**Title**

# Reframing self-talk in endurance sports using grammatical taxonomy

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# Abstract

In this theoretical paper, we use a linguistic vocabulary to reframe self-talk in endurance sport through a focus on grammatical function. Self-talk often works as *speech acts*, a kind of communicative action, e.g. where a self-talker is using the *imperative mood* to accomplish some goal with respect to herself (Come on!). Auxiliary modal verbs work across three main types of utterances: *Deontic modality* involving permission and obligation; *dynamic modality* involving ability and willingness; *epistemic modality* involving probabilistic judgements. In self-talk, these all function to establish a hypothetical domain for further reflection. Self-distance can be negotiated using 1$^{st}$ and 2$^{nd}$ *person pronouns* (I/you) and *spatial demonstratives* (this/that). Sentiment is communicated using *adjectives*, while *negation* may yield a means for impulse control. We can *question* our own utterances and use *interjections* to communicate surprise. These are all vital mental tools in endurance sports and an increased awareness of their functions in self-talk research will likely yield better self-talk interventions and lead to better performance for athletes.


**Keywords:** self-talk; inner speech; language; grammar; endurance sport

# 1 Introduction

Self-talk is one of the most salient techniques for mental training used by athletes (Behnke, et al., 2019). A large body of research has investigated the effects of self-talk on performance in sports (e.g. Latinjak & Hatzigeorgiadis, 2020), but these studies rarely use tools from linguistics to study the phenomenon. One illustrative example is the commonly cited category of motivational self-talk (Hatzigeorgiadis et al., 2011, 2018; Theodorakis et al., 2000). In a study of marathon runners, Van Raalte and co-authors (2015) found a distinction between motivational self-talk with a positive valence, exemplified with the utterance *I can do it!*, and motivational self-talk with a negative valence, exemplified with the utterance *Don't be a wimp, this isn't hard!* Seen from a linguistic perspective, these two utterances do not only differ in their emotional valence. The first example contains the modal auxiliary verb *can*, which modifies the main verb *do*, while the other sentence has no modal verb. Furthermore, in the positive statement the self-talker is addressing herself using a 1st person pronoun *I*. No pronouns are used in the negative example. Instead, the verb *be* is in the imperative mood, which implicitly has a 2nd person addressee (*you*). It is also striking that the motivation is expressed through negation (*Don't…*), followed by another negated sentence, this time in the indicative mood (*This is not…*) with a proximal demonstrative (*this*) coupled with an adjective (*hard*). Might it be that these different grammatical constructions reveal something about the utterances which makes it worthwhile to investigate how grammar plays out in self-talk during sport? In this paper we suggest that they do.

It has previously been argued that a focus on grammatical form in the study of self-talk in sports would be beneficial for understanding the phenomenon, but this line of reasoning has not been elaborated extensively (Van Raalte & Vincent, 2017; Van Raalte, et al., 2016). In this article, we point to a number of areas where looking at the grammatical features of self-talk will extend the vocabulary for research and potentially make categorization of self-talk statements more precise. It is not meant to be an exhaustive

overview of how grammar and self-talk are interconnected. Rather, we focus on the areas where we see an immediate gain from thinking about linguistic structure. The foundation for venturing into this field is the assumption that natural other-directed language and self-directed language are in most respects fundamentally alike (Frankish, 2018; Langland-Hassan, 2018; Martínez-Manrique & Vicente, 2015), although they also differ in some respects, such as the necessity for having an external auditory or visual component. They are assumed to both have fundamentally the same structure and vocabulary and thus the same possibilities and restrictions. These restrictions, we argue, have to do with both the development of the particular spoken language (e.g., English versus Spanish), but also with the adaptation to the human cognitive system. Linguistic communication both extends cognition (Sutton, et al., 2010; Tylén, et al., 2010) and may be limited by it (Danziger & Pederson, 1998; Levinson, 2003, p. 153). Language is thus, both in structure and in content, a window into the mind of the speaker (Pennebaker, 2017; Tylén, et al., 2010; Wallentin & Trecca, 2023), regardless of whether this language is other- or self-directed.

Our "one system" view is in contrast with some theories of inner speech (e.g. Alderson-Day, et al., 2018; McCarthy-Jones & Fernyhough, 2011), which suggest that inner speech is fundamentally distinct from outer speech in certain respects, in particular in the observation that it can be more condensed in form and meaning. The condensed nature of inner speech has been used to argue that it follows different rules than outer speech (Grandchamp, et al., 2019; Wiley, 2006). Here, however, we will argue, that this is probably only true on the surface. Outer speech is often condensed too. Whenever possible, we use short-hand descriptions to communicate. Spatial demonstratives (*this/that/here/there*) and personal pronouns (e.g. *I/you/it*) are examples of such markers that may stand in for extended meaning (*There it was!)*, provided that interlocutors have common ground for unpacking the condensed meaning (Clark, et al., 1983).

## 1.1 What is self-talk?

The term self-talk has been used to describe verbalizations addressed to the self, overtly or covertly (Latinjak et al., 2019). These verbalizations may occur both spontaneously or intentionally and be used strategically to achieve performance-related outcomes. They may also in some cases be experienced to have the opposite effect. Self-talk can be distinguished from other types of thoughts that have no linguistic structure (Hardy, 2006). It can also be differentiated from experience, imagination or hallucination of other people's voices talking to you or someone else. Self-talk must by definition be experienced as the self talking, not just listening. It thus involves some form of articulation whether real or simulated (Tian et al., 2016; Tian & Poeppel, 2012). Self-talk could also potentially be set apart from linguistic utterances which are addressed to other individuals than the self (Dickens, et al., 2018). Internal (i.e. unspoken) utterances towards others, e.g. team members or opponents, would not qualify as self-talk under this definition. Here, however, we will argue otherwise. Any utterance can have multiple addressees, and the linguistically defined addressee (e.g., *you*) is far from always the intended addressee (e.g., one may praise or criticize someone to satisfy a bystander or make them jealous). When addressing someone else using inner speech, the intended addressee must pragmatically speaking be the self. It cannot be anyone else. We will therefore argue that all inner speech is self-talk. Indeed, all outer speech may also have an element of self-talk to it since the self is always listening in on its own utterances.

## 1.2 What is self-talk for?

### 1.2.1 Spontaneous, goal-directed and strategic self-talk

In the self-talk literature, a distinction is often made between *spontaneous* and *goal directed self-talk* (Latinjak, et al., 2020b). Spontaneous self-talk is described as the reflection of some physiological (*I am tired!*) or psychological process (*I want to win!*) (Latinjak, et al., 2014), whereas goal-directed self-talk is described as an attempt to control the spontaneous processes (*Don't get too tense*). Later we will argue why it may not be coincidental that

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negation occurs in an example of goal-directed self-talk, such as the one cited above. Control may also sometimes be attempted from outsiders, such as coaches or self-talk psychologists, who may introduce athletes to particular ways of talking to themselves in order to reach a goal. This type is often called *strategic self-talk* (Galanis, et al., 2022).

The possibility for self-cueing (Ziegler, 1987), which is at the heart of strategic self-talk, opens up for a fascinating view into the hierarchical nature of cognition. Strategic self-talk can be seen as instructions to the self-talker. If we acknowledge that the instructor could be the self (but in a temporally distinct setting), we notice how self-talk can be dialogic in nature where the self uses itself as an interlocutor and someone to be instructed (Larrain & Haye, 2012). The first place where goal-directed and strategic self-talk may (or may not) have an impact is in a confrontation with non-verbal processes (e.g., emotion). As mentioned, these are the processes that lead to the production of spontaneous self-talk (e.g., *I am anxious)*, and it is these processes which the use of goal-directed or strategic self-talk is an attempt to control. In this way, the distinction between goal directed/strategic and spontaneous self-talk becomes a distinction between voluntary and involuntary reflections of underlying processes, between top-down and bottom-up self-talk (Van Raalte et al., 2019). This distinction mirrors the distinction in dual-process approaches to cognition (Evans, 2003; Frankish, 2018; Van Raalte, et al., 2016), which is also mirrored in English grammar as the distinction between grammatical subject and object (e.g. *I* and *me*), which prototypically denote the agent and the recipient of an action. Utterances not only describe actions, they are a kind of action (called a speech act) that speakers use to cause a change in the listener (Austin, 1962; Levinson, 2017). Using a self-directed speech act, *I* may be able convince *myself* to keep running. The utterance *I can keep going* thus performs the action of manipulating my belief about whether I can keep going or not. Another way of framing the difference between spontaneous and goal-directed self-talk may thus be that during spontaneous self-talk, the talker informs herself about current physiological processes (*I am*

*tired*), while goal-directed/strategic self-talk is an attempt to control the same processes (*Don't give up!*). Spontaneous self-talk may therefore be classified according to its information content, e.g. emotional valence (*I am the best/worst*), whereas goal-directed/strategic self-talk may be described according to the controlling effect it is trying to obtain, e.g. on motivation, technique or performance (Latinjak, et al., 2020b). In competitive settings, the different types of self-talk have been found to follow one-another as in a kind of dialogue between spontaneous and goal-directed voices (Latinjak, 2018).

### 1.2.2 Motivational vs. instructional self-talk

When using self-talk to achieve goals, it is often reported that athletes use self-talk for motivational and instructional purposes (Hardy, 2006; Hardy, et al., 2015) with motivational self-talk, according to the matching hypothesis, being more important for endurance sports while instructional self-talk is more important for more technical types of sports (Hatzigeorgiadis et al., 2004; Nedergaard et al., 2021; Theodorakis et al., 2000). A detailed linguistic description of the two types of self-talk is lacking, but examples of instructional self-talk include: *elbow straight*, *stay low, move your feet* while examples of motivational self-talk could be: *You can do it! Hang in there,* and *Get tough!* Due to our focus on endurance sport, we will concentrate on motivational self-talk in this paper.

Laboratory tests have investigated whether motivational self-talk improves endurance performance (Blanchfield, et al., 2014). Participants cycled at 80 % of their peak power output (a strenuous workload sustainable for approximately 10 minutes). One group was instructed to identify and use motivational self-talk involving two statements in the early-to-mid stages of the cycling (e.g., *Feeling good*), and two statements used when near exhaustion (e.g., *Push through this*). The group who was instructed to use self-talk increased their performance with 18 % from pre- to post intervention, while a control group saw a minute improvement. Real world studies of endurance have yielded mixed results. Some studies found that self-talk interventions made participants run or cycle faster (Barwood, et al., 2015;

Cooper, et al., 2021). However, a study of ultramarathon runners was unable to show such an effect (McCormick, et al., 2018), although participants reported finding the intervention helpful. Apart from a small sample size, the fact that most runners already prior to interventions use self-talk, in a more or less goal-directed/strategic manner (see below), may help to explain why there is sometimes no effect. The work-book approach (Barwood, et al., 2015; Blanchfield, et al., 2014; Thelwell & Greenlees, 2001) used in these studies may offer an additional explanation. This method requires participants to identify motivating self-talk statements themselves and does not prescribe any analysis of the linguistic content or structure of these statements. Further scrutiny of the actual language used by participants and its grammatical and semantic content might prove useful for understanding the variability in results.

### 1.2.3 Association vs. dissociation

Self-talk plays an important role in maintaining attention on a straining or boring task (Nedergaard, et al., 2023). *Association* is when athletes focus their thoughts on the ongoing activity, including bodily sensations such as their heart rate, breathing, temperature, and muscle fatigue, whereas *dissociation* refers to when exercisers direct their attention away from these sensations due to unpleasantness or distraction (McCormick & Hatzigeorgiadis, 2019).

At a low intensity and lower ratings of perceived exertion, runners (Aitchison, et al., 2013), cyclers (Hutchinson & Tenenbaum, 2007) and rowers (Tenenbaum & Connolly, 2008) report more spontaneous dissociative thoughts, while at a high intensity they report more associative thoughts. Again, an obvious question is whether there are identifiable structural differences in the language used for associative and dissociative self-talk. Further studies are needed to answer this question.

## 1.3 How prevalent is self-talk?

The prevalence of self-talk can be studied and quantified in multiple different ways. Some researchers have claimed that more or less all people have inner speech (Archer, 2000, p. 193; Winsler, et al., 2006) all the time (Baars, 2003). Indeed, there is a long tradition both within linguistics and philosophy to assume that thought is linguistic (Humboldt, 1827, p. 62; Kompa, 2023; Whorf, 1956, p. 252). These claims, however, are widely disputed. One line of evidence comes from descriptive experience sampling studies where participants are prompted at random intervals to report on the form and content of their mental states (Hurlburt & Akhter, 2006). These studies have revealed a large variability in the frequency of inner speech for particular individuals at particular timepoints, ranging from zero to close to 100%, with a mean of about 23% of sampled moments (Heavey & Hurlburt, 2008). Other methods have estimated the frequency of interior monologue to be much higher, as high as 75% of samples (Klinger & Cox, 1987). This discrepancy may be at least partly related to how experiences are sampled. As an analogy, one could consider respiration. If you sample respiration in very brief time intervals (e.g., for one 10$^{th}$ of a second), you could reach the conclusion that respiration is not omnipresent in living organisms. You will find many instances where the participant does not seem to breathe. However, once you extend your sample beyond the natural respiration frequency, you will find that respiration is a continuous phenomenon. Along a similar vein, it is a fact that natural speech evolves over stretches of time, with shorter or longer breaks in-between, where the talkers "gather their thoughts". It may thus be that self-talk frequency is underestimated if people are asked to report on momentary experiences only. On the other hand, internal speech frequency may be over-estimated if participants are asked to report on longer periods, such as hours or days. Nevertheless, it is probably safe to say that most people engage in self-talk from time to time, mostly in the form of inner speech, when not engaged in actual dialogue. Self-talk and inner speech have been found to be tightly linked to a number of cognitive processes, such as

working memory and maintaining attention (Nedergaard, et al., 2023; Nedergaard, et al., 2022b), processes which are also important for endurance sports (Brick, et al., 2016).

### 1.3.1 Self-talk frequency in sports

Studies have found that most athletes use internal rather than external self-talk (≈80-90 % of self-talk was reported to be internal or muttered, Hardy, et al., 2005) and that most self-talk statements have positive valence (≈60%) and make use of whole phrases or sentences (≈ 75%, Hardy, et al., 2005). Self-talk was found to be used more in competition than during practice (Hardy, et al., 2005). It was also found that individual sport athletes, such as runners, use self-talk more frequently than their team sport counterparts (Hardy, et al., 2004; Hardy, et al., 2005; but see Nedergaard, et al., 2021 for contrasting findings). An early study among a small group of elite gymnasts found that self-verbalizations and certain forms of mental imagery seemed to differentiate the best gymnasts from those who failed to make the Olympic team. "Talking to themselves extensively during training and competition" was positively correlated with performance while "less successful gymnasts seemed to arouse themselves into near-panic states by self-verbalizations" (Mahoney & Avener, 1977). Later studies have also found positive effects of randomized control-trials using self-talk interventions on performance in swimming (Hatzigeorgiadis, et al., 2014). Other studies did not found an effect of skill-level (Hardy, et al., 2005). A meta-analysis concluded that a positive effect could be observed (Hatzigeorgiadis, et al., 2011), but concluded that the effect was largest for sports which involved fine-motor control rather than gross-motor control.

### 1.3.2 Frequency of self-talk in endurance sport

Studies have documented that the vast majority (70-90%, see Figure 1) of endurance athletes report making use of self-talk during training and competition (Anstiss, et al., 2020; Nedergaard, et al., 2021; Van Raalte, et al., 2015).
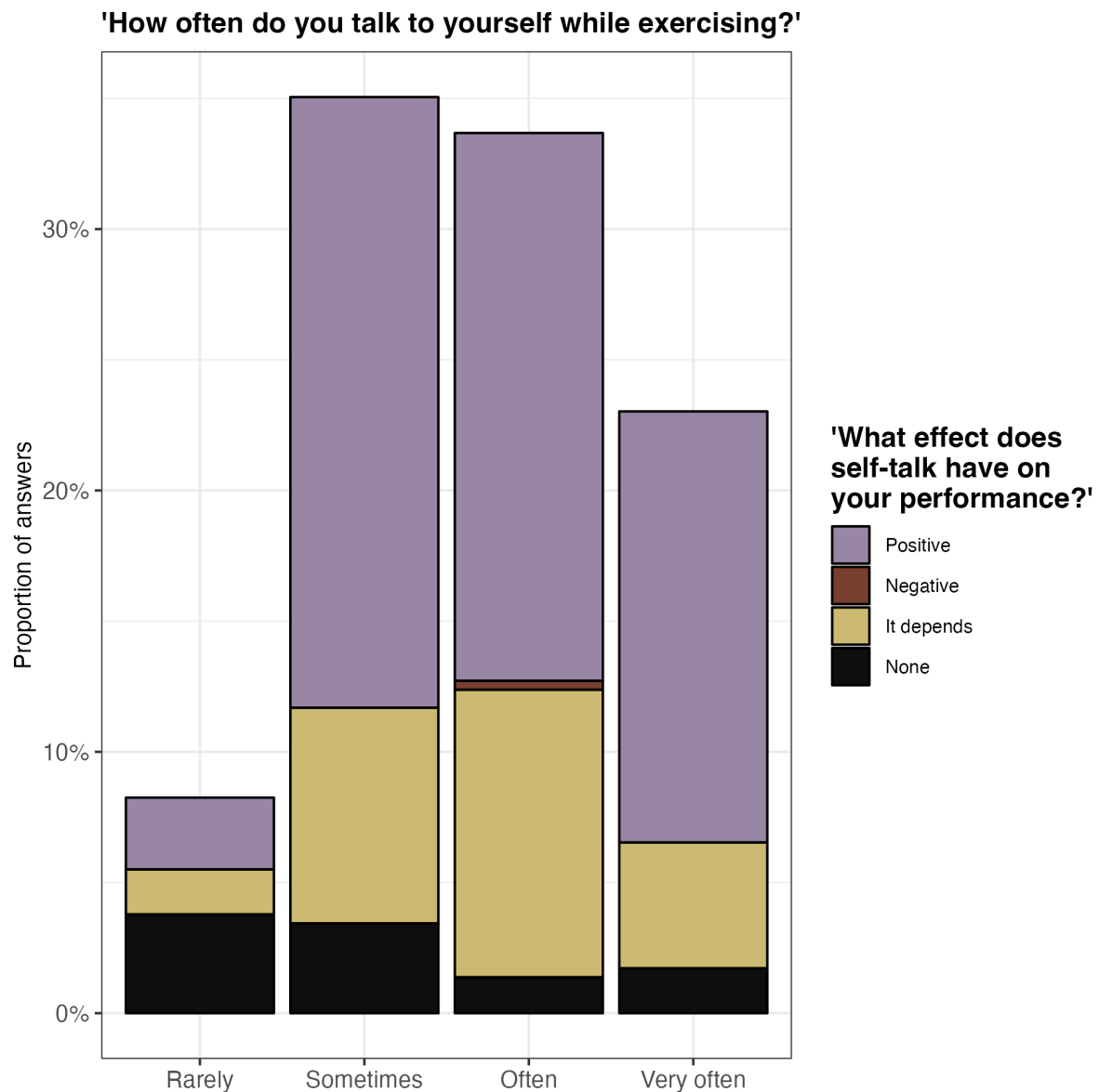
**'How often do you talk to yourself while exercising?'**

*Figure 1*. *In a survey of 267 long distance runners, more than 90 percent reported talking to themselves to some degree (sometimes, often or very often) during running, and most reported it having a positive effect. Figure adapted from Nedergaard et al. 2021.*

Due to the nature of endurance sports where shortness of breath limits the possibility and potential positive effects of overt self-talk, we assume that most reported self-talk is internal. A study (Nedergaard, et al., 2021) found that the content of self-talk, as measured with a version of the Automatic Self-Talk Questionnaire for Sports (Zourbanos, et al., 2009), was predictive of best running time in long-distance running. We also found that interfering with self-talk using verbal interference (Nedergaard, et al., 2022b), causes participants to

cycle slower on an exercise bike compared to a non-verbal interference task (Nedergaard, et al., 2022a). This suggests that spontaneous and/or goal directed self-talk is a causal factor in endurance sports.

In the following, we look into the linguistic properties of self-talk in order to shed light on the details and variability of the phenomenon.

## 2 Reframing self-talk through grammatical categories

Languages are adaptive systems used for human communication. They are constantly evolving, and huge variability thus exists between languages (Evans & Levinson, 2009). In the following, we will focus on some overarching grammatical principles with a focus on English. The examples provided are hypothetical self-talk utterances. However, most of them should be recognizable to endurance athletes. The examples may not be directly translatable across all the world's languages, but as we will try to argue, they are related to language-independent cognitive parameters which any language needs to be able to communicate.

### 2.1 Verbs and nominals

Verbs and nominals are among the most fundamental categories in cognitive theories of grammar (Langacker, 1987, 2013). Nouns prototypically designate objects that reside in space (e.g. the body), while verbs designate energetic actions (*to run*, *jump*) or interactions (*to compete, fight*) that unfold in time, dependent on the objects (Langacker, 1987, 2013). Nouns, however, may also be used to conceptualize non-material objects and events as static entities (*an event*, *a run*), while verbs may be used to point to the dynamic potential of otherwise static objects (e.g., *to leg it*). If we assume that part of the function of self-talk is to focus and maintain attention on particular external and internal processes and objects (Nedergaard, et al., 2023), then knowledge about this distinction is beneficial, because awareness of the right grammatical forms and constructions will allows an athlete to flexibly

and strategically use self-talk to frame and attend to desired elements of their sport before, during or after training and competition.

## 2.1.1 Verbs

Verbs prototypically denote, as mentioned, energetic actions and interaction between agents and objects in the course of events. The semantic domains that verbs relate to are not in themselves material but consist of change and transfer of energy. The events depicted by verbs reside primarily in time and are temporally bounded (Langacker, 2013, p. 104). Events, actions and expenditure of energy are central to sports and it is therefore hardly surprising that verbs are central when talking about sports, both in self-talk and dialogic communication. In self-talk, the verb may be the only needed linguistic element if the task is to maintain attention on a difficult or straining task (*Focus! Go! Run! Breathe!*).

### *2.1.1.1 Verb tense (present, past, future)*

Verbs can be further characterized by their tense, which is a subdivision of their temporal perspective. We use verbs to talk about events in the past (*I did it*), the present (*I am doing it*) and the future (*I will do it*). These different temporal relations make an important difference in self-talk (and everywhere else). Future tense plays a key role in planning. Using the future tense means that the self-talker is involved in predicting the future, setting goals and committing these goals to memory. Present tense is prototypically used for the present. This includes describing and maintaining the current continuous situation (*I am doing it*) or narrating previous or future events as though they were here and now (*I was at this race and I take the lead*). The past tense has its prototypical functions in recollection and evaluation (Figure 2). This distinction is parallel to some studies of self-talk where self-talk items are categorized as either anticipatory or retrospective (Latinjak, et al., 2020a; Latinjak, et al., 2017), albeit often not based on transparent linguistic criteria.

**VERB TENSE**



*Figure 2*. *Verb tense allows the self-talker to focus on the future, the present or the past. Each focus predominantly supports a different kind of self-talk: Future tense is for planning, present tense for maintaining, past tense for evaluation.*

*2.1.1.2 Mood and modality*

Self-talk utterances during sport most often serve a function of trying to bring about some desired state or action which does not yet exist (e.g., improved performance). Modal expressions (*I can do it!*) play a key role in verbalizing the relationship between the speaker and hypothetical events and objects. Modality differs from tense in that it does not refer directly to any characteristic of the event, but rather to the status of the utterance itself (Palmer, 2001, p. 1). Grammatical mood and modality in general are used to negotiate a number of different relations between the uttered proposition and reality and truth, as seen from the speaker's perspective. Modal utterances are non-factual in that they implicitly or explicitly question the truth value, the necessity or the possibility of the described situation (Depraetere & Reed, 2006). Modal expressions may also convey if something is desirable, or permissible.

Modal expressions are central to self-talk as the primary relevance of self-directed talk is to negotiate the aspects of a given situation which are not strictly factual, but instead relate to the talker's perception of the situation and possibilities for change. Following this, we hypothesize that it is more frequent for self-talkers to say to themselves *I can win today*

than to say *I won today*. Not just because victories are rare, but because of the relationship between the self-talker and her knowledge of her own situation. *I can win today* refers to a hypothetical situation while *I won today* refers to a factual situation, which the self-talker in most situations would already know and thus have little reason to inform the self about. Whether this hypothesis can be supported by data remains to be tested.

### *2.1.1.4 Grammatical mood*

In English, there are usually said to be three inflectional moods: the *indicative*, the *imperative*, and the *subjunctive* (Figure 3). They each convey meanings which are captured by the labels *fact-mood*, *will-mood*, and *thought-mood* (Khomutova, 2014).

#### 2.1.1.4.1 The indicative mood

The indicative is the normal mood in English and is used in all ordinary statements and questions. This mood is also often called *realis* in a contrast to *irrealis* which deals with hypothetical situations (Palmer, 2001, p. 5). In self-talk, the indicative mood is used to remind the talker about the state of affairs, whether these are neutral (*I am here, now!*) or marked with a negative (*I am losing*) or positive semantic valence (*I am winning*). The indicative voice can also be used to represent counterfactual situations (e.g., *I wish this run was over*). The indicative part here is the main clause verb *wish*.

Usually, the self-talker does not need to remind herself of where she is and what is going on, as this is supposedly shared information across the compartments of the cognitive system. The indicative mood, however, may serve an important function in both self-directed praise (*I am doing well*) and scolding (*I am a looser*), where the self-talker uses their self-directed utterances to fixate themselves in a particular category or group of contestants (*I am too old for this*). The point of such utterances, however, is not to point out facts, but to point to implicit consequences of these facts (e.g., *I am doing well – so I should keep going*). It thus seems that even utterances in the indicative mood, when uttered as self-talk, relate to some hypothetical state, either a change (*I should quit*) or maintenance (*I should keep going*). They

thus have an element of *irrealis*, i.e., dealing with hypothetical situations. The irrealis mood, we claim, is central to most self-talk. Voicing the elements and consequences of hypothetical situations may improve the possibility for obtaining an imagined goal and/or help in choosing between different actions. Self-talk may thus be a vital tool for maintaining motivation or for reaching a decision through linguistic elaboration.

## 2.1.1.4.2 The imperative mood

An imperative utterance signals that the speaker wants a certain state of affairs to be brought about (i.e., considers it necessary), and directs the addressee to make it happen. Verbs in the imperative mood (e.g. *Look! Go! Help!*) constitute core speech acts (Austin, 1962; Searle, 1969) that not only present information but directly attempt to control the actions of the interlocutor. Imperatives are not always direct orders but may also function as invitations (*Come to the training*!) or suggestions (*Have a great time!*), but common to these are that the speaker is exerting force on the addressee to perform a particular physical, social or mental action. Imperatives are thus by definition motivational utterances. In fact, we hypothesise that imperatives can be seen as the prototypical form of motivational self-talk (*Do it! Come on! Go!*).

## 2.1.1.4.3 The subjunctive mood

The subjunctive mood is used to express doubt, possibility, necessity, desire, and hypothetical time. The English subjunctive is fairly limited in its use. It is mainly found in formal styles (e.g., *Long live the King*) or when stating hypothetical situations (*If I were you…*). The past subjunctive is only distinct from the past indicative for first and third persons singular, which are realized by the form *were*. This type of subjunctive construction can be used by self-talkers in planning (*If I were to do it…*). It offers a more hypothetical and less committed stance than simple future tense (*I will do it*). Using the past subjunctive, the self-talker can construct a hypothetical scenario seen from the future, where she by the use of

the past tense looks back at her situation and reflects on how things will turn out if she were to choose a particular set of actions (*If I were to compete, I could win)*.

Additional variability can be offered, as the example illustrates, if the self-talker uses modal auxiliary verbs, such as *can*, *may*, or *must*, which we will investigate next.
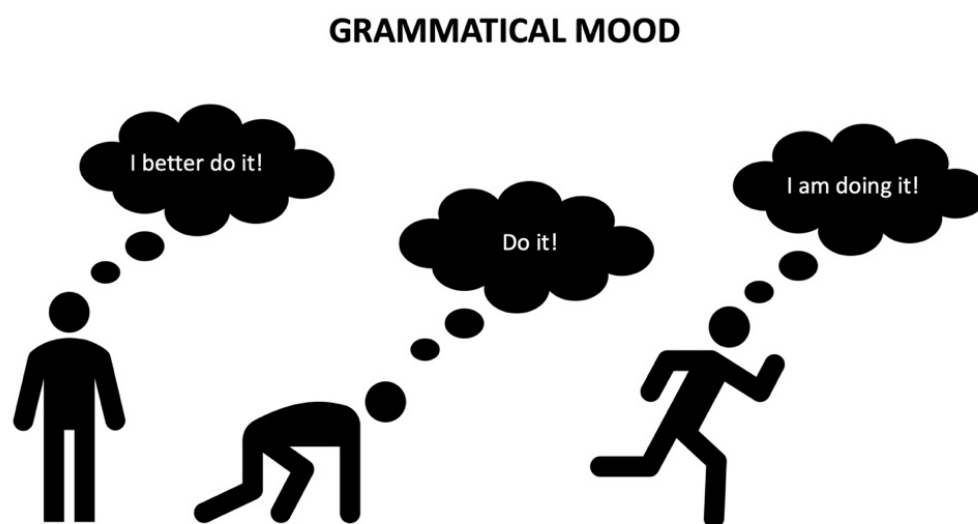
**GRAMMATICAL MOOD**



**Figure 3.** *Grammatical mood in English gives the self-talker the opportunity to focus on an intentional stance about a possible situation (subjunctive mood), on the urge and will to perform some action (imperative mood), the actual situation (indicative mood).*

### 2.1.1.5 Modal verbs

Modal verbs are a small class of verbs used to modulate the meaning of other verbs. A modal auxiliary verb (e.g. *can*, *may*, *must*) gives information about the function of the main verb that it governs. Modal verbs also cause the meaning of the utterance to move into the hypothetical domain (*irrealis*). One type of utterance using modal verbs is related to placing the described situation on a scale of probability ranging from possible (*may*) to necessary (*must*). This type of modality is called *epistemic modality*. If an athlete towards the end of a marathon has overtaken several opponents, she may say to herself: *I must be in the lead!* The meaning being that, according to her estimates, it is most likely that she is in front of the race. The same utterance, however, said before the race, is more likely to reflect *deontic modality*. Here, *I must be in the lead!* most likely reflects that the self-talker feels some sort of obligation to lead the race, due to some real or imagined force acting upon her. Deontic

modality thus relates to obligation and permission (*The others may allow me to lead!*) emanating from an external source (Palmer, 2001, p.9). A third type of modality expressed using modal verbs is *dynamic modality*. This type of modality relates to the ability (*I can win!)* or willingness (*I will win!)* to perform some action (the verb *will* in English has the double function of expressing future tense and dynamic modality). Dynamic modality is also sometimes called *intrinsic modality* to highlight that it involves "*a person's or thing's intrinsic disposition, which has the potential of being actualized*" (Radden & Dirven, 2007, p. 247). Dynamic/intrinsic modality is thus closely related to motivation and as such central to endurance sports.



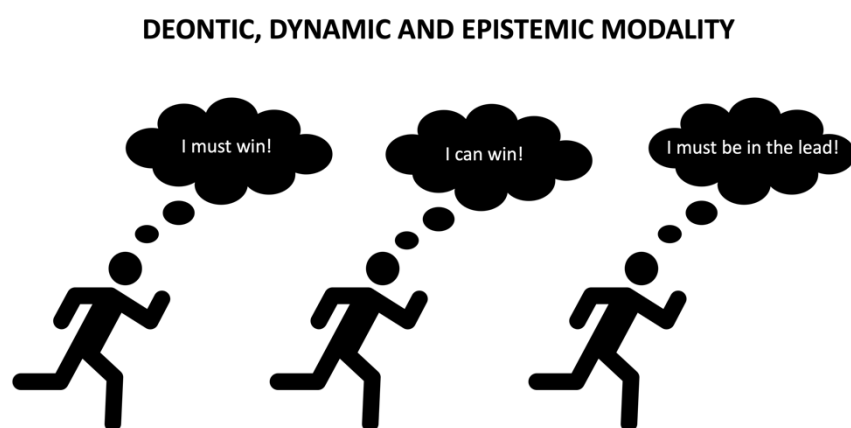**DEONTIC, DYNAMIC AND EPISTEMIC MODALITY**

*Figure 4. Modal auxiliary verbs are used across different domains: Deontic modality refers to some forces acting upon the situation, causing obligation (I must win!); Dynamic modality refers to ability and willingness (I can win!) while epistemic modality reflects the speaker's assessment of probability for the utterance being true (I must be in the lead!).*

The differences between deontic, dynamic and epistemic modals are often subtle (Figure 4). Indeed, the exact same utterance can sometimes be deontic, dynamic or epistemic, depending on the context. An illustrative example relates to the situation prior to and after a competition, where the winner has not yet been found/announced. If an athlete before the run says to herself: *I might win!* this may relate to either her being permitted to win (the deontic sense: *I might be allowed to win!*), her ability to win (the dynamic sense: *I might be able to*

*win!*), or the likelihood that this will happen (the epistemic sense: *I might possibly win!*). If the athlete considers her abilities to be among the best, the statement will reflect this, but needless to say, the probability of the win will depend on the number of other skilled opponents. The dynamic and epistemic sense will thus be correlated but may also diverge to some extent. Once the competition is over, however, the result no longer depends on the athlete's ability or willingness. We might imagine that a sprint was very close and the contenders are awaiting a finish photo. If the athlete now utters: *I might actually win!* to herself, this must reflect an epistemic judgment of the probability of being the winner. This can be determined by considering how strange it would be if the *I might actually win!* utterance came from an athlete who finished last, i.e., whose chance of winning was zero.

A primary reason for venturing into self-talk may be to negotiate obligations and willingness at different timescales, i.e., one part of the self may not want to participate in an event on a particular day due to fatigue or wish to be somewhere else, while another part of the self has a longer time perspective and argues that participation will help to achieve a desired goal (*I should/must participate in this event, otherwise I will not meet my goal for the season!*). The short-term obligation (the deontic stance) is a consequence of a long-term goal (the dynamic/intrinsic stance). In other words: The athlete's own long-term goals and motivation form an obligation on the athlete's short-term actions and this division can be reflected in their self-talk.

### 2.1.2 Nominals

The term nominal denotes a category of speech elements that function as a noun in a sentence. Nominals include nouns (*The winner*), proper nouns (*Eliud Kipchoge*), noun-phrases (*The winner of the race* …) and pronouns (*I, you, he/she/it*). Nominals can be subject (*I*) or object (*me)* or predicate nominative, which elaborates on the subject (*I am <u>the winner</u>)*.

#### *2.1.2.1 Nouns*

The prototypical noun describes a physical object which resides primarily in and is bounded by space (a *thing*). The objects described by nouns typically have temporal

persistence, and they can be conceptualized independently of any event that they may be involved in (Langacker, 2013, p. 104). This conceptualization of a noun is obviously not definitive. It is easy to find counterexamples. The difference between *running* and *a run* is not that the run is a physical object. A run, however, needs to be spatially bounded. If a run does not have a beginning and an end, then it is not a run. A run is something which can be depicted by a path on a map, and this path will have temporal persistence. Once a run is finished, the particular path of the particular run will in principle exist forever. Turning an action (usually denoted by a verb) into a noun thus means to bound it in space and time. This is not only true for actions, but for many things described by nouns. Body parts are just that: parts. Once we use a noun to talk about a knee, for example, we intentionally focus our attention on some part of the body and disregard other parts. The boundary between the knee and the rest of the leg may not be clear-cut, but by using a noun to describe it, we claim that such a spatially bounded body part exists. Ephemeral concepts such as *thoughts* and *self-talk* become things by the same operation. We borrow the concept of boundedness from the physical domain to imagine that thoughts are stable entities. The noun schema (which includes all nominals) thus plays a huge role in grouping and categorization, and it is used to select the focus of attention in a figure/ground relationship (Talmy, 2000, pp. 311-345). The figure (i.e., the foregrounded object) in a sentence is usually the noun that is mentioned first which in English usually coincides with the grammatical subject (*The Dane will beat me!*). In particular contexts, however, the speaker may want to disentangle the attentional markers offered by order of mentioning and grammatical subject (*Me, the Dane will beat!)* (Kristensen, et al., 2014; Stroustrup & Wallentin, 2018).

In self-talk in sports, the use of nouns or noun phrases to focus attention on particular people, body parts, moves or techniques is highly relevant. As was the case with verbs, the self-talker may only need to mention the particular body part (*Right foot! Shoulders!*) or technique (*Stride!*). The utterance of the nominal may represent a more complex sentence,

conceptual schema or behavioral script, about which the self-talker can use the nominal to remind herself. In this way, complex meaning may be condensed into a single word which then functions as a "trigger" for attention and conceptual unpacking (Talmy, 2017).

Famous examples are the use of the noun *Rosebud* by the main character in Citizen Kane, the film by Orson Welles (1941) and *The horror!* whispered by Kurz in the novel Heart of Darkness by Joseph Conrad (1899). In the Automatic Self-Talk Questionnaire for Sports (ASTQS) (Zourbanos, et al., 2009), one of the items is simply the noun *Power!*, which is one of the utterances used by athletes to "*Psych up*" themselves during their sports. The underlying idea that needs to be unpacked being that using this noun in your self-talk will prompt you to act in a way which will maintain power in your efforts.

### *2.1.2.2 Pronouns*

Sometimes we can condense our speech even further. An important parameter in communication is efficiency, and it is often beneficial to state things as briefly as possible (Grice, 1975). Pronouns (e.g., *I, you, he, she, it, we, you, they)* are short words that may substitute for a noun or a noun phrase (*It was a big victory*) or a proper noun. Pronouns can be used as short-hand for discourse items which are present in the perceptual surroundings of the speaker (deictic reference) or for previously mentioned discourse elements (anaphoric reference) or for items soon to be introduced (cataphoric reference). Pronouns thus stand in for larger chunks of nominal meaning.

#### 2.1.2.2.1 Personal pronouns

Personal pronouns in English are divided by the first, second and third person and into singular and plural number. The third person singular is furthermore divided into female (*she, her)*, male (*he, him*) and neuter (*it, it*) gender. Some pronouns are inflected to reflect case (e.g., subject, object).

Of obvious importance for self-talk is the use of 1st person singular pronoun *I, me, my* and the 2nd person pronoun *you*, *your*. In other-directed talk, the talker would usually refer to

herself using a 1st person pronoun. But in self-talk, the talker can choose between using 1st and 2nd person pronouns (*I am winning,* vs *You are winning)*. In a sense, the two utterances mean the same thing when used in self-talk, but there may be a subtle difference (Kross, et al., 2014). Talking to yourself using 2nd person pronouns means addressing yourself as though you were someone else. The fact that this is even possible says something important about what the linguistic ability affords. When we say something, we usually have an addressee in mind. One might ask the person sitting at the other end of the table to pass the salt (*Will you pass me the salt, please?*). If more people are sitting around the table, the utterance becomes ambiguous. *You* could in principle refer to all the people present. Usually, this ambiguity is easily resolved by means of gestures, eye gaze and proximity to the salt, but the example illustrates that if there are more people present in the room, then these will all become implicit addressees of the utterance, whether intended or not. Similarly, the speaker is always an implicit addressee of her own utterances. In self-talk, this is apparent in situations where the actual addressee may not hear the utterance. Imagine a marathon-runner who is lagging behind an opponent and then looks ahead while saying inside her head: *I will get you!* In a sense, the opponent is the addressee named *you* in the sentence, but the sentence in most cases was not uttered for the opponent to hear, but as a motivational phrase for the self-talker herself. She is thus the implicit addressee of her own utterance. Furthermore, we often do not know exactly what we are going to say until we have said it. This is apparent when speakers stop and search for words in the middle of a sentence. The inclination to say something was there beforehand, but the utterance is constructed incrementally, on the fly, as we speak (Edelman, 2017). One of the functions of self-talk may therefore be, to give linguistic form to more or less vague inclinations and representations, in order to be able to consciously evaluate them or act upon them.

Spontaneous self-talk has been observed to most often be formulated in 1st person whereas 2nd person is more frequent in goal-directed self-talk (Latinjak, et al., 2017). Zell and

co-workers (2011) documented that the use of *you* in self-talk was most prevalent in situations requiring direct behavior regulation, such as negative events, experiences of autonomy, and action as opposed to behavior preparation or behavior evaluation. The use of the 2nd person pronoun has been suggested to be tied to the use of imperative statements invoked when people engage in action (Zell, et al., 2011). Other studies (Dolcos & Albarracin, 2014; Son, et al., 2011) have since found that use of 2nd person pronouns improved conscious self-guidance when solving anagrams compared to self-talk using 1st person pronouns. Across several experiments (Kross, et al., 2014), it was also found that refraining from using 1st person pronouns during introspection enhances self-distancing. According to the authors, this allows non-1st person users to better regulate stress and improve performance on tasks, such as making good first impressions and public speaking. They also engaged in less maladaptive postevent processing.

In endurance sport, self-talk using 2nd person pronouns has also been found to yield better performance in a 10 km cycling time trial than self-talk using 1st person pronouns (Hardy, et al., 2019). Further studies are needed to establish the robustness of this finding, but talking to yourself as though you were someone else may be helpful for endurance.

### 2.1.2.2.2 Demonstrative pronouns

The term *demonstrative* is used to refer to a small class of expressions that are commonly divided into two basic types: demonstrative pronouns (nominal demonstratives) such as *this* and *that* in English and adverbial demonstratives such as *here* and *there* (Diessel & Coventry, 2020). The two types are closely related. Here, we will focus on the demonstrative pronouns.

Demonstratives constitute a universal class of spatial terms (Diessel & Coventry, 2020). The use of demonstratives relies on the establishment of a particular point of reference, the deictic center, also called the origo (Bühler, 1934/2011). The origo is the center of a coordinate system from where the world is evaluated. The interpretation of *this* and *that*

is determined by the referent's position in relation to the origo. The origo is most often grounded egocentrically in the speaker's body (Diessel, 2013, 2014). Within a body-centred perspective, the proximal demonstrative is prototypically used to refer to objects within reach, i.e. within peripersonal space, while the distal demonstrative is used to refer to objects that are out of reach (Coventry, et al., 2008). Interaction with objects, visibility and ownership, however, may modulate the use of demonstratives (Coventry, et al., 2014), and proximal and distal demonstratives may also be used contrastively and at different scales (*This planet* versus *That planet*). In the absence of a concrete spatial context, demonstratives can be used to display psychological distance across a variety of semantic dimensions (Rocca, et al., 2019; Rocca & Wallentin, 2020; Todisco, et al., 2021). Thus, if a self-talker says *This is good* versus *That is good*, it may refer to actual effects which are located at different distances in vicinity of the speaker, but it may also indicate different levels of mental distancing, somewhat analogous to the use of 1st and 2nd person pronouns, where *this* is conceptualised as close to the self while *that* is conceptualised as being distanced for some reason. In the absence of a context, participants usually pair words with the proximal demonstrative if the word refers to small, manipulable, inanimate and harmless things (*This shoe*) or more generally things with positive valence, whereas the distal demonstrative is used for objects with negative valence, distant in time, large in size (*That volcano*) or for animate beings (*That tiger*), including humans (Rocca, et al., 2019; Rocca & Wallentin, 2020; Todisco, et al., 2021).

An obvious relation to self-talk during endurance sports is the direct reference to the spatiotemporal surroundings of the self-talker, where *this* will be used to refer to the here and now and close spatial proximity (*This is a steep hill*), while *that* will be used to self-talk about objects and events placed at a distance (*That is a steep hill*). The origo may also be scaled to the body, such that *This pain* means a pain closer to the centre of the body than *that pain.* This logic may be expanded to the area of attention. Demonstratives may serve a role in

association/dissociation, where distal demonstratives can serve to place an experience at a distance (*That anxiety*) which is considered less important or intrusive than an experience described with a proximal demonstrative (*This anxiety*). Intervention studies are needed to investigate if demonstratives can be used in framing of experiences in endurance sports.

## 2.2. Adjectives and adverbs

An adjective is a word that describes and changes information given by a nominal (*A good runner*). Adverbs, on the other hand modifies verbs, adjectives or other adverbs (*A nicely planned session*). Adjectives are used to add description to the words they modify, such as size, shape, age, color, origin, material, and purpose. Adjectives and adverbs may thus play a role in instructional self-talk by adding detail to description (*A longer stride*) But as the examples above show, adjectives and adverbs are also often used to add an opinion, sentiment or evaluation to an utterance. Traditionally, analyses of adjectives and adverbs have been used for evaluating sentiment in texts and utterances (Benamara, et al., 2007; Hatzivassiloglou & McKeown, 1997), although more recently deep language models incorporating multiple contextual parameters have been found to increase performance in sentiment detection (Catelli, et al., 2022).

When looking at the self-talk factors in sport proposed by Zourbanos and co-authors, measured using affiliation with the self-talk statements in the Automatic Self-Talk Questionnaire for Sports questionnaire (Zourbanos, et al., 2009), adjectives are found in almost all dimensions, such as psyching up (*Do your best*), anxiety control (*Don't get upset*), confidence (*I feel strong*), worry (*I am not as good as the others*), disengagement (*I am fed-up*), somatic fatigue (*I am tired*) and irrelevant thoughts (*I am hungry*). Common to all examples, however, is that they have to do with expressing some either positive or negative sentiment.

Previous research has focused on the distinction between positive (*You're*

*doing great*) and negative (*This stupid pain*) self-talk and found indications for positive self-talk having more beneficial effects on sports performance than negative self-talk (Tod, et al., 2011). Negative self-talk, measured using the Performance Worries subscale from the Thought Occurrence Questionnaire for Sport (Hatzigeorgiadis & Biddle, 2000), including thoughts of having *a bad day*, that *competitors are better* and that *conditions are not good*, have been found to be linked with pre-competition anxiety (Hatzigeorgiadis & Biddle, 2008). Positive self-talk has been found to be positively associated with the experience of flow, while negative self-talk has the opposite relationship (Miller Taylor, et al., 2018). Additional studies that focus on the adjectives and adverbs used to create positive and negative sentiment in self-talk thus seem like a *worthwhile* investment.

## 2.3. Questions (Interrogatives)

Posing questions is an important part of language and another way of moving a statement into the hypothetical domain (*Is this a good idea?*) Interrogatives have a distinct grammatical profile in English, where the verb is placed in front of the subject noun. This type of question usually invites a yes/no answer, while questions asked using *wh*-question words are used to invite answers in particular domains (*what*, *who*, *where*, *when*, etc.). Interrogatives can also be posed by rising intonation (*I am the winner?*)

Senay and co-authors (Senay, et al., 2010) studied the use of questions as preparation for a cognitive task (solving anagrams). They found that participants were more likely to solve anagrams if they prepared for the task by asking themselves whether they would work on anagrams (*Will I?*) as opposed to declaring that they would (*I will!*). Subsequent follow-up experiments indicated that merely writing the question in an unrelated writing task was enough to cause an improved performance. The authors interpreted their findings to mean that interrogative self-talk functions as a motivator for goal-directed behavior. These findings, however, have been questioned (Francis, 2014), and the only independent attempt at replicating them was a failure (Puchalska-Wasyl, 2014).

However, the fact that it is possible to ask yourself questions speaks to the discursive nature of self-talk (Larrain & Haye, 2012) and allows us to speculate about what self-talk is good for. If communication is information sharing, self-talk seemingly becomes meaningless. The self has no need to share information with itself. It does, however, need to access stored knowledge. Linguistic cues serve a function in memory access (Condray, et al., 2010; Marian & Fausey, 2006). Any linguistic utterance causes activation in a semantic network which allows stored memories, both semantic and episodic, to be retrieved for conscious access. Human cognition is inherently dualistic, as has been noted by many scholars historically (Frankish & Evans, 2009). The mind is divided up into a conscious and a non-conscious part. This is also true for memory: We are not always aware of what we remember. Asking yourself a question may thus reveal information to the conscious self that only the non-conscious self had access to (*Where did I put my keys?*). Interrogatives and self-talk in general thus have a role in memory retrieval. Questions are not just about retrieving stored material about the past. Self-talk questions have another important function in the evaluation of prospects for which there is not a predetermined outcome, often related to decision making (*Which way?*). Self-talk questions thus serve a role in reflective thought. A question posed to the self facilitates an explicit evaluation of the topic questioned (*How long can I keep this pace?*). As the example shows, questions may often be combined with modal verbs. The hypothetical nature of modal constructions makes them natural targets for questions (*Must I do this?*). Interrogatives thus serve a role in evaluating and reevaluating permission/obligation, ability/willingness and probability for some decision, action, event or outcome.

## 2.4 Negation

Utterances are usually implicitly affirmative. You are stating that something is the case. Language, however, allows for negation of statements and has words or particles that function to communicate this, such as the English word *not* (Horn & Wansing, 2022). The

asymmetry between affirmative and negated utterances goes beyond the fact that one is implicit and the other is linguistically marked. Negated utterances are also usually less informative (*This is not a world record*) and are cognitively more demanding to process (MacDonald & Just, 1989). Although intuitively appealing, negation of a proposition does not yield the same meaning as an affirmative of the opposite (*I can win* vs. *I cannot loose*) and a double negation does not mean the same as the affirmative (*I can win* vs *I cannot not win*), apart from when using a logical *is a* connection (*I am a winner* vs *I am not a non-winner*). Negations thus allow subtle differences in meaning production. This is especially true when combined with modal utterances where the hypothetical nature of the proposition allows the speaker to add layers of complexity to the meaning by using negations.

Negation may be related to negatively valenced self-talk (see below), but does not have to. In the Automatic Self-Talk Questionnaire for Sports (ASTQS) (Zourbanos, et al., 2009) a factor in self-talk called *worrying* is observed. The utterances used to probe this factor to a large extent consist of negated utterances (*I am not as good as the others, I am not going to reach my goal, I cannot concentrate, I am not going to make it*). It is important to note that it is the combination of a desired goal and the negation which yields the negative meaning, not the negation itself. One could imagine the same sentences with negated failures instead of achievements (*I am not as bad as the others*), although such utterances may be less common. When investigating self-talk in endurance sports it would thus be interesting to monitor if the use of negations is more frequent during negatively valenced self-talk than during positively valenced self-talk (*This hypothesis is not bad at all!*).

Another asymmetry may exist between negation and its use in system 1 and system 2 behavior as defined in dual-system theories (Epstein, 1994; Evans, 2008; Van Raalte, et al., 2016). Negation may be important in self-regulatory self-talk. If self-talk is used for overcoming impulses or instincts from system 1 to choose the tempting, easy or comfortable behavior, then it may be natural to need to tell yourself NOT to do this (*Don't eat the*

*candy!*), while it conversely is more important to use the affirmative voice when talking to yourself about doing things in system 2 that require control, reflection, and attention (*Eat more broccoli!*) (Figure 5).

A study (Patrick & Hagtvedt, 2011) used negations to study how self-talk might influence self-regulation. In one experiment, participants were asked to rehearse a refusal of unhealthy food, either by using the phrase *I don't eat X* or the phrase *I can't eat X*. The idea was that the use of *don't* would serve as self-affirmation while *can't* would indicate an external force on choice. As each participant turned in their questionnaire, they were asked to choose between two snack bars, either a chocolate candy bar or granola health bar. It was found that participants who were primed with the *don't* strategy more often chose the healthy bar. A later field study reported in the same paper found a similar effect of *don't.* Here it was also present relative to a control condition which did not involve negation. This suggests that using negation in self-talk can be effective as a means to avoid impulsive behavior, but that combinations with certain modal expressions are less effective. The authors suggest that the *don't* construction works better than the *can't* construction because the former fosters empowerment. Here, we suggest that knowledge of modal constructions allows for a more sophisticated analysis where it might be different modal constructions that cause the difference, such that modals involving obligation and permission are less effective for self-regulation than constructions involving willingness and ability. As outlined above, these constructions are to some degree instantiated by the modal verbs used (e.g., *can't* evokes an ability schema, while *won't* evokes a willingness schema) together with context.
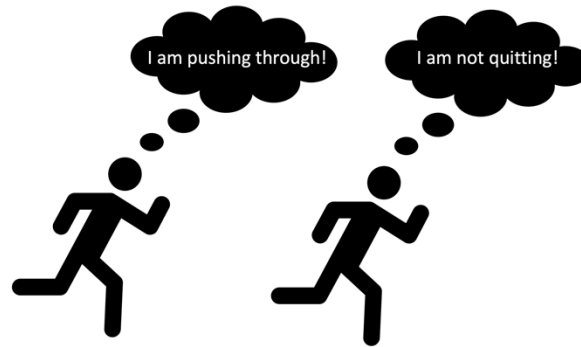
***Figure 5****. Affirmative sentences may play a role in reminding the self-talker of what the current plan is while negations are more related to impulse control. We negate what we would be doing had we not been in control.*

## 2.5 Interjections

The last grammatical category we will consider in this paper is interjections. An interjection is a loud calling or crying out, for example as in surprise, pain, grief, joy, anger, such as *No! Shit! Fuck! My God! For Christ's sake!* These outcries are a vital part of the spontaneous self-talk inventory. Many interjections have to do with some disappointing turn of events, but positive interjections are also frequent in self-talk (*Yes! That's it! Way to go! Hell yeah!*). Contrary to much of the self-talk investigated so far, interjections in sports are very often spoken out loud and thus easily observable (Dickens, et al., 2018; Thibodeaux & Winsler, 2022). However, an interesting and telling aspect of interjections is that their meaning is highly condensed and (apart from their valence) can only be discovered by knowing the context of the utterance, whether it is a lost game, an injury or an intrusive thought. As noted previously, condensation is a phenomenon which can be observed at all levels of communication (Christiansen & Chater, 2016). Whenever humans communicate, some level of common ground (Clark, et al., 1983) is necessary, and we constantly take into account what our interlocutor knows in order to avoid redundancy (Brown-Schmidt, et al., 2008).

Obviously, when talking to ourselves, most of the context is given to the listener. Given the duality/hierarchical nature of mind there may not be a complete sharing of context across communicating levels, but most is available. Thus, only very little actual language is needed, and often what remains are the involuntary interjections fostered by surprise. These, on the other hand, may be followed by a prolonged inner dialog about what to do about the new turn of events, e.g., if you discover that you have run the wrong way or that you are late for the start.

## 3 Conclusions

In this study we have gone through some of the foundational elements of grammar and illustrated how they might be relevant for the study of self-talk in general and for endurance sport in particular. There is plenty of evidence to suggest that self-talk is frequent in endurance sports, and looking at the content through the lens of grammar allows us to categorize the content in a detailed fashion. Language is a window into the mind, and grammar is used to structure meaning. Self-talkers may use their self-talk to reflect on the past, future or present, as speech acts to try to change, maintain, or optimize their behavior and performance. Self-talkers may reflect on the situation they are in using modal constructions to express their sense of obligation/permission or ability/willingness to perform their sport, and they may use epistemic modal expressions to reflect on the probability of outcomes. Self-talkers may modify and modulate those expressions using personal pronouns and demonstratives in order to position themselves spatially and psychologically in the imagined scenarios evoked by the self-talk narrative. They may use adjectives and adverbs to add sentiment in order to clarify the value of the projection. When tempted by impulses, they may use negation to stop themselves, and they may simply say *shit* when surprised by how things turn out. Together, these verbal considerations may help the self-talker's decision making in situations with competing outcomes at different time scales.

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