self-talk of tennis players in multiple situations from a previous competitive match (Fritsch et al., 2020). In the study of Latinjak et al. (2017), the self-talk statements were classified by the participants themselves into spontaneous and goal-directed self-talk, whereas in the other four studies this classification was made by the researcher. The results of these studies showed that when participants were asked specifically about their self-talk in situations in which they experienced emotions, they reported more spontaneous than

goal-directed self-talk (Latinjak et al., 2014, Study 1; Latinjak et al., 2017, 2020). In contrast, when asked specifically about situations in which they tried to regulate emotions, participants reported more goal-directed than spontaneous self-talk (Latinjak et al., 2014, Study 2). Moreover, the results of the study of Fritsch et al. (2020) indicated that the intensity of emotions experienced and outward emotional reactions were lower in situations in which tennis players reported goal-directed self-talk than in situations in which they reported only spontaneous self-talk. Two studies took a different methodological approach by conducting semi-structured interviews that took place after tennis matches (Boudreault et al., 2018, 2019). The interviews focused on the relationship between players' self-talk and their emotions in different situations during the match, and allowed athletes' self-talk interpretation to be considered. The results of these studies also indicated that spontaneous self-talk was related to one's emotional experience, while goal-directed self-talk was used as an emotion regulation strategy.

Some of the studies also examined the specific content of spontaneous and goal-directed self-talk (Boudreault et al., 2018, 2019; Latinjak et al., 2014, Study 1 & 2; Latinjak et al., 2017, 2020). The results indicated that the content of spontaneous self-talk in positive emotional situations involved the expression of positive emotions, engagement, consequences of success, and attribution of success. In contrast, the content of spontaneous self-talk in negative emotional situations involved the expression of negative emotions, disengagement, worry, rumination, performance pressure, self-criticism, negative predictions, consequences of failure, or attribution of failure (Boudreault et al., 2018, 2019; Latinjak et al., 2014, Study 1; Latinjak et al., 2020). Classifying spontaneous self-talk into positive and negative valence and comparing their association with the valence of emotions further showed that the valence of spontaneous self-talk correlated positively with the valence of emotions (Latinjak et al., 2014, Study 1; Latinjak et al., 2017, 2020). In one study, however, spontaneous self-talk in anxiety-eliciting situations was close to the median point on the positive–negative scale (Latinjak et al., 2017). Regarding the content of goal-directing self-talk, studies showed that goal-directed self-talk in relation to emotions involved various functions such as being motivational and instructional, regulating emotions, activations levels, behaviour, and cognitive reactions as well as creating positive attitudes for the future (Boudreault et al., 2018, 2019; Latinjak et al., 2014, Study 2; Latinjak et al., 2017).

Finally, two studies with an applied focus evaluated reflexive self-talk interventions using single-case study designs (Latinjak, Font-Lladó, et al., 2016; Latinjak, Hatzigeorgiadis, et al., 2019). In such an intervention, athletes are first asked to analyse their organic spontaneous and goal-directed self-talk and, based on the analysis, attempt to adapt their goal-directed self-talk. The results of both studies suggest such an intervention may help athletes better manage their emotions.

### *Studies on valence of self-talk*

There are 11 quantitative studies in which various self-talk instruments were used to measure positive and/or negative self-talk and these were associated with instruments of affective processes (Burton et al., 2013; Cheng & Hardy, 2016; Conroy, 2004; Conroy & Metzler, 2004; Conroy & Coatsworth, 2007; De Muynck et al., 2020; Hardy, Hall, et al., 2001; Hatzigeorgiadis & Biddle, 2008, studies 1 & 2; Latinjak, Viladrich, et al., 2016; Zourbanos et al., 2009). In some of the studies, the subscales of the instruments also allowed for consideration of more specific positive and negative self-talk contents (Conroy, 2004; Conroy & Coatsworth, 2007; Conroy & Metzler, 2004; De Muynck et al., 2020; Latinjak, Viladrich, et al., 2016; Zourbanos et al., 2009). For positive self-talk, content categories included confidence, instruction, anxiety control, psych up, self-affirm, active self-love, self-protect, and self-emancipate. For negative self-talk, content categories included somatic fatigue, disengagement, irrelevant thoughts, worries, self-blame, self-neglect, self-attack, and self-control.

The results showed that measures of negative self-talk correlated positively with measures of

negative affective processes, whereas measures of positive self-talk correlated negatively with measures of negative affective processes. These findings referred to affective processes such as anxiety (Burton et al., 2013; Cheng & Hardy, 2016; Conroy & Metzler, 2004; Hatzigeorgiadis & Biddle, 2008, Study 1 & 2; Latinjak, Viladrich, et al., 2016; Zourbanos et al., 2009), fear of failure (Conroy, 2004; Conroy & Coatsworth, 2007; Conroy & Metzler, 2004; De Muynck et al., 2020), fear of success (Conroy & Metzler, 2004), mood states, such as tension and boredom (De Muynck et al., 2020; Zourbanos et al., 2009), and negative affect (Hardy, Hall, et al., 2001). Moreover, with regards to the interpretation of anxiety, two studies showed that negative self-talk was negatively correlated with a facilitative interpretation of anxiety (Cheng & Hardy, 2016; Hatzigeorgiadis & Biddle, 2008, Study 1 & 2). One quantitative study focused on positive affective processes, revealing that negative self-talk was negatively correlated and positive self-talk positively correlated with the mood state vigour (Zourbanos et al., 2009). In contrast to the results indicating a consistent overlap between the valence of self-talk and the valence of affective processes, two studies showed a positive correlation between the two positive self-talk subscales anxiety-control and instructions with somatic anxiety (Latinjak, Viladrich, et al., 2016; Zourbanos et al., 2009). In a similar vein, it was also shown that fear of failure was associated with positive self-talk (De Muynck et al., 2020).

In addition, five qualitative studies provided findings on the relationship between the valence of self-talk and affective processes. These studies focused on diverse sport psychological topics such as the awareness and motivation to change negative self-talk (Hardy, Oliver, et al., 2009), competition stress (Neil et al., 2011, 2016), an application of the individual zone of optimal functioning (Woodcock et al., 2012), or the temporal patterns of attentional foci (Bernier et al., 2016). The findings indicated that negative self-talk was positively associated with negative emotions (Hardy, Roberts, et al., 2009; Neil et al., 2011, 2016; Woodcock et al., 2012) or a debilitative interpretation of anxiety (Neil et al., 2011), while positive self-talk was positively associated with positive emotions (Neil et al., 2016). However, one study showed that negative self-talk was also positively associated with positive emotions, although to a lesser extent than with negative emotions (Hardy, Roberts, et al., 2009).

### *Studies on functions of self-talk*

Two quantitative studies examined the relationship between measures of instructional/ cognitive and motivational self-talk with affective processes (Cheng & Hardy, 2016; Zervas et al., 2007). The results showed that instructional/cognitive self-talk correlated negatively with performance worries and social evaluations worries (Zervas et al., 2007), but positively with physiological anxiety (Cheng & Hardy, 2016), while motivational self-talk correlated negatively with performance worries, social evaluation worries, and physiological anxiety (Cheng & Hardy, 2016; Zervas et al., 2007).

In addition, both motivational and instructional self-talk correlated positively with the regulatory anxiety dimension (Cheng & Hardy, 2016). In addition, seven qualitative studies provided insights into the potential of self-talk for emotion regulation. These studies focused on self-talk (Hardy, Gammage, et al., 2001; Miles & Neil, 2013), emotion regulation (Martinent et al., 2015), competition stress (Miles et al., 2016; Neil et al., 2011, 2016), or mental toughness (Coulter et al., 2010). The results indicated that self-talk is generally used, among other things, to regulate emotions (Hardy, Gammage, et al., 2001; Neil et al., 2011). Moreover, the results pointed to more specific self-talk functions such as motivational and instructional (Coulter et al., 2010; Neil et al., 2016), or rational self-talk (Martinent et al., 2015; Miles et al., 2016; Miles & Neil, 2013) and its potential for emotion regulation.

### *Studies on strategic self-talk*

Six quantitative studies used an intervention design to assess the effects of a self-talk treatment on different forms of anxiety (Hatzigeorgiadis et al., 2007, 2009; Kanniyan, 2015; Marshall et al., 2016; Walter et al., 2019; Wood et al., 2017). The studies that specified the content of the self-talk

treatment described the cue words as attention-controlling or anxiety-controlling (Hatzigeorgiadis et al., 2007), motivational (Hatzigeorgiadis et al., 2009), instructional or motivational (Marshall et al., 2016), rational (Wood et al., 2017), or positive (Kanniyan, 2015). Three of the interventions resulted in reductions in state cognitive anxiety (Hatzigeorgiadis et al., 2007; Hatzigeorgiadis et al., 2009; Kanniyan, 2015) and two in state somatic anxiety (Kanniyan, 2015; Walter et al., 2019). A direct comparison of cue words showed that anxiety-control statements were more effective than attention-related statements, which, however, also had a significant anxiety reducing impact (Hatzigeorgiadis et al., 2007).

Three quantitative studies further assessed the relationship between the use of self-talk as a mental strategy and its relationship with anxiety. The results showed athletes who used self-talk as a mental strategy more often tended to interpret somatic anxiety as more facilitative and had lower scores in cognitive and somatic anxiety (Fletcher & Hanton, 2001; Ryska, 1998). However, it was also found that trait somatic anxiety correlated positively with the use of self-talk as a strategy (Burton et al., 2013). In addition, seven qualitative studies reported findings on the effects of strategic self-talk on affective processes. Five of these studies focused on mental skills (Cotterill et al., 2010; Devonport, 2006; Freitas et al., 2013; Thelwell & Greenlees, 2003; Wadey & Hanton, 2008) and two on anxiety interpretation (Hanton et al., 2004, 2005). The results showed that strategic self-talk is used to deal with emotions and feelings in general (Devonport, 2006; Thelwell & Greenlees, 2003), to regulate pre-competitive mood states (Cotterill et al., 2010), to control stress and anxiety (Freitas et al., 2013), and to interpret anxiety symptoms in a facilitative way (Hanton et al., 2004; Wadey & Hanton, 2008). However, a study also showed that in athletes who tended to have a debilitative interpretation of anxiety, the use of strategic self-talk often turned into negative cognitions (Hanton et al., 2005).

## Discussion

The purpose of this scoping review was to provide a comprehensive overview of the existing literature that examined the relationship between self-talk and affective processes in sports. Following the PRISMA-ScR guidelines (Tricco et al., 2018), the review identified a total of 46 studies that were classified as either organic or strategic self-talk.

### Organic self-talk and affective processes

#### *Spontaneous self-talk and affective processes*

It is assumed that affective processes are often accompanied by spontaneous self-talk, referring to unintended and non-instrumental self-talk statements (Latinjak, Hatzigeorgiadis, et al., 2019). This assumed relationship is supported by studies that showed that, in emotional situations, spontaneous self-talk was more prevalent than goal-directed self-talk (Fritsch et al., 2020; Latinjak et al., 2014; Latinjak et al., 2017). In line with the diverse emotions theories emphasizing the role of cognitions in emotions (e.g. Barrett, 2016; Lazarus, 1991), the consistent finding that the valence of affective processes was associated with the valence of self-talk further supports the inherent relationship between spontaneous self-talk and affective processes. Because this is true for studies that were based on the distinction between spontaneous and goal-directed self-talk (Boudreault et al., 2019; Latinjak et al., 2017; Latinjak et al., 2020) and those that were not (e.g. Conroy & Metzler, 2004; Hardy, Hall, et al., 2001; Zourbanos et al., 2009), this suggests that studies focusing on the valence of self-talk primarily reflect spontaneous self-talk.

Importantly, some studies also revealed the existence of inverse relationships between the direction of valence of self-talk and the direction of valence of affective processes (De Muynck et al., 2020; Hardy, Roberts, et al., 2009; Latinjak, Viladrich, et al., 2016; Zourbanos et al., 2009). Complimentary to studies showing that self-talk classifications made by athletes themselves may differ from those done by researchers (Latinjak et al., 2017; Van Raalte et al., 2014), these

findings point to the importance of taking the idiosyncratic interpretation of self-talk into account (Hardy, 2006; Latinjak, Hatzigeorgiadis, et al., 2019). Thus, in some instances, positive self-talk about winning the upcoming competition may be accompanied by worries about losing, while negative self-talk may be used for motivational reasons, leading to a change in the emotional state (Boudreault et al., 2018; Hardy, Hall, et al., 2001). At the same time, however, these findings may also indicate a potential ambiguity between the content and functions in previous self-talk classifications (Hardy, Gammage, et al., 2001). It is possible that some positively valenced self-talk subscales actually describe specific self-talk functions (Karamitrou et al., 2020). This could explain the existence of inverse relationships between valence of self-talk and affective processes. For example, the positive associations between the subscales Instruction and Anxiety-control of the Automatic Self-talk Questionnaire in Sports and anxiety (Latinjak, Viladrich, et al., 2016; Zourbanos et al., 2009) could indicate that the Instruction and Anxiety-control subscales represent goal-directed self-talk that athletes use to deal with anxiety.

The analysis of the spontaneous self-talk content points to the diverse psychological challenges athletes experiences during their Sport involvement (Boudreault et al., 2018, 2019; Latinjak et al., 2014, study 1; Latinjak et al., 2020). In that sense, spontaneous self-talk may reveal underlying intrapersonal (e.g. high own performance expectations), but also interpersonal (e.g. high performance expectations of coach) aspects related to athletes' emotional experience (Latinjak, Hatzigeorgiadis, et al., 2019; Van Raalte et al., 2016). For example, rumination, which has been identified as a specific spontaneous self-talk content in emotional situations (Boudreault et al., 2018), refers to perseverative, past-oriented thoughts that focus on negative events (e.g. an own mistake) and associated feelings (Nolen-Hoeksema, 1991). Rumination has been associated with athletes having a higher likelihood of experiencing clinical levels of depressive symptoms (Tahtinen et al., 2020), which is consistent with much research in clinical psychology (Nolen-Hoeksema et al., 2008). Moreover, rumination has been linked with the tendency to focus on problems instead of taking actions (Kröhler & Berti, 2019), which may explain why rumination predicts performance decrements in high-pressure situations (Kinrade et al., 2015). In line with attentional control theory (Eysenck et al., 2007), one explanation for this performance decrement may be that stimuli with high emotional significance to the individual (e.g. an own unnecessary mistake leading to impending defeat) may divert attention from task-relevant stimuli. The importance of rumination notwithstanding, it should be acknowledged that rumination does not occur exclusively in the form of self-talk, but also in non-verbal forms of inner experience (Hurlburt & Akhter, 2006). Yet, the example of rumination indicates how a specific self-talk content can shed light on the effects of the interplay between self-talk and affective processes on mental health and sports performance as key sport psychological topics.

### *Goal-directed self-talk and affective processes*

Both those studies that distinguished between spontaneous self-talk and goal-directed self-talk (e.g. Boudreault et al., 2019; Fritsch et al., 2020; Latinjak et al., 2017) and those that did not, but focused on the functions of self-talk (e.g. Martinent et al., 2015; Miles & Neil, 2013; Neil et al., 2016), showed that athletes use self-talk with the aim of regulating affective processes. These findings suggest that studies focusing on the functions of self-talk primarily reflect goal-directed self-talk. However, the available evidence does not allow us to draw conclusions about the effectiveness of goal-directed self-talk for emotion regulation. One theoretical framework that might allow for a better understanding of how the different self-talk functions (e.g. motivational, instructional, rational) influence affective processes in sports is the sport-specific temporal influence model of emotion regulation (Beatty & Janelle, 2020), which is based on the process model of emotion regulation (Gross, 1998). This model distinguishes between time abundant pre- and post-phases before and after a competition and the time constrained active performance phase during a competition. Moreover, within the time constrained active performance phase

during a competition, situations are divided into involving self-paced (e.g. free throw in basketball) or externally paced tasks (e.g. return in tennis) and those with high predictability (e.g. playing in good weather conditions) or low predictability (e.g. playing in bad weather conditions).

According to temporal influence model of emotion regulation, cognitive demanding emotion regulation processes are effective during pre- and post-phases, but also during active phases when athletes have much time and control over task performance (Beatty & Janelle, 2020). Following this rationale, rational self-talk as a cognitive demanding strategy seems promising in these phases, as it can have lasting effects by changing the emotional interpretation of the situation (Gross, 1998). In contrast, it assumed that in situations where substantial cognitive resources must be devoted to the task at hand, less cognitively demanding cognitive emotion regulation processes, which focus on task-relevant stimuli, may be more effective (Beatty & Janelle, 2020). In this regard, consistent with the potential of self-talk to regulate one's attention (Hatzigeorgiadis & Galanis, 2017), particularly instructional self-talk directing the focus on task-relevant stimuli seems helpful in these situations. Besides considering contextual factors such as the time point in the competition or the nature of the sport, the influence of different goal-directed self-talk functions may also depend on the temporal course of the emotion itself. For example, when a mistake is made, instructional self-talk that directs the focus on task-relevant stimuli ('focus on the next point') may prevent emotions from occurring, pointing to the proactive influence of goal-directed self-talk (Van Raalte et al., 2016). However, especially during the active performance phase, it seems almost impossible to avoid emotions entirely (Beatty & Janelle, 2020). Thus, particularly in instances of intense debilitative emotions, motivational self-talk ('you can still win') can reactively promote facilitative emotions and confidence (Latinjak, Hatzigeorgiadis, et al., 2019). Moreover, consistent with studies that showed how self-talk may help interpret anxiety in a facilitative manner (Cheng & Hardy, 2016; Hatzigeorgiadis & Biddle, 2008; Neil et al., 2011), this shows how goal-directed self-talk does not necessarily alter affective processes, but helps to deal with them (Latinjak, Hatzigeorgiadis, et al., 2019).

### *Strategic self-talk and affective processes*

In contrast to the vast amount of studies indicating that self-talk interventions have a positive effect on sport performance (Hatzigeorgiadis et al., 2011), this review revealed only six studies involving a self-talk intervention on affective processes. All of these studies exclusively examined whether a self-talk intervention could reduce anxiety symptoms. The results from these studies showed that strategic self-talk could reduce anxiety, but sometimes only the cognitive and sometimes only the somatic component. Thus, no clear conclusions can be drawn. Findings from qualitative studies in this review indicate that athletes also use strategic self-talk for affective processes other than anxiety (Cotterill et al., 2010; Devonport, 2006; Thelwell & Greenlees, 2003), highlighting the general need in sport psychology of moving away from the main focus on anxiety only (Hanin, 2007).

Various theoretical approaches such as flow theory (Csikszentmihalyi, 2013), reinvestment theory (Masters & Maxwell, 2008), theory of ironic processes of mental control (Wegner, 1994), or self-regulation theory (Carver & Scheier, 1990) may help to understand the effectiveness of conscious cognitive strategies, like strategic self-talk, to influence one's behaviours and feelings. In line with flow theory (Csikszentmihalyi, 2013), the experience of flow as a psychological state in which individuals are absorbed in the current activity might be disrupted by the use of strategic self-talk (Boudreault et al., 2018). In this regard, much research indicates the negative effects of an inwards focus of attention (Wulf, 2013), which could be involved in cue words focusing on the execution of a task. In the same vein, reinvestment theory postulates that conscious cognitive strategies may interfere with movements performed at a high level of automaticity, emphasizing, at the same time, the role of personal and situational moderators (Masters & Maxwell, 2008). For example, considering the

familiarity with a task as a situational moderator, research generally shows that strategic self-talk is more effective for novel than for well-learned tasks (Hatzigeorgiadis et al., 2011). Potential counterproductive effects of strategic self-talk can also be explained by the theory of ironic processes of mental control (Wegner, 1994). According to this theory, conscious strategies to suppress an undesirable mental state (e.g. the experience of anxiety) can actually reinforce that very mental state. This assumption is supported by the qualitative finding that for athletes prone to a debilitative interpretation of anxiety, the use of strategic self-talk may have counterproductive effects (Hanton et al., 2005). Finally, a central assumption of self-regulation theory is that individuals use cognitive strategies when they detect a discrepancy between their current state and their intended state with negative affect being an indicator of such a discrepancy (Carver & Scheier, 1990). The importance of considering the bi-directionality between the conscious use of self-regulation strategies and affective processes is shown by the positive correlation between trait anxiety and self-talk strategy frequency (Burton et al., 2013). To sum up, these theoretical approaches can help understand the mixed effects of strategic self-talk interventions in terms of their potential for emotion regulation and point to the importance of considering both personal (e.g. trait anxiety) and situational factors (e.g. familiarity with task) for the effectiveness of self-talk interventions (Van Raalte et al., 2016).

### *Applied implications*

The identification of organic self-talk as an own self-talk entity has led to the development of reflexive self-talk interventions, which have been shown to be helpful for emotion regulation (Latinjak, Font-Lladó, et al., 2016; Latinjak, Hatzigeorgiadis, et al., 2019). A central difference to strategic self-talk interventions, in which athletes use pre-determined cue words (Hatzigeorgiadis et al., 2011), is that in reflexive self-talk interventions first athletes' organic self-talk is identified (Latinjak, Hatzigeorgiadis, et al., 2019). The identification of one's spontaneous self-talk may help to recognize psychological challenges typical for an athlete (e.g. getting easily frustrated when losing many points in a row). Based on the awareness of how one typically reacts to such situations, the goal is then to enhance athletes'self-regulatory skills. If self-talk is identified as a functional self-regulatory strategy for an athlete, reflexive self-talk interventions aim to provide flexibility in the choice of cue words to be used and the situations when to use them. This rationale is again different from strategic self-talk interventions where content and context of cue words are typically determined before the sport involvement (Hatzigeorgiadis et al., 2011).

Elements of reflexive self-talk interventions can be related with various psychotherapeutic approaches such as cognitive therapy (Beck, 1976), rational emotive behaviour therapy (Ellis, 1957), or acceptance commitment therapy (Hayes et al., 1999) that have received increasing attention in sport psychology (Jordana et al., 2020; Noetel et al., 2019). For example, according to cognitive therapy, individuals are often not aware about their automatic thoughts associated with their emotional experience (Beck, 1976). Thus, similar to reflexive self-talk interventions, the aim of cognitive therapy would be for an individual to identify these automatic, emotionally thoughts, and replace dysfunctional thoughts with more functional ones. Rational emotive behaviour therapy puts the focus on rational and irrational beliefs as central mediators of associated emotions and behaviours (Ellis, 1957). The analysis of spontaneous self-talk (e.g. 'if I don't win today, this will be the end of the world'), typically conducted as the first step of reflexive self-talk interventions (Latinjak, Hatzigeorgiadis, et al., 2019), can help identify irrational performance beliefs associated with dysfunctional emotions and behaviours. Consequently, a core feature of rational emotive behaviour therapy is then to challenge irrational performance beliefs and adopt more rational beliefs (Jordana et al., 2020). Finally, acceptance and commitment therapy, also referred to as part of the so-called third wave of cognitive–behavioural therapies, includes the concepts mindfulness and acceptance (Hayes et al., 1999). Unlike previous approaches that attempt to replace dysfunctional with functional psychological processes (e.g. spontaneous self-talk and associated emotions), through

mindfulness and acceptance, this approach fosters awareness of these psychological processes in a non-judgemental and non-reacting manner. While this approach seems incompatible with strategic self-talk interventions with the repetition of predetermined cue words as the key feature, a central element of reflexive self-talk interventions is the creation of awareness (Latinjak, Hatzigeorgiadis, et al., 2019). In addition, the outcome of a reflexive self-talk intervention does not necessarily imply the promotion of goal-directed self-talk. In fact, by using reflexive self-talk interventions athletes can learn to respond to their organic self-talk in a non-judgemental and non-reactive manner.

### *Limitations and future directions*

The distinction between organic, goal-directed and spontaneous, self-talk and strategic self-talk allowed for a systematic classification of the available evidence on the relationship between self-talk and affective processes in sports in this review. However, it is important that a classification into different psychological processes always comes with a simplification of reality. In nature, when looking at the human brain, it becomes apparent that the neural networks underlying the constructs commonly used in psychological research have a myriad of interactions (Lindquist & Barrett, 2012). Moreover, the post-hoc classification of studies in this review into organic and strategic self-talk should also be considered with caution. Although it was relatively easy to decide from the study descriptions whether or not the self-talk was based on a plan before the sport involvement or not, the lack of control measures in most studies means it cannot be ruled out that, for example, in studies classified as organic self-talk, some of athletes' self-talk was predetermined and therefore strategic self-talk. Another limitation is the disregard of grey literature, which carries a potential publication bias (Hopewell et al., 2007). However, because the aim of the review was not to address an explicit research question (e.g. can self-talk interventions reduce anxiety?), we chose not to include studies of grey literature, since they often do not contain sufficient information for determining the level of confidence in their findings (Gunnell et al., 2020).

In light of the present findings, several suggestions for further research are made. First, the new perspectives introduced into the self-talk literature appear suitable for a more systematic approach when studying the relationship of self-talk with other psychological constructs (Latinjak, Hatzigeorgiadis, et al., 2019; Van Raalte et al., 2016). A-priori labels of the used self-talk constructs would facilitate the pooling of knowledge and increase the correspondence between different studies. Second, it appears fruitful to integrate theoretical considerations from emotion theories (e.g. Beatty & Janelle, 2020; Gross, 1998; Scherer, 2009) as well as self-regulation theories (e.g. Carver & Scheier, 1990; Masters & Maxwell, 2008; Wegner, 1994) that may foster our understanding of how spontaneous self-talk is associated with affective processes as well as how goal-directed and strategic self-talk is related with emotion regulation. Third, with regards to the effects of strategic self-talk on affective processes, research could particularly benefit from considering personal and situational moderators and from shifting the current dominant focus on anxiety to other affective processes (Van Raalte et al., 2016). Finally, from a methodological perspective, it seems important to employ study designs that allow accounting for athletes' self-talk interpretation (e.g. Boudreault et al., 2018; Latinjak et al., 2017), focus on aspects other than the self-talk content (e.g. automaticity, underlying neural networks), and to use control measures that help to assess whether or not self-talk is predetermined.

## Conclusions

The wide range of theoretical frameworks identified in studies using qualitative and quantitative methods indicates that the relationship of self-talk and affective processes is linked to diverse sport psychological topics. Based on the distinction between organic and strategic self-talk, the present scoping review provides a comprehensive overview of existing literature on the relationship between self-talk and affective processes in sports. On the one hand, for organic self-talk, research has been relatively consistent in pointing to the inherent relationship between spontaneous self-talk and affective processes. At the

same time, the potential of goal-directed self-talk for the regulation of affective process was shown, whereby a more theory-driven approach is needed to assess the effectiveness of the different self-talk functions. On the other hand, the evidence regarding the potential of strategic self-talk to regulate affective processes is rather limited to studies focusing on anxiety. To further advance our understanding about the relationship between self-talk and affective processes, we encourage future research to consider recent developments in the self-talk literature as exemplified in this review.

## Note

1. Because the studies Conroy (2004) and Conroy and Metzler (2004) included the same sample, the sample was counted only once.

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An asterix (*) indicates articles that are included in the review.

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