Inner Obstacles and Goal-Directed Behaviors of Elite and Youth Level Cyclists:

A Qualitative Analysis From the Perspective of Athletes and Coaches

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Abstract

As self-regulation is crucial in top-level performance, prior investigations aimed at the efficacy of the self-regulatory strategy of implementation intentions (i.e., if-then plans) on athletic performance. We investigated the inner obstacles (if) that athletes face in competitive situations and assessed the corresponding goal-directed behaviors (then) to design effective implementation-intention-theory-based interventions. We asked elite and youth level cyclists (Study 1; $N = 34$; age: $M = 23.7 \pm 9.9$ years) with a self-designed questionnaire and used a reworded version for assessing these research questions from a coaches' perspective (Study 2; $N = 42$; age: $M = 50.2 \pm 9.8$ years). Dealing with demanding situations, pressure, and concentration were most frequently named inner obstacles, while goal-directed behaviors were preparation, self-encouragement, and relaxation (athletes) and concentration (coaches). The results highlight the emotional-psychological challenges that elite and youth level cycling athletes face and provide insights for sport psychological research with implementation intentions.

Keywords: *obstacles and goal-directed behaviors in cycling, elite athletes, elite coaches, implementation intention theory, thematic analysis.*

Inner Obstacles and Goal-Directed Behaviors of Elite and Youth Level Cyclists:**A Qualitative Analysis From the Perspective of Athletes and Coaches**

Top-level cycling inspires millions of people. The Tour de France is the worlds' largest annual sporting event (sport1.de, 2016) and it captures the attention of millions of spectators every year. To be successful in such an event, racing cyclists not only need outstanding physical fitness but also a broad set of excellent mental skills (Orlick & Partington, 1988). One broad mental faculty that is particularly relevant for optimal sports performance is self-regulatory control (e.g., Englert, 2016), which refers to "the set of mechanisms required to pursue a goal, especially when distraction and/or strong (e.g., habitual) competing responses must be overcome" (Shenhav et al., 2013, p. 217). The relevance of this set of mechanisms for endurance performance is intuitively apparent: During an endurance competition, athletes frequently have to cope with intensifying sensations of pain, fatigue, and exertion that create and amplify the urge to quit rather than to continue the race (Enoka & Duchateau, 2016; Marcora & Staiano, 2010; Mauger, 2019). Accordingly, endurance performance is critically dependent on how effectively athletes apply self-regulatory strategies to deal with such inner obstacles (Wolff et al., 2018). For example, an athlete might employ self-talk or imagery as goal-directed self-regulatory behaviors to deal with exercise-induced obstacles (McCormick et al., 2015). To shed light on the nature of these obstacles and the behaviors employed to deal with them, the present research takes a qualitative approach to analyze the inner obstacles elite and youth level cyclists face during competitions and the goal-directed behaviors they use to overcome them.

Implementation intention theory (Gollwitzer, 1999, 2014) provides a conceptual framework for such an analysis: It explicates the role of obstacles and goal-directed behaviors in goal attainment. Specifically, the theory assumes that attaining a goal (e.g., "I want to achieve X") is facilitated by making self-regulatory if-then plans. If-then planning involves thinking about two key elements: a critical situation that might jeopardize goal attainment (e.g., an inner obstacle standing in the way) and a goal-directed behavior that might be used to deal with this situation (e.g., how to overcome the obstacle). These two elements are then linked to an if (situation)-then (behavior) plan. In the context of cycling, for example, the goal to win a sprint stage in the Tour de France could be threatened by the fear of being badly positioned in the closing kilometers of the stage which often can be very hectic. To deal with this obstacle, an athlete might engage in self-talk to keep focused on the goal to stick with his lead out rider in the closing kilometer. Making if-then plans is an important component of successful goal

attainment across different domains (e.g., physical exercise, Bélanger-Gravel et al., 2013; health, Adriaanse et al., 2011; Bélanger-Gravel et al., 2013; Orbell & Sheeran, 2000; see Gollwitzer & Sheeran, 2006 for a meta-analysis, and Bieleke, Keller, & Gollwitzer, 2021 for a recent review). Accordingly, it has been suggested that if-then planning might also be a relevant self-regulatory strategy in sports in general and in endurance sports in particular (Bieleke, Wolff, et al., 2021). Indeed, the beneficial effects of if-then planning rest primarily on automating both the detection of critical situations and the initiation of goal-directed behaviors (Gollwitzer, 2014) – attributes that are likely crucial for effective self-regulatory control in endurance sports (e.g., to deal efficiently with the urge to quit even under high levels of stress; Wolff et al., 2019).

Considering the suitability of implementation intention theory as a conceptual framework and its well-established effectiveness as a self-regulatory strategy, interventions based on the theory have so far produced surprisingly inconsistent results in endurance sports and other sports domains (Bieleke, Wolff, et al., 2021). Concerning endurance, for example, if-then planning has been observed to enhance performance in some tasks (e.g., a group weight-holding tasks, Thürmer et al., 2017; posture-holding tasks, S. Wang et al., 2019), but not in others (e.g., static muscular endurance tasks, Bieleke & Wolff, 2017; Hirsch et al., 2020; Wolff et al., 2018; cycling tasks, Hirsch et al., 2021; Latinjak et al., 2018). One possible explanation for these heterogeneous findings is that the bulk of studies investigated the effectiveness of if-then plans made by inexperienced exercisers who might or might not have sufficient insight into the inner obstacles that limit their performance and goal-directed behaviors suitable to overcome them (Hirsch et al., 2021). Other studies used predetermined if-then plans which targeted obstacles (e.g., pain, effort) and behaviors (e.g., task continuation) that turned out to be unsuitable for improving endurance performance. For instance, it has been demonstrated that the obstacles specified in an if-then plan (e.g., physical pain versus perceived effort) must correspond to exercisers' beliefs about whether these obstacles in fact limit their performance (Hirsch et al., 2020). Thus, making an if-then plan to deal with exercised-induced pain during a static muscular endurance task was effective only when exercisers felt that such a physical obstacle limited their performance (in contrast to believing that performance was limited by mental factors). In another study using a static muscular endurance task, participants made if-then plans specifying that sensations of effort should be ignored; however, this plan inadvertently intensified rather than attenuated the perceived effort and thus failed to enhance performance (Bieleke & Wolff, 2017). Taken together, the heterogeneity of findings regarding the effects of if-then planning might be due to inexperienced samples with too little or no insight into

relevant obstacles and goal-directed behaviors, reliance on obstacles that are at odds with athletes' beliefs about what limits their performance, and/or use of goal-directed behaviors that failed to improve performance. Thus, to facilitate the design of effective interventions based on implementation intention theory, it is important to take one step back and investigate which obstacles highly experienced athletes face in their sports, and what kind of goal-directed behaviors they employ to deal with those obstacles.

Accordingly, we turned to two independent samples of elite and youth level cyclists and cycling coaches, respectively. In comparison to sub-elite and recreational athletes, elite and youth level athletes excel in a variety of essential mental skills (e.g., most importantly self-control, Englert et al., 2021; but also mental toughness, Beckford et al., 2016; imagery skills and use of associative strategies, Morgan & Pollock, 1977) and seem to possess higher neural efficiency (e.g., Li & Smith, 2021) which might allow them to deal more efficiently with the self-regulatory demands of sports (Wolff et al., 2021). Additionally, they are likely familiar with a broad range of challenging sensations that commonly arise in competitions (e.g., fear of failure, negative emotions, and dysfunctional thinking; Birrer et al., 2012) and with applying various skills that help them deal effectively with these challenges (e.g., imagery, emotion control, and automatic skill performance in Olympic medalists, Taylor et al., 2008). Taken together, elite and youth level athletes are perfectly suited for studying the inner obstacles associated with endurance performance and behaviors that help to overcome these obstacles, which promises to provide a foundation for developing more effective interventions based on implementation intention theory.

In the present research, we report two studies that set out to identify the inner obstacles that athletes face in cycling competitions and the goal-directed behaviors they apply to deal with these obstacles. As mere naming of goal-directed behaviors is little informative in gaining an impression of their usefulness, we asked athletes and coaches how helpful these behaviors were perceived. We relied on two samples of participants: one sample of elite and youth level athletes who actively competed in cycling events (Study 1) and a sample of elite cycling coaches (Study 2). Importantly, these two samples were recruited independently from each other (i.e., the athletes and coaches did not work with each other) and thus provided unique answers to our research question. Due to the explorative nature of our research, we capitalized on a qualitative, data-driven approach to identify relevant categories of obstacles and behaviors.

General Method

The study was carried out as part of a larger research project and conducted according to the 1975 Declaration of Helsinki. The questionnaires used in the athlete and the coach sample took about 25 minutes to complete and were developed together with an amateur and an elite cyclist to ensure comprehensibility and suitability for the target group (see <https://osf.io/2bqtx/> for the questionnaires). Furthermore, we have based the structure and phrasing on established methods from if-then plan research, for example by explicitly asking for inner obstacles first and then focusing on possible goal-directed behaviors. The athlete survey was conducted online (Qualtrics, 2005/2021), while the coach survey was conducted in a paper-and-pencil format at the beginning of an in-person workshop. At the beginning of the questionnaire, athletes and coaches were informed about the purpose of the study and their participation rights. Data were collected anonymously. Neither the athletes nor the coaches received a financial compensation for participating in the study.

Questionnaires

Study 1: Athlete Sample. After they had given informed consent, the athletes provided demographic information (age, gender) and information about their cycling experience (e.g., years of cycling, competition experience). Athletes were then asked to name and describe inner obstacles they encounter in a typical competition (“Please describe your central inner obstacles in a typical competition in few words”) that keep them from turning a race into a successful race. It was emphasized that athletes should focus on obstacles they could in principle overcome by themselves (as opposed to external obstacles, like a crash). Afterwards, the athletes specified the behaviors they commonly apply to deal with these obstacles (“How do you typically deal with these inner obstacles?”) and indicated the extent to which these goal-directed behaviors help them to overcome them (on a scale from 1 = *not at all* to 5 = *very much*).

Study 2: Coach Sample. The coach questionnaire was analogous to the athlete questionnaire but differed in two ways: First, the coaches provided information about their coaching experience rather than their cycling experience (e.g., highest coaching qualification, main coaching discipline). Second, we asked the coaches about their view on the inner obstacles and goal-directed behaviors of the athletes they coached.

Data Analysis

Data resulting from the questionnaires were analyzed with thematic analysis on a semantic level (Braun et al., 2016; Braun & Clarke, 2006) individually for the athlete and the coach sample. Epistemologically, the

analysis can best be allocated as essentialist-realist, being of inductive nature, meaning that categories or themes, respectively, were derived from participants' answers in a data-driven manner (Braun & Clarke, 2006). In the first step, the lead author of this paper conducted an initial review of the data in order to familiarize herself with the data, noted first ideas to code the data and then created codes for all data extracts. These codes were then grouped into possible main categories. Data extracts that were related to more than one category were assigned to multiple categories. These categories were then re-evaluated by the researcher regarding homogeneity of context and content overlaps and to ensure that they reflected the data accurately and parsimoniously. Finally, each category was defined and labelled. In the second step, two independent experimenters assigned all answers into the previously defined categories for reexamination. The interrater reliability was between $\kappa = .66$ and $\kappa = .75$ in the athlete sample and $\kappa = .54$ and $\kappa = .62$ in the coach sample, which is adequate and suggests that the categories represented the answers in a meaningful way (Altman, 1999; Landis & Koch, 1977). Mutual agreement was achieved by discussion (see Sarkar & Fletcher, 2014) with the exception of two answers in the athlete sample, which were accordingly assigned to the *other* category.

Finally, the category labels developed from the athlete and the coach data were compared to align category names to establish a coherent wording across both studies. Figure 1 provides an overview of the extracted categories and their frequencies. Tables 2 and 3 provide the categories and their definitions along with examples. Figure 2 shows how helpful the handling of mental obstacles was rated in Study 1 and Study 2. For the analyses and illustrations, the statistical software environment R (4.1.0; R Core Team, 2021) and the package ggplot2 (3.3.5; Wickham, 2016) were used.

Study 1: Athlete Sample

Participants

$N = 34$ elite (world team, continental (pro) team, (elite) amateurs) and youth (under age 19) level cyclists took part in the study (age: $M = 23.7 \pm 10.0$ years; gender: 7 female). The recruitment took place through the coaches of the German Cycling Federation, who sent the questionnaire to their cyclists. As can be seen in Table 1, our sample covered a wide range of experience levels concerning cycling and cycling competitions. Twenty-seven athletes completed the questionnaire in full, the remaining athletes dropped out before reaching the end of the questionnaire (athletes' level: $N = 1$ elite, $N = 2$ elite amateur, $N = 1$ elite woman, $N = 1$ junior, and $N = 2$ other). We used all the available answers in the analyses.

Results

Inner Obstacles. Athletes' answers regarding the inner obstacles they experience during competition were assigned to a total of 10 categories comprising between 1 and 10 answers. The most frequent obstacle was *pressure*, in terms of pressure to succeed or pressure to perform well (e.g., previous year's placement). *Dealing with demanding situations* during the competition (e.g., unforeseen situations like crashes, hectic pace) and *concentration* difficulties (e.g., when making decisions under stress) were also identified as major obstacles. Being *demotivated* due to difficult competitive situations (e.g., being overtaken by opponents) was perceived as an obstacle as well, as were difficulties with sticking to their *cycling strategies* (e.g., power management). Related to this latter obstacle was not underestimating or overestimating one's own performance (i.e., *self-assessment*). Upcoming *tension* (e.g., feeling anxious prior to the competition) or *mental exhaustion* – for example feeling mentally depleted due to increased mental demands – were further inner obstacles. *Pursuing the goal* when being mentally exhausted or lagging behind was also stated.

Goal-Directed Behaviors. Goal-directed behaviors that were used to deal with the stated inner obstacles were assigned to 12 categories with 1 to 7 answers per category. *Preparation* (i.e., any way of preparing to face possible mental obstacles) was the most frequent goal-directed behavior, which was estimated between rather helpful and very much helpful. *Self-encouragement* (e.g., telling myself no pain no gain) was the second most frequent goal-directed behavior in terms of verbalizing statements to cheer oneself up, which athletes perceived as partly helpful. Maintaining a *calm, relaxed inner attitude* in the face of mental obstacles or calming down (e.g., through breathing) as well as *imagination* in the sense of using motivating pictures or ideas and repression (i.e., ignoring the mental challenge) was also named. Athletes described inadequate dealing with inner obstacles due to *excessive demands* through mental obstacles, for example because they felt overwhelmed. *Visualization* (e.g., of the racing situation) and *focusing* on themselves was a possible goal-directed behavior, which was perceived as between rather and very much helpful. *Social support*, for example using teammates or the coach for support and *concentration* were estimated as quite helpful. *Fun* with the athletic activity and *external aids* like music were also stated. Goal-directed behaviors were on average rated as rather helpful ($M = 3.7 \pm 0.8$), with *focusing* being estimated as most helpful ($M = 4.5 \pm 0.7$). Figure 2 illustrates how helpful athletes rated each of the goal-directed behaviors.

Study 2: Coach Sample

Participants

$N = 42$ coaches (age: $M = 50.2 \pm 9.8$ years, gender: 3 female), participated in the paper-pencil survey during an in-person workshop for A-level cycling coaches. They reported a coaching experience of $M = 25.6 \pm 10.7$ years, most had an A-trainer license in competitive sports (i.e., the second highest coaching license in Germany) and three coaches had the highest German coaching license. Table 1 shows which disciplines coaches stated to train overall and what levels their coached athletes perform.

Results

Inner Obstacles. Coaches' answers regarding athletes' inner obstacles were assigned to a total of 14 categories which comprised between 1 and 8 answers. The most frequently stated inner obstacle was *dealing with demanding situations* (i.e., falls, course, weather conditions). Difficulties to *concentrate*, like strong distractions by irrelevant things, and adhering to their *cycling strategies* (e.g., rear end cycling) were obstacles for the athletes. *Self-assessment*, such as underestimating one's own possibilities, and emotions of *insecurity* (e.g., about dealing with challenging situations like obstacles) and *fear* (e.g., to fail or concerning one's own performance and competition) were further performance-reducing obstacles. *Demotivation* due to difficult competitive situations, like being unable to follow the pace of the field, and *tension* (i.e., high nervousness which keeps athletes from preparing or performing well) were reported as well. A lack of *willpower*, that the athlete cannot always maintain the will to push to the limit (e.g., stamina) was an inner obstacle as well as difficulties in *planning* and *flexibility*. Planning here includes the athlete's difficulty in planning how to deal with certain obstacles, while flexibility refers to the athletes' difficulty in responding safely and quickly to changing conditions during the race. *Distraction* in the sense that athletes are too distracted to prepare adequately (e.g., forgetting to eat) was also an inner obstacle.

Goal-Directed Behaviors. Goal-directed behaviors were assigned to 12 categories in total with 2 to 11 answers per category. *Preparation* (i.e., planning how to deal with difficult or critical information, like regarding their competition, conditions), was mentioned most frequently but rated as partly useful. *Social support*, for example cooperation with the trainer, and *concentration* was also mentioned frequently but estimated as partly helpful. An important aspect was that athletes *assimilated* inner obstacles *negatively* by reacting aggressive or nervous and that *tension* as reaction to mental obstacles was also mentioned as a (maladaptive) goal-directed behavior which was rated as little useful. *Self-encouragement* like motivational phrases (e.g., never give up) as

goal-directed behavior was estimated between partly and quite useful as well as *motivation*, a positive *mindset* (e.g., a positive pre-start mode), and *willpower* to win. Further goal-directed behaviors to deal with mental obstacles were *relaxation* in the sense of resting before competition, as well as *imagination* (i.e., using motivational images). One sixth of the coaches' statements could not be classified in a differentiated way because the statements were too general (e.g., “different, some very good, others rather bad”). Goal-directed behaviors on average were rated as partly helpful ($M = 3.3 \pm 0.9$), with *motivation* being estimated as most helpful ($M = 5.0$, only one estimation provided; Figure 2 illustrates the helpfulness of each goal-directed behavior).

Discussion

We investigated the inner obstacles that athletes face in cycling competitions and assessed the goal-directed behaviors they use to deal with these obstacles to design effective interventions based on implementation intention theory. To this end, we recruited a sample of athletes (Study 1) and a sample of coaches (Study 2) to obtain two nonaligned perspectives on these questions. These analyses revealed substantial overlaps between the two perspectives (i.e., athletes and coaches) with respect to obstacles and goal-directed behaviors. Pressure, dealing with demanding situations, and maintaining concentration were the most frequently experienced obstacles reported by athletes. Coaches reported dealing with demanding situations, concentration, and cycling technique as most common challenges. However, some particularly interesting differences were observed too: for example, athletes frequently named dealing with external circumstances as demanding (e.g., crashes, weather, course), while coaches were more likely to specify obstructive emotions such as fear and insecurity. To deal with these obstacles, athletes relied on preparation, self-encouragement, and relaxation. Preparation was also a goal-directed behavior mentioned by the coaches, who additionally mentioned concentration and social support. All in all, athletes and coaches alike presented an extensive overview over the obstacles recurring in cycling competitions and the goal-directed behaviors they would apply to deal with them. In the following, we will first outline how the findings of this qualitative assessment fit into existing sport psychology literature and then deduce how future research on implementation intention theory in sports might incorporate the present findings to develop better if-then plans for the sports domain to arrive at more effective interventions.

Inner Obstacles and Goal-Directed Behaviors

Regarding the inner *obstacles*, the central role of perceived pressure in both the athlete and the coach sample is consistent with existing literature (e.g., McKay et al., 2008; Thelwell et al., 2007). For instance, the

importance of pressure and competitive stressors was also emphasized in a study focusing on young elite athletes across sport disciplines (Kristiansen & Roberts, 2010). Athletes in this study reported to be challenged by pressure exerted by others and themselves as well as by being intimidated by more experienced competitors in the field. These athletes also found it difficult to adhere to rituals before competitions, which was also mentioned by the coaches in Study 2 as a potential obstacle (e.g., athletes forget to eat because they are distracted by environmental factors). Especially negative emotions like insecurity and fear were mentioned by the coaches, which have been observed to interfere with focus and concentration in a similar manner as demotivation (Lazarus, 2000). The mention of mental exhaustion by athletes fits into the large research body of ego depletion (e.g., Englert, 2016) and mental fatigue (e.g., Marcora et al., 2009), respectively, and reflects the presumed impairment of athletic performance well studied in the theoretical framework (for an overview, see Giboin & Wolff, 2019).

Concerning *goal-directed behaviors*, athletes and coaches in our studies mentioned a broad range of behaviors that could be used as mental strategies to deal with inner obstacles, indicating their importance for optimum performance in elite competition (e.g., Orlick & Partington, 1988) is recognized. For instance, self-encouragement that might occur in the form of self-talk was mentioned as a strategy by both athletes and coaches, in line with findings that athletes use self-talk routinely (L. Wang et al., 2003) and consider it as performance enhancing (Masciana et al., 2001). Similarly, research revealed that young elite athletes find it useful to engage in self-talk; moreover, they emphasized maintaining concentration and focus as well as controlling their nervousness as further helpful behaviors (Kristiansen & Roberts, 2010). The importance of emotion regulation is also evident in the coaches' mentions that an accumulation of negative emotions (e.g., anxiety, self-doubt) occurred as maladaptive reaction in dealing with inner obstacles. The necessity to keep up cognitive control, reflected by the categories concentration and focus in our data, is known to enhance performance (Brick et al., 2014) and to facilitate performance improvement (Clingman & Hilliard, 1990). Indeed, appropriately used mental strategies have been linked to superior athletic performance in several studies. For example, ultramarathon runners use mental strategies like self-talk, attention strategies, imagery, and goal setting to master their race (Simpson et al., 2014). Finally, both athletes and coaches identified the relevance of social support in order to improve performance, which is assumed to aid coping with stress in competitive contexts (Rees et al., 2007) and to protect from stress (Rees & Hardy, 2004). Coaches particularly emphasized the importance of their athletes' willpower and motivation in dealing with challenges, reflecting the complex discourse and interplay between these two

factors (e.g., Ainslie, 2020) and also raising questions for further research, such as whether athletes prefer to deal with effort or experience it as more justified.

Implications for If-Then Planning Research in Sports

To reiterate, we addressed our research question through the lens of implementation intention theory, which provides a conceptual framework of the role of obstacles and goal-directed behaviors in goal attainment. Interventions based on the theory commonly take one of two forms (e.g., Keller et al., 2019): (1) participants are either instructed to specify obstacles and goal-directed behaviors on their own or (2) they are given plans with predetermined obstacles and behaviors. In the first case, the assumption is that participants have sufficient insight in the obstacles that might jeopardize their goal attainment as well as sufficient knowledge about effective goal-directed behaviors. Based on our data, we addressed this assumption and established that athletes' and coaches' answers converge with findings in the sport psychology literature. The present research suggest that elite and youth level athletes and coaches have substantial insights into the obstacles associated with cycling competitions and the goal-directed behaviors they could use to deal with them. This puts them in the ideal position to devise effective if-then plans to enhance their performance, which might not have been the case with the less experienced exercisers that have been investigated in previous research on implementation intention theory in sports (Bieleke & Wolff, 2017; Hirsch et al., 2020; Hirsch et al., 2021; Latinjak et al., 2018; Wolff et al., 2018).

In the second case of interventions based on implementation intention theory, knowledge is required about what relevant obstacles and goal-directed behaviors are on the part of the researcher or practitioner. This is where our findings make an important contribution to designing effective sport psychological interventions based on implementation intention theory. One possibility to capitalize on the results of the present studies in future research is to combine the assessed obstacles and goal-directed behaviors into if-then plans to examine whether these if-then plans support athletes in optimizing performance. For instance, future studies might focus more strongly on negative affective reactions as obstacles (e.g., tension, nervousness, pressure, anxiety) than previous if-then planning interventions in endurance tasks did, whose focus was mainly on muscle pain (e.g., Hirsch et al., 2020; Thürmer et al., 2017; S. Wang et al., 2019) and on perceived effort (e.g., Bieleke & Wolff, 2017; Wolff et al., 2018). This seems particularly promising as negative affective reactions like aggression or anxiety have been observed to facilitate performance (Hanin, 2010; Lane et al., 2011), for example, when exercisers associate nervousness with a good performance. Regarding the goal-directed behaviors specified in previous if-then

planning research, a stronger focus could be on relaxation, concentration, preparation, or self-reassurance. Especially the focus on self-encouraging statements would reflect the importance of self-talk in sport psychology literature (e.g., McCormick & Hatzigeorgiadis, 2019). Indeed, while previous research has often specified task continuation (“Keep going”; e.g., Hirsch et al., 2020) as a goal-directed behavior and failed to observe enhanced performance, one study found positive effects of if-then planning on endurance performance when using self-encouragement as a goal-directed behavior (“I can do it”; e.g., Thürmer et al., 2017). Even though this study relied on a student sample, it provides preliminary support for our assumption that using the information obtained from athletes and coaches in the present study might allow researchers to design more effective interventions based on implementation intention theory in sports, given the frequent mention of self-encouragement by athletes and coaches. In addition, one could build on previous research in this area by combining implementation intentions with another effective strategy, namely mental contrasting (guides contrasting positive fantasies of the future with thoughts of resistant reality; for a detailed description, see Oettingen, 2015). Connecting mental contrasting with implementation intentions (MCII; Oettingen, 2014; Oettingen & Gollwitzer, 2010) successfully employs a similar formulation of wishes, optimal outcomes, possible obstructive obstacles, and plans, for example in the area of health (Stadler et al., 2010), or physical activity (Marquardt et al., 2017).

Further Considerations and Practical Implications

Some limitations of the present research should be noted. First, we relied on data sets from athletes and coaches who were not matched to each other (even though we cannot rule out that some of them already worked together). While this provided us with more diverse perspectives than dyadically matched data, it also limits our ability to directly compare the answers. For instance, future research might investigate whether athletes differ in their view on obstacles and goal-directed behaviors from their own coaches. Second, while the responses from coaches were collected via a paper-pencil questionnaire with a researcher on site, the athlete data were collected with an online survey which might explain the higher dropout rate among athletes. This might limit the generalizability of our results (e.g., athletes who dropped out might have named other obstacles and behaviors) but the online format allowed to recruit a larger number of athletes. Also, with regard to the obstacles and goal-directed behaviors mentioned, further questions arise that go beyond the scope of this study. For example, one notices discrepancies in the frequency with which pressure was mentioned: pressure is perceived as the most common obstacle by athletes, while coaches often see pressure as an important factor in achieving best

performance. Considering that a very controlling, pressure-building training style was more likely to be associated with demotivation (e.g., Haerens et al., 2018), this would be a factor to consider when training coaches in sport psychology interventions. One could speculate that the pressure that athletes named is also captured by the negative affect that coaches mentioned. Linking this to the factor of willpower (which only coaches mentioned), it could be assumed that coaches tend to build up pressure when they suspect that their athletes have too little willpower, while on the other hand, the athletes might choke precisely because of this pressure. This assumption might be supported by the goal-directed behaviors mentioned by athletes and coaches: For example, athletes mentioned relaxation, possibly to reduce pressure, while coaches emphasized concentration, motivation, and social support to increase willpower and thus athletic performance. However, this could create even more pressure for athletes. Future investigations might consider interviews with athletes and coaches to allow a more in-depth exploration (e.g., in terms of context) of the findings compared to the questionnaires used. This would allow to assess the extent to which athletes and coaches speak a different language for similar inner obstacles and goal-directed behaviors or where they might misunderstand each other. On a small scale, this would reduce the likelihood of unclear or overly general statements (as occurred in Study 2) and on a large scale would improve athlete-coach communication, thereby increasing athlete satisfaction.

Conclusion

This study explored athletes' inner obstacles and goal-directed behaviors in a competitive context from the perspective of athletes (Study 1) and coaches (Study 2). The qualitative analysis provided a comprehensive picture of inner obstacles (e.g., pressure, dealing with demanding situations, maintaining concentration, cycling technique) and goal-directed behaviors (e.g., preparation, self-encouragement, relaxation, concentration, social support). The results of this study contribute to sport psychological research with implementation intentions by providing new approaches regarding the mixed literature in this area (e.g., through new plan content) and underline the variety of emotional-psychological obstacles that elite and youth level cycling athletes face.

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Conflict of Interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Data Availability Statement

Questionnaires available at [//osf.io/2bqtx/](https://osf.io/2bqtx/).

Author Contribution

A.H., M.B., W.W., and J.S. contributed to the design of the survey. A.H. carried out the data collection. The first draft of the paper was written by A.H. Data analysis was performed by A.H.; M.B., W.W., and J.S. revised and edited the manuscript which was then finalized by A.H. All authors approved of the submitted version of the manuscript.

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Tables

Table 1.*Descriptive information on Study 1 and Study 2.*

Study 1		M	SD	Range	Study 2		M	SD	Range
Cycling experience (years)*		10.2	5.1	22.0	Coaching experience (years)	25.6	10.7	38.0	
Competitive experience (years) *		6.9	4.5	18.0					
No. of competitions		5.6	5.7	20.0					
Watts step test	m	351.7	105.4	100.0					
	f	302.0	49.2	520.0					
Cycling training (h/week)		12.1	3.9	15.0					
Training overall (h/week)		14.4	4.0	17.0					
Cycling disciplines**	Competition experience	Competitive discipline			Coached disciplines	Main discipline			
Road	27	13			37	23			
Track	15	8			18	2			
MTB	25	13			22	9			
Trial					1				
MTBO					0				
Cyclo-Cross	10				20	2			
No Answer					2	6			
Athletes' level***									
Elite (WT, KPT, KT)				7	8				
Elite (Elite Amateur, Amateur)				8	17				
Elite G/S Woman und Elite Woman				1	7				
Junior U19				8	23				
Junior (f) U19				2	7				
Other				8	25				

Note. *Athletes that indicated more than thirty years or less than one year experience were not included in the mean value calculation (cycling experience $N = 1$; competition experience $N = 2$). **MTB = Mountain biking, MTBO = Mountain bike orienteering. ***WT = World Tour, KPT = Continental Professional Team, KT = Continental Team.

Table 2

Themes used to code answers regarding inner obstacles and their definitions.

Theme	Definition	Example statements athletes	Freq.	Example statements coaches	Freq.
Dealing with Demanding Situations	Difficulties to deal with particularly demanding situations. This includes unforeseen events such as falls as well as difficult environmental conditions (unfavourable weather conditions, disadvantageous starting position, etc.) and personal situational difficulties such as experiencing pain.	<i>Pain relief; Bad starting place</i>	9	<i>Course conditions; surviving the mass start situation ("ride as far ahead as possible"); challenges on the course (e.g., extreme climbs, dangerous descents).</i>	8
Concentration	It is difficult for athletes to make a focused decision under high physical stress or to maintain concentration under distracting, irrelevant environmental factors, distractions that may arise internally or externally.	<i>To always stay alert in a 200km race. And to go beyond the limit at the end.</i>	7	<i>Make thoughtful decisions under high physical stress; 100% focus but not tense</i>	7
Pressure	Influenced from outside or by the person him/herself. Can be caused by different factors such as competition, own attitude of entitlement or the individual situation as well as by the lack of competence to distance oneself internally and can be perceived as a threat.	<i>Expectations; pressure to succeed; pressure to perform; competition</i>	10	<i>Pressure of expectations (internal + external);</i>	4
Cycling Technique / Strategy	This includes everything that is related to the applied tactical strategy in a broader sense. Applying/maintaining the strategy even when the situation might lead one to do otherwise. Recognizing and assessing the right moment in a race situation for certain strategic moves, but also having difficulty using these moments to one's advantage.	<i>To restrain oneself during long bike marathons, even though the legs seem to be able to give more;</i>	3	<i>Rolling along in the main field to save energy; completing difficult technical sections without crashing;</i>	7
Demotivation	Difficult to keep up motivation and not being able to motivate oneself despite/because of a negative situation occurring.	<i>Not giving up when being overtaken; catching up after falling behind and not letting the block in your head be intimidated by the time figure.</i>	5	<i>Motivation problems when the pace of the field cannot be followed; To finish the race, not to give up even in a hopeless situation.</i>	5
Self-Assessment	A correct self-assessment as a challenge. This includes, for example, not overestimating oneself prematurely and then collapsing, but also not underestimating oneself and possibly risking too little. Overcoming a negative self-assessment or achieving a positive self-assessment also falls into this category.	<i>Assessing your own strength and attacking at the right moment; sections that didn't work well during training</i>	4	<i>Not to become arrogant; self-assessment of tactical-technical performance; self-doubt.</i>	6
Tension	High nervousness or an increased state of arousal (due to stress, hectic, excitement) hinder athletes from being able to deliver the best performance or to prepare well for the competition.	<i>Excitement before the competition; playing down excitement</i>	5	<i>Nervousness at start (and prior); too high activation level</i>	4
Mental Exhaustion¹	A decrease in mental strength due to increased mental stress. This can show itself, for example, in increased distractibility / diminishing focus.	<i>Moving clever in the field costs mental energy, because of permanent concentration</i>	2		
Goal Pursuit¹	The constant pursuit of the goal and the belief in the goal as a mental challenge. Continuing to pursue the goal even when (mentally) exhausted or lagging behind as a challenge.	<i>Believe from the beginning to the end that the goal can still be achieved</i>	1		
Insecurity²	Athletes react with insecurity to demanding situations in competition.			<i>Classification in the starting field ("There are so many strong/better athletes"); Not knowing about strength of competition</i>	5
Willpower²	Athletes cannot always maintain their will to go to the limit of performance.			<i>Perseverance; overcoming limitations.</i>	5
Fear²	Athletes suffers from anxiety concerning their performance and competition, are afraid to fail.			<i>The higher the level, the more existential fears; fear of failure, of not performing up to expectations</i>	4
Planning²	Athletes still have difficulties to plan the correct dealing with certain challenges.			<i>1. Warm up 2. Start of the race, Pedalling 3. Contact with escapees</i>	4

Distraction²	Athletes are too distracted prior to competition to prepare themselves well.	<i>Focus too much on external factors (forgetting about eating)</i>	3
Flexibility²	It is difficult for athletes to react safely and quickly to changing conditions.	<i>Reactions to changed competition situation (keyword Plan B);</i>	3
Other	Not classifiable		1

Note. ¹ refers to obstacles only stated in Study 1, while ² indicates obstacles reported only in Study 2.

Table 3

Themes used to code answers regarding goal-directed behaviors and their definitions.

Theme	Definition	Example statements athletes	Freq.	Example statements coaches	Freq.
Preparation	Athletes prepare intensively for the competition and plan how to deal with difficult or critical situations.	<i>Regarding food and drink: develop routine + logic regarding KH-turnover and calorie consumption and maximum KH intake as well as fluid supply; pacing strategies</i>	7	<i>They require an extremely large amount of information on the competition requirement, competition, except. Conditions, etc.; talking through individual actions in your head (line choice, riding actions, self-motivation).</i>	11
Self-Encouragement	Any form of speaking to oneself. Mental (for outsiders not audible) self-promotion like speaking aloud with oneself.	<i>I tell myself that it is only a momentary state and will get better abruptly in the next rounds; not to give up talking to myself</i>	6	<i>...the opponent is no better. Get through the next round like the previous one; Only the good ones stay The losers leave</i>	6
Calming / Relaxation	Maintaining a calm, serene inner attitude when mentally challenged. Also, actions that promote relaxation or reduce hectic/stress.	<i>Regarding riding in the field, concentration, and tactics: Try to stay relaxed, don't tense up; try to stay calm and tell myself that I trained well. Have fun</i>	6	<i>Conversation leading to the fact that all opponents are equal, are to be taken equally seriously</i>	2
Concentration	Athletes concentrate and blank out everything else.	<i>Trying to think logically as much as possible, retrieve learned and also use more and more feeling and routine</i>	1	<i>Focus on own pre-start process; hide own weaknesses, concentrate on strengths</i>	7
Social Support	Support from people in the social environment, such as family members, friends, coaches, etc.	<i>Talk with parents or coach</i>	1	<i>Cooperation with trainer (encouragement, strategy, cheering); team meeting</i>	7
Imagination	Athletes use motivational images or imagery.	<i>About going to the limit: Thinking about why you are doing it, playing music in your head or certain motivating phrases. Create feelings that release performance, e.g., euphoria, anger.</i>	4	<i>Think of images; you can do this, the road is one with you think and imagine yourself riding the track.</i>	2
Repression¹	The mental challenge is ignored, blanked out or repressed by athletes.	<i>Fade out</i>	4		
Visualization¹	Something is pictured to deal with the mental challenge. This can be a past training as well as a future race. The visualization can happen before or in the situation.	<i>Visualization of the race situation, the attack, the victory in the head prior to the race.,</i>	3		
Excessive Demand¹	Athletes have inadequate strategies to deal with mental obstacles. Implies that athletes are impaired in their performance by their mental obstacles.	<i>Serene, but sometimes also overwhelmed; Bad</i>	3		
Focusing¹	Focus (concentration) on the own person. The actions of other people and the situation recede into the background.	<i>I do my own thing</i>	2		
Fun¹	Athletes try to meet the mental challenge by having fun with the activity (in this case, cycling) or use fun that does not come from the activity itself as coping.	<i>Trying to stay calm and tell me that I trained well. Have fun</i>	1		
External Aids¹	These include technical aids that are external to the person, such as special apps, etc. These categories also include aids that the person uses before or during the stress situation, such as certain drinks, food, or music.	<i>Take a deep breath, music</i>	1		
Undifferentiated²	No specific handling can be derived from the answer.			<i>Varies from type to type</i>	10

Negative Assimilation ²	Athletes process mental obstacles negatively and may react irritably or withdraw themselves.	<i>Individual; introverted, sometimes aggressive behaviour; nervous, talking out of it</i>	6
Mindset ²	Athletes deal with mental obstacles with a certain attitude.	<i>Positive basic attitude</i>	3
Motivation ²	Athletes are highly motivated for the competition.	<i>High intrinsic motivation</i>	3
Tension ²	Athletes reacts nervously to mental challenges.	<i>Nervousness is projected onto various trivialities (e.g., supposedly "bad" food). They then get caught in a spiral of discomfort and are then unable to ride optimally activated.</i>	3
Willpower ²	Athletes use their will, e.g., to win.	<i>Will to fight, will to win (victory rider);</i>	2

Note. ¹ refers to strategies only stated by in Study 1, while ² indicates strategies reported only in Study 2.

Figures

Figure 1

Visualization of the frequencies of (A) inner obstacles and (B) goal-directed behaviors of athletes' (Study 1) and coaches' (Study 2) perspective.

Figure 2

Perceived helpfulness of solutions to overcome inner obstacles in Study 1 and Study 2 (scale from 1 = “not at all” to 5 = “very much”).

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