JYX
JYVÄSKYLÄN YLIOPISTO
UNIVERSITY OF JYVÄSKYLÄ

This is a self-archived version of an original article. This version may differ from the original in pagination and typographic details.

Author(s): Saint-Martin, Samira V.; Turner, Martin J; Ruiz, Montse C.

Title: Mental preparation of olympic and paralympic swimmers : performance-related cognitions and emotions, and the techniques used to manage them

Year: 2020

Version: Published version

Copyright: © JPES, 2020

Rights: In Copyright

Rights url: http://rightsstatements.org/page/InC/1.0/?language=en

Please cite the original version:

Saint-Martin, S. V., Turner, M. J., & Ruiz, M. C. (2020). Mental preparation of olympic and paralympic swimmers : performance-related cognitions and emotions, and the techniques used to manage them. Journal of Physical Education and Sport, 20(6), 3569-3578. https://doi.org/10.7752/jpes.2020.06481

Journal of Physical Education and Sport ® (JPES), Vol.20 (6), Art 481, pp. 3569 - 3579, 2020
online ISSN: 2247 - 806X; p-ISSN: 2247 – 8051; ISSN - L = 2247 - 8051 © JPES

Original Article

Mental preparation of olympic and paralympic swimmers: performance-related cognitions and emotions, and the techniques used to manage them

SAMIRA V. SAINT-MARTIN[1], MARTIN J. TURNER[2], MONTSE C. RUIZ[3]
[1,3,]Faculty of Sport and Health Sciences. University of Jyväskylä, FINLAND.
[2] Department of Psychology, Manchester Metropolitan University, UK

Published online: December 30, 2020
(Accepted for publication: December 15, 2020)
DOI:10.7752/jpes.2020.06481

Abstract
Purpose: The present study investigated the cognitions and emotions of swimmers,and explored thepsychological techniques they use to manage these internal processesprior to and during their best and worst performances. *Method*: Seven Paralympic and five Olympic male Brazilian swimmers took part in this qualitative study. A semi-structured interview with open-ended questions was conducted to explore how swimmers interpreted and experienced specific competitive events and what they did to manage their internal processes, prior to and during what they considered to be their best and worst performances. The process of data analysis included inductiveand deductive approaches. Cognitive therapy theory wasused to establish some of the themes and sub-themes, also to contribute to the data analysis.*Results*: Functional cognitions and pleasant emotions were more commonly reported by swimmers associated to their best performances, whilst dysfunctional cognitions and unpleasant emotions were more common in their worst performances, both influenced by their beliefs about the preparation during the season.Swimmers used imagery, breathing, music, self-talk, and cognitive restructuring to manage their cognitions and emotions, mainly in the day of their best performances. Although swimmers believed that cognitions and emotions could influence their performances, they reporteddifficulty identifying, evaluating, and modifyingtheir dysfunctional thinking. *Conclusion*:Our findings suggest that different patterns of cognitions and emotions were related to swimmers' best and worst performances, which were influenced by their beliefs about the preparation during the season.These results support the use of individualized and task-specific mental preparation programsto help athletes identify and manage dysfunctionalcognitions and emotions, and elicitadaptivebehaviors.
Keywords: Psychological techniques; cognitive model; CBTs; athletic performance..

Introduction

Emotional experiences are the core component of athletes' psychobiosocial states, which also involve cognitive, motivational, bodily, motor-behavioral, and communicative components (Hanin, 2010; Ruiz et al.,2016). Emotional reactions occur as a result of cognitive processing, in which realistic or unrealistic processing of internal stimuli (e.g., cognitions) or external stimuli (e.g., environment) will produce healthy or unhealthy emotional reactions (Hyland & Boduszek, 2012).Athletes would benefit from learning to consider their cognitions as hypotheses, and by testing their validity, they could modify their cognitive appraisals from unhealthy and maladaptive to more evidence-based and adaptive cognitions (Moran, 2012).

Considering the influence of cognitions on people's emotions, cognitive behavioral therapies (CBTs;Beck, 2005; Ellis, 1995)havebeen successfully appliedto a variety of sports modalities (Didymus & Fletcher, 2017; Turner & Barker, 2014; Turner&Davis, 2018).The key construct underlying cognitive behavioraltherapiesis the concept of*cognitive model* that considers the link between cognition, emotion, and behavior, whereby it is not the situation itself that determines what people feel or how they react, but the way they interpret it that will generate emotions and influence their behavior (Beck, 2011).The integration of psychological preparation to manage these variables should be carefully chosen to meet the requirements of the sport and the athletic skills (Birrer & Morgan, 2010). The use of CBTswithin athletes' psychological preparation programs may help them become aware of their cognitions and emotions influencing their performance, and manage internal and external events triggering them (Turner & Bennett, 2018).

CBTs have been used to teach athletes how to identify cognitions also known as*automatic thoughts* (Didymus & Fletcher, 2017;Turner, 2016, Whelan et al., 1991).Automatic thoughts can be functional or dysfunctionalgenerating pleasant or unpleasant emotions, which may influence behavior and sport performancepositively or negatively (Beck, 2011; Ruiz et al., 2017). Miles et al., (2016) explored the cognitions of elite athletes associated with a variety of competitive stressors (e.g., selection of players to the game) thatresulted in pleasant (e.g., happiness) and unpleasant (e.g., anxiety) emotions. A realistic evaluation of the

Corresponding Author: SAMIRA V. SAINT-MARTIN, E-mail: samira.psicologia@gmail.com

eventcould be useful in modifying cognitions, which in turn influencethe experience of emotionsand may elicit adaptive behaviors (Beck, 2011; Weaver et al., 2014).

Events, cognitions, and emotions can be interpreted in different ways, based on previous experiences and expectations (Beck, 2011; Mahoney & Avener, 1977).For instance, in a study by Didymus and Fletcher (2012) with 13 swimmers, more than 200 organizational stressors were appraised as threat, challenge, and harm or loss. One swimmer experienced a particular stressor as a challenge, but the same event was appraised as a threat in a different moment. In another study by Sofia and Cruz (2016)similar findings were observed with experiences of anger related to competition in 269 athletes. Significant differences were found in fight or flight response, anger rumination, antisocial behavior towards teammates and opponents, and self-control among athletes with different levels of anger. Similarly, previous research has found that anger can be perceived as facilitating and debilitating for performance (Ruiz & Hanin, 2011), with 75% of the high-level karate athletes reporting facilitating effects of anger and 60% of the athletes reporting debilitating effects. Taken together, these studies illustrate the importance of identifying cognitions and emotions that influenceperformance, and the way these internal processesare interpreted by the athletes.

Besides helping individuals identify and respond to automatic thoughts, CBTs also provide a variety of psychological techniquesto athletes and teams to manage their internal processesduring training and competition. The most common techniques include imagery, self-talk,relaxation or arousal regulation (e.g., breathing), goalsetting,and thought managementsuch as cognitive restructuring (Andersen, 2009; Beck, 2011;Didymus & Fletcher, 2017; Gustafsson et al., 2017; Vealey, 2007; Weinberg & Gould, 2015). The psychological demands of a specific sport distinguish which psychological skills are required, allowing the sport psychologist to selectpsychological techniques to improve the athlete's psychological skills (Birrer & Morgan, 2010; Gould & Maynard, 2009). This topic requires further investigation.

The reported usage of techniques by athletes as part of their psychological skills training in high-intensity sports (e.g., swimming) to enhance performance is increasing (Birrer & Morgan, 2010).According to Birrer and Morgan, high-intensity sport is characterized by an impact duration between 1 and8minutes, with a very high-impact intensity and a continuous power output throughout theperformance.Due to the demands of the sports in a short time frame, they pointed out the need to manage the high level of stress and pressure, and the pain and fatigue, typical of swimming competition (Birrer & Morgan, 2010). They also highlighted the need for more research related to whichpsychological training techniques are being usedby these athletes, the purposes for their usage, and their effectiveness.

Psychological techniquessuch as imagery, self-talk, relaxation or arousal regulation, goal setting, and thought managementhave been extensively used in most sport psychology intervention research (Vealey, 2007), as well as clinical psychology (Beck, 2011), showing positive and sound results (Weaver et al., 2014). Research has demonstrated different ways to execute techniques in sport context (Andersen, 2009; Van Raalte et al.,2016; Vealey, 2007; Williams et al., 2013). Although these techniques can be performed singly or in combination, most research has investigatedthemseparately(Gould & Maynard, 2009; Van Raalte et al., 2016; Vealey, 2007; Williams et al., 2013). Therefore, the effectiveness of psychological preparation including a variety of techniques aimed at managingathletes'internal processes remains unclear, especially when consideringhigh-performance athletes (Dieffenbach & Statler, 2012). High-level athletes are typically very difficult to access and the design of controlled interventions is challenging.

High-level (i.e., Olympic and Paralympic) athletes have reported using psychological strategiesto regulatetheir cognitions, emotions, and psychological responses(Dieffenbach & Statler, 2012). Moreover, research has shown that Olympic and Paralympic athletes display similar psychological skills, indicating that elite athletes, with or without physical disabilities, share similar needs and experiences (Baĉanac et al., 2014; Dieffenbach & Statler, 2012). On the other hand, differences in psychological skills were found comparing successful and unsuccessful soccer teams (Coetzee et al., 2006). Additionally, it is suggested that athletes' patterns of cognitions are strongly correlated with successful and unsuccessful performances (Mahoney & Avener, 1977). Thus, athletes should be encouraged to reflect on the factors that influencing their performances, associated cognitions,andemotions (Turner& Barker, 2014).

Research has shown thatmany athletes experience difficulties in managing their cognitive processes (Birrer & Morgan, 2010; Gould & Maynard, 2009; Vealey, 2007). According to Gould and Maynard, more research is needed, in which mental preparation strategies are contrasted comparing performances (e.g., best vs.worst matches) of the same athlete. Many studies have been conducted on psychological strategies and characteristics of successful athletes, but more is needed to understand the behaviors and attitudes of athletes comparing different levels of performance. Thus, it is relevant to investigate whether and to what extent athletes are aware of their cognitions and emotions, how these influence their performances,and how they manage these internal processes. Therefore, the purpose of the present exploratory studywas to investigate thecognitions and emotions of Paralympic and Olympic level athletes before and during what they considered to be their best and worst performances.A secondary purpose was to examine what techniques athletes used to manage their internal processes.

Material & methods

Participants

A purposeful sample of 12 male Brazilian swimmers, five Olympic and seven Paralympic athletes (six withcongenital physical disability, and onewith severe visual impairment)were recruited. Their age rangedfrom 22 to 37 years old (M = 26.16, SD = 4.32). They started swimming when they were 3 to 29 years old (M = 10.66, SD = 7.03) and they became professional athletes (i.e. signed their first contract)at the age of 14 to 30 (M = 17.75, SD = 4.09). All athletes participated in one to three Olympic or Paralympic Games (M = 1.5, SD = 0.67). Nine swimmers were sprinters in all four strokes, and three were middle distance freestyleswimmers.

Instrument

A semi-structured interview was designed with open-ended questions, which permitted an in-depth exploration of how swimmers interpreted and experienced specific competitive events and what they did to manage their internal processes. The interview was separated into three sections: the first section focused ontheir best performances.At the beginning of this section, the participants were asked to recall what they considered to be the best performance in their careers. They were given time to recall the competition and the specific race, and to speak freely about it to help improve the accuracy of the evoked information. Then, the athletes answered 11 questions, such as *"What did you do in the day of this race?*", in which they could decide from which moment they wanted to talk about (e.g., at the hotel, at the competition venue). Then, using the mentioned situation, the questions focused on internal processes, for instance:*"What did you feel while you were (e.g. warming up)?"*, and "*What was going through your mind when you felt that way?"*. Also, what was done to manage the cognitions and/or emotions:*"What did you do to manage it?"*. The same set of questions was used to enquire about internal processes andtechniques used during the races. The swimmers could speak freely at the end of this section in case they had remembered something or wanted to add information they considered relevant.

The second section of the interview was similar to the first one, but itfocused on what the swimmers considered to be theirworst performances.They were given time to recall the competition and the race that they considered to be the worst performance in their careers and to speak freely about it, to help improve the accuracy of the recalled information. There were also 11 questions to investigate the internal processes and the techniques used before and during the race mentioned. The thirdsection of the interview containedthree questions thatinvestigated theswimmers' awareness about internal processes and the influence on performance, for instance: *"Do you think that there is a relationship between the way you think and the way you feel? Can you tell me more about it?".*At the end of the interview, swimmers were given the possibility to speak freely to add information they considered relevant.

Procedure

Ethical approval was gained from the institutional review board where the first and third authors are based. A pilot study was conducted via Skype (video calling software), with a Brazilian professional swimmerto check understanding and flow of questions. Minor amendments were made to the question order to facilitate recollection of the competitive events and the aspects related to them.The first contact was made with the coaches from bothteams to explain the study purpose. Then, the coaches provided a list of participants who fit in the inclusion criteria (i.e. males who have participated in an Olympic Game) and their contact information (i.e. cellphone number). Fifteen swimmers were invited to participate in the research and received information about the study purpose and procedures. Twelve athletes agreed to participate in the study and signed an informed written consent. All individual interviews were conducted in Portuguese by the first authorat the teams' training site. Following participant consent, the interviews were audio recorded, and lasted from 25 to 40minutes (M = 32.5 minutes).

Dataanalyses

All interviews were transcribed verbatim. Due to the exploratory nature of the study qualitative thematic analysis was used. This type of analysisemphasizes the identification, examination, and creation of themes within data (Braun & Clarke, 2006). The following six phases suggested by Braun and Clarkewere followed to create established and meaningful patterns: familiarization with the data, generating initial codes, searching for themes among codes, reviewing codes and themes, defining themes and giving names, and the final report.Interview transcripts were read several timesby the first author to get familiar with the data.Different numbers were assigned to each athlete to ensure the participant's anonymity. Then, codes were developed from the raw data using software ATLAS.ti 7 (Friese, 2014). Themes and sub-themes were developed from the list of codes and patterns.The process of data analysis included inductive (i.e.,themes and sub-themes identified from the data) and deductive approaches (i.e., cognitive model).Cognitive therapy(Beck, 2011)theory was used to establishother themes and sub-themes, also to contribute to the final report, in which the competitive events, associatedbeliefs, and the internal processes were analyzed together.

A second coder created their own codes and themes, which were compared across coders. The divergent codes and themes were discussed, anda consensus was reached.The final list of themes, sub-themes, and the quotes weretranslated to English, agreed by both coders, andchecked by the third author.To maximize research quality, this processof data analysis was employed to secure that there was general agreement between the two coders and the third author on how codes and themes were developed. Also, to secure that all definitions were

clear and inclusive of all the possible types of responses, and not for the purposes of establishing inter-rater agreement, since it does not ensure rigor in qualitative research (Smith & McGannon, 2018). Following recommendations by Smith andMcGannon, member checking was not employed as it is unlikely to generate new insights that could be used in further analysis (Tracy, 2010).All the interviews were conducted before the data analysis started. When ongoing analysis is not possible, the quality of dataand sampleshould be able to promote data sufficiency and answer the research questions (Suri, 2011), which was achieved with the in-depth interviews and the purposeful sampling.

Results

The main emergent themes and sub-themes are presented in Table 1. Since the Olympic and Paralympic swimmers provided similar contents during the interviews, fitting within the same codes and themes, results are presented together.Swimmers identifiedtheir best (and worst) performances as best (or worst) results in a race, qualification for a championship, and achieving (or not) their expectations.For bothbest and worst performances, the swimmers reflected on the same swimming strokes, some times at the same event. For example,one swimmer identified his, best performance during the semi-final and the worst performance duringthe final in the same championship.

Cognitive model

In this theme, the cognitions, emotions, and the consequences on performance are presented in Table 2. In their best performances, swimmers' beliefs about the preparation throughout the season contributed to the evaluation of the events. All the swimmers mentioned having had good preparation regarding physical, psychological, and technical aspects, which led them to feel confident and prepared for the competition. Although some events on race day triggered thoughts of doubt, the beliefs about the preparation and previous results in the same day, influenced positively their attitudes. The swimmersreported that they faced the competitions in a similar way, which ledthem to have a positive attitude towards it: *"I did not face it as a big challenge, I faced it as something that I did every day during practice" (#12)*. All swimmers had functional automatic thoughts before their best performances, which led to them experiencing pleasant emotions. Three swimmersalso had dysfunctional automatic thoughts, and anxiety was the only unpleasant emotion mentioned by six swimmers before their races. However, they felt secure about performing well and described anxiety as *"nice adrenaline" (#5).*

During the races, the swimmers also had functional automatic thoughts, which influenced pleasant feelings. However, two swimmers had dysfunctional automatic thoughts and the unpleasant feeling mentioned was muscle pain. It was mentioned that external factors were important during the final meters and helped for instance, oneswimmerto overcome the pain: *"By the end of the race I was feeling too much pain, and the crowd was a motivational factor in that moment, and I knew it was for me" (#5).*Such cognitions and emotions were seen as beneficial for performance. The swimmers reported being able toaccomplish what they had planned, even inthe presence of dysfunctional cognitions and unpleasant feelings. Swimmers reported achieving their goals and having what they considered to be their best performances.

Regarding worst performances, beliefs about alack of preparation ledswimmers to have a negative attitude towards the competitive events. Nine swimmers believed that they did not have good preparation during the season,geared to their needs, as mentioned: *"I am sure that the trainings were not what they should have been" (#4)*. Dysfunctional automatic thoughts were very common before the worst performances of ten swimmers(see Table 2). These thoughts started weeks or days before the competition, due to personal or professional reasons, such as *"my team ceased its activities" (#4*). Although functional automatic thoughts about the possibility to perform well were mentioned, dysfunctional thoughts were recurrent, and theswimmersdid not know how to manage them. On the other hand, two swimmers mentioned being overexcited aboutthe possibility to win a medal, which influenced their emotions positively.Cognitions and emotions were perceived differently in their worst performances. Anxiety was faced as something harmful, with swimmerswho reported not having good sensations in the water during the warm-up,not being able to managesuch experiences: *"The water was heavy, I was not pulling enough water. Maybe everything was right, but in my head it was not" (#8).*

During the races, dysfunctional automatic thoughts were also very common and generated unpleasant emotions. The cognitions were triggered by internal events, such as comparing themselves with their opponents, or and external events such as and uncertain about the race strategy. They also had positive thoughts, however, according to the swimmers, these were not enough to regulate their dysfunctional cognitions. Swimmers who had high expectations about winning a medal, mentioned having had negative cognitions when the race started: *"I was thinking that I had real chances to be on the podium. But as soon as I started swimming, I messed up the start and for the 50m there is no time to recover" (#9).*There were different negative consequences on performance, for instance swimmers were not able to achieve their goals, couldnot execute their race strategies following their established plans. Thus, swimmers had what they considered to be their worst performances.

Psychological techniques

This theme covered the different techniques the swimmers reported usingregarding best performances (see Table 3). All swimmers reported using imagery in different moments and for different purposes, mainly on the race day. The time and place influenced the way theyused imagery to achieve their goals. The swimmersalso

added features to the techniqueto image the whole race close to their ideal time. The purposes of using imagery were achieved in the best performances, as exemplified: *"I did imagery to count how many strokes I had to do, the rhythm of them, and the force that I had to do in each of the 50 meters, to finish the race the way I wanted" (#5)*. Imagerywas not reported as being used during the race.

Different breathing techniques were usedmainly throughout the race dayin different moments by most swimmers, for example:"*During the warm-up I used slow breathing.But right before the announcement, I started doing faster breathing" (#5)*. The purposes of using breathing techniques varied, which influenced how they were executed, singly or along with other techniques. During the race, swimmersused rhythmic breathing orheld their breath, both as part of their race strategies. Only one swimmer stated that not using breathing techniques.

Music was used by seven swimmers, with four of themusedit with specific focusing purposes, and three of them using music as a distraction. The swimmersused different musical genres in variousmoments throughout the race day, mainly at the competition venue, used along with some other techniques. Music was reported as being part of the swimmers'daily routines, helping them to be prepared: *"Music is part of my routine during practice. When I listen to music in the competition, my brain knows that it is time to go hard" (#2)*.Three swimmers stated not liking to use music in any moment.

Self-talk was used in different moments at the competition venue. Motivational and instructional self-talk were used along withsome other techniques, as illustrated: *"I told myself how I would swim and the rhythm of the strokes while I saw myself swimming" (#4).*The different purposes for the use of self-talk were achieved in the best performances. During the races, instructional and motivational self-talk were used by six swimmers. Five swimmersmentioned that they did not use self-talk, indicating thatthey had never practiced this techniquebefore,thus, they did not feel confident it could be useful.

Lastly for the best performances, cognitive restructuring was used mainly throughout the race day, at the competition venue.The swimmersstated that this technique helped them to have more realistic cognitions, reconsidering their emotional states, as exemplified: *"I was anxious, but then I thought about it and, in fact it was not anxiety, it was desire to swim, I knew my potential" (#7).*During the race, four swimmers reported using cognitive restructuring to manage internal and external factors, such as opponents, as illustrated: *"I thought 'I am pushing hard as I always do, and I am losing him. Am I right or he is risking? No, I think that he is risking, I will do it my own way'" (#12).*

As Table 4 shows, the use of techniques to manage the internal processesof swimmers in their worst performances was less frequent. Swimmersexecuted the techniques in different ways and moments,with the purpose of modifying dysfunctional cognitions and unpleasant emotions,however,they reported not being able to manage to use them effectively.Imagery was used in less variedwaysmainly in the week and the race day. Only one swimmermentioned having achieved his goals using this technique. Six swimmers did not use imagery because they wereunfamiliar or uncertain about using it: *"I was afraid that if I had done that, it could worsen my emotional state" (#8)*. One swimmerdid not use imagery, believing he had a chance to be on the podium: "*I was thinking 'I'm going to win, this medal is mine'. So, for this race I did not do imagery, I was thinking about the medal and I forgot that firstly I had to swim!" (#9).*

Deep and slow breathingwasmentioned, followed by deep and fast breathing to manage emotional states, mainly at the competition venue. Breathing was also used along with some other techniques. Three participants reported such techniques being successful momentarilyhelping them to achieve the intended purposes. During the race, one swimmerused rhythmic breathing as part of his race strategy. Moreover, three swimmersmentioned that breathing techniques were not used, as they reported not knowinghow to use them effectively.

Five swimmers reported using music throughout the race day, withthree of them indicatinghaving being able to regulate their emotional states.Three swimmers mentioned that at that time, they did not use music orthey had not considered using it for specific purposes, and threeother swimmersbelieved that musiccould trigger some other unintended emotional states.

Motivational self-talk and positive self-talkwere used mainly at the competition venue, however swimmers reported that they were not effective. During the race, three swimmers mentioned having used negative self-talk, believing they did not have any chance to succeed. Additionally, instructional self-talk was reported to be ineffective, as exemplified:*"I was screaming to myself, but my body was not responding" (#1)*. Four swimmers stated not using self-talk.

Lastly for the worst performances, one swimmerachieved his goals using cognitive restructuring at the competition site. According to this participant, other techniques were not as effective in managing dysfunctional cognitions and emotions, as mentioned*: "Analyzing the thoughts and understanding where they come from is the most valid technique to me, more helpful than thinking positively, breathing, or positive self-talk" (#2)*. The five swimmers who used cognitive restructuring in their best performances reported not been able to apply this technique in their worst performances and were unable to manage their cognitions and emotions, as shown: *"I noticed that there was something wrong in the swimming technique, and instead of focusing on improving it, I focused on the feeling of something being wrong" (#8).*

The techniques mentioned above were reported to assist theswimmersto manage their cognitions and emotions successfully in their best performances. In contrast, this did not the casein their worst

performances.Eleven swimmers mentioned that they learned the techniques or got better at utilizing them to achieve specific purposes with the help of a practitioner, as stated: *"Most of the techniques that I know like imagery, especially how to evaluate my thoughts, I learned with my psychologist" (#2).*Other sources, such as *"yoga classes" (#1)* and *"observing other swimmers" (#6*) were also effective for swimmersto learnhow to use effective breathing techniques and musicuse to regulate their internal experiences. Eight swimmers had their worst performances prior totheir best performances, which led to seven of them starting a systematic psychological preparation.

Perceptions about cognitions-emotions relationship and the influence on performance

In this theme involvingswimmers'perceptions about the relationship between cognitions, emotions, and performance, ten swimmers mentioned that there was an interplay, in which positive or negative cognitions trigger emotions, while two swimmerssaid that this relationshiponly existed occasionally. Eight swimmersbelieved that cognitions trigger emotions, but that they both influenced each other, as reported: *"Everything that you think will generate emotions, and if you are not aware of it, the negative emotions will worsen your thoughts" (#5)*. Allswimmersbelieved that cognitions and emotions played an important role and influenced their performances. They also stated that functional cognitions facilitated their performance, letting them perform to the highest of their capabilities, whereas dysfunctional cognitions prevented this from happening.

Ten swimmers mentioned using techniques and strategies to regulate dysfunctional cognitions and unpleasant emotions, withsix swimmersindicating that they tried to evaluate their cognitions, searching for evidence to confirm or deny them. According to the swimmers, realistic thinking helped them manage cognitions and regulate theiremotions, helping them being more aware of situations, and carry out their plans, as exemplified:

> *"On its way to the competition venue, the bus got lost. Everybody was desperate, and I thought "Wait, let's make it happen, what can I do?".... When everything was OK, whereas some people were shaking, I took a deep breath and I thought 'Ok, everything is solved now, let's work'. So, it is about knowing how to think during these moments" (#2).*

Three swimmersmentioned using positive thinking to deal with potential negative cognitions and unpleasant emotions. However, the swimmersalso stated that being unsure about the effectiveness of this strategy.Moreover, the importance of a good preparation during the season, and a pre-performance routine were raised, both to manage their dysfunctional internal processes and to distract themselves: *"Even if I am feeling weird or having negative thoughts, I know that if I follow my routine, I will do everything that I need, and then, I forget what I was thinking" (#9).*Two swimmers indicatednot having aspecific plan to manage their internal processes and not beingsureabout how to do it.

Discussion

The present study investigatedthecognitions and emotions of 12 Olympic and Paralympic swimmers before and during their best and worst performances. Furthermore, what techniques the swimmersused to manage these internal processes were investigated. Regarding the first theme, it was presented that for the Olympic and Paralympic swimmers, theirbeliefs about the preparation during the season influenced their evaluation about the competitions. In their best performances, swimmersconsidered the preparation a positive aspect that helped them to achieve these results. In the case of worst performances, swimmersbelieved that there was a lack of preparation, which influenced negatively their performances. These results add relevant information, since they showthe swimmers' sources of the cognitions and emotions. It can explain the way that swimmersfaced the competitive events, since according to Beck (2011),the beliefs can influence the way that situations are perceived. It corroborates the statement that the facilitative interpretation of cognitive and somatic variables is considered as suitable to fulfill the psychological demands of many sports (Birrer & Morgan, 2010). Moreover, Deen et al., (2017) have shown that changes in irrational beliefs led to pleasant emotions and more adaptive behaviors.

Functional cognitions leading to pleasant emotions were more common before best performances, while swimmers managed successfully dysfunctional cognitions and unpleasant emotions. On the other hand, dysfunctional cognitions and unpleasant emotions, more common in worst performances, were difficult to be managed by the athletes.Regarding the influence of beliefs on internal processes,these cognitionsseemed to have been generated by the swimmers' beliefs about the season, and those patterns are related to their behaviors.Additionally, the same emotion (e.g., anxiety) wasperceived differently in both performances, suggesting that it was reappraised, influenced by those beliefs. These findings concur with those of Mahoney and Avener (1977), as well as Coetzee et al., (2006), who suggested that patterns of cognitions and psychological skills correlate with successful and poor performances. The findings are also in line with the notion that athletes' experiences are individual and can have facilitating or detrimental effects on their performance depending on their appraisals of the situation, their experiences, and the capability to deal with task demands (Ruiz et al., 2017; Ruiz & Robazza, 2020).

Regarding the second theme, all swimmers appliedpsychological techniques mostly before their best performances, and the time and purpose ofthe techniques influenced their execution.These findings corroborate

with previous studies, whichsuggested that multiple types of techniques are important for athletes' success, giving them more options to cope with emotions (Gustafsson et al., 2017) and different situations of training and competitions (Birrer & Morgan, 2010; Weinberg & Gould, 2015). The present findingsare also in line with the notion that athletes tend to use mental techniques more in competitions than in practice (Vealey, 2007).Additionally, the fact that Olympic and Paralympic swimmers reported using same techniques for similar purposes, concurs with the idea thatthese elite athletesface similar preparation needs and skill demands (Dieffenbach & Statler, 2012).

Swimmers started practicing imagery weeks before the competition, and all of themused it in the dayof their best performances.Imagery was executed in different ways, involvingseveral dimensions to make itmore realistic. Moreover, the swimmers reported that this technique helped them to manage internal processes in their best performances.The present findings support those of Williams et al., (2013), who indicated that the timing influences how the technique is used.It is thus, recommended that athletes should be encouraged to practice imagery daily, more vividly, rehearsing for instance, overcoming barriers and what they would like to accomplishin a competition (Vealey, 2007; Williams et al., 2013).

Breathing techniques were used to regulate the emotional states of swimmers before their races, and also as part of their race strategies. Research has indicated that sprinters for instance, do hyperventilation before races to try not to breathe during them (Jacob et al., 2015). Williams and Andersen (2007) have suggested that deep breathing exercises can lower physiological activation level,whereas short breathing exercises can increase the activation level.The use of breathing exercises along with relaxation and meditation are in line with Beck (2011), who suggested that people can benefit from learning these techniques to manage stress symptoms.

The athletes used different musical genreswith specific purposes, also used it only as distraction. This information can illustrate the statement that music maybe used as distractionbecause of the emotions it evokes,to regulate emotions, to enjoy or comfort themselves, and to relieve stress (Juslin & Västfjäll, 2008). Research indicates that music can help swimmers regulate their performance related states (Middleton et al., 2017), and facilitate flow states(Norsworthy et al., 2017), which can help explaining the purposeful use of it by the athletes.

Self-talk wasreported to beneficially assist the swimmersto change cognitions or emotions before and duringbest performances, although the same effect was not mentionedin the worst performances. Self-talk is ideal whenit helps athletes to direct attention,to be motivated, and to focus on the task (Van Raalte et al., 2016; Vealey, 2007), such as the instructional self-talk reported.However, self-talk may lead to overthinking, disturbed focus,and unpleasant emotions, and positive self-talk, which helps momentarily to deviate from what is disturbing, can actually worsen the emotional state (Moran, 2012; Van Raalte et al., 2016).This statement can be exemplifiedby theswimmers who did not want to use this technique and preferred to manage their internal processes in some other way.

Cognitive restructuring assisted some of the swimmers to be aware of their internal processes, to evaluate their dysfunctional automatic thoughts and regulate their emotions. Cognitive restructuring has been widely used to help individuals reappraise their internal processes(Beck, 2011; Didymus & Fletcher, 2017; Turner & Davis, 2018; Weaver et al., 2014).For instance, female field hockey players reduced the amount of threat and loss appraisals, and increased challenge appraisals when were educated about this technique (Didymus & Fletcher, 2017).However, individuals' perceived ability to modify the meaning of a situation to change their emotions is important(Robazza & Ruiz, 2018).This was exemplified in our study but the fact that although known by the swimmers, there were some techniques they did not used intentionally, as they have not been practiced before or were not confident they could implement their effectively. The swimmerslearned or improved the way they practiced the techniques with a sport psychologist, after having their worst performances.The purposeful use of a variety of techniques mainly before the swimmers' best performances enrich the discussion about mental preparation towards high-intensity sports. Furthermore, both Olympic and Paralympic swimmersmentioned that due to their psychological preparation, they were able to use the techniques in different ways to achieve their purposes. When mental training is guided by a specialist, it gives athletes more chances to achieve their goals (Arnold & Sarkar, 2015; Haberl & McCann, 2012).Also, individualized preparation creates awareness of athletes'optimal psychological and physiological performance states using different tools with specific purposes, especially when time is given to practice them (Hays, 2012).

Theswimmerswere aware of the relationship between cognitions and emotions, and all of them believed that internal processes could influence performance.However, six swimmers knew how to manage cognitionsto produce lasting results, whereas the other six did not know how to identify, evaluate, and change their thinking. It is understandable, since they did not know how to use cognitive restructuring. Athletes would benefit from learning to consider their cognitions as hypotheses, and by testing their validity, they could modify their cognitive appraisals from dysfunctional to more evidence-based and adaptive cognitions (Moran, 2012). Expanding the repertoire of techniques helps to increase the sense of control, and the management of internal processes (Beck, 2011; Gould & Maynard, 2009). Moreover, the application of CBTs in high-intensity sports can offer a deep understanding about the influence of internal processes on performance.

The results of the present study should be interpreted considering its methodological strengths and limitations. It was not determined what best or worst performances should be, neither a limited time span was specified for the competitive events to be remembered. It may have influenced the way the memories were

recalled. This is one of the difficulties in qualitative research when assessing emotions and related cognitions, and the time they occurred (Ntoumanis & Jones, 1998). The sample size,and participants' nationality, do not permit external validity. However, the elite level of the swimmersis considered a strength.Furthermore, the in-depth nature of the findingshighlights the importance of awareness of internal processes and their management, which can reinforce the importance of individualized psychological preparation.Future research should investigateif athletes can change their internal processes before and during competitions to have a better performance, since the current study investigated specifically the best and the worst ones. Since this present study used a qualitative approach, future research should also investigate thecognitions and emotions of athletes using standardized questionnaires, in larger samples of athletes across different cultures.Longitudinal study designs can provide more information about how cognitions and emotions are managed, as well as how and when the techniques are executed.Finally, sport psychologists should first evaluate the psychological requirements of the sport as well as the level of the athlete before implementing a psychological training program.

Conclusion

In conclusion, the present findings suggest thatdifferent patterns of cognitions and emotions were related to swimmers' best and worst performances, which were influenced by their beliefs about their preparation during the season. Olympic and Paralympic swimmersreported some similarities regarding the patterns in their internal processes, and how they tried to manage them. Moreover, the findings suggest the type of psychological techniques used and their purposes in high-intensity sport.The practice and systematic use of the techniques reported helped swimmersto achieve different intended purposes, likely because their mental preparation was individualized and task-specific. Although the swimmers believed that internal processes influence performance, they mentioned somedifficulties to manage their dysfunctional cognitions, for instance how to identify and evaluate them. Overall, our findings indicate that cognitive restructuring was useful in helpedswimmers to manage internal processes.

References

Andersen, M. B. (2009). The "canon" of psychological skills training for enhancing performance. In K. F. Hays (Ed),*Performance psychology in action: A casebook for working with athletes, performing artists, business leaders, and professionals in high-risk occupations* (pp. 11-34). American Psychological Association.

Arnold, R., &Sarkar, M. (2015). Preparing athletes and teams for the Olympic Games: Experiences and lessons learned from the world's best sport psychologists. *International Journal of Sport and Exercise Psychology*, *13*, 4-20. https://doi.org/10.1080/1612197X.2014.932827

Baĉanac, L. J., Milićević-Marinković, B., Kasum, G.,& Marinković, M. (2014). Competitive anxiety, self-confidence and psychological skills in top athletes with and without disabilities. *Facta Universitatis, 12,* 59-70.

Beck, A. T. (2005). The current state of cognitive therapy: A 40-year retrospective.*Archives of General Psychiatry, 62,* 953–959.https://doi.org/10.1001/archpsyc.62.9.953

Beck, J. (2011). *Cognitive behavior therapy. Basics and beyond*(2nd ed.). Guilford Press.

Birrer, D., &Morgan, G. (2010). Psychological skills training as a way to enhance an athlete's performance in high-intensity sports. *Scandinavian Journal of Medicine and Science in Sports, 20 (suppl. 2),* 78-87.https://doi.org/10.1111/j.1600-0838.2010.01188.x

Braun, V., &Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology, 3,* 77-101.https://doi.org/10.3402/qhw.v9.26152

Coetzee, B., Grobbelaar, H. W., & Gird, C. C. (2006). Sport psychological skills that distinguish successful from less successful soccer teams. *Journal of Human Movement Studies, 51,* 383-401.

Deen, S., Turner, M. J., &Wong, R. S. K. (2017). The effects of REBT, and the use of credos, or irrational beliefs and resilience qualities in athletes. *The Sport Psychologist, 31,* 249-263.https://doi.org/10.1123/tsp.2016-0057

Didymus, F.F., &Fletcher, D.(2012).Getting to the heart of the matter: A diary study of swimmers' appraisals of organisational stressors. ***Journal of Sports Sciences****, 30,*1375-1385.https://doi.org/10.1080/02640414.2012.709263

Didymus, F. F., &Fletcher, D.(2017).Effects of a cognitive-behavioral intervention on field hockey players' appraisals of organizational stressors. ***Psychology of Sport and Exercise****, 30,* 173-185.https://doi.org/10.1016/j.psychsport.2017.03.005

Dieffenbach, K. D., & Statler, T. A. (2012). More similar than different: The psychological environment of Paralympic sport. *Journal of Sport Psychology in Action, 3,* 109-118.https://doi.org/10.1080/21520704.2012.683322

Ellis, A. (1995). Changing rational-emotive therapy (RET) to rational emotive behavior therapy (REBT). *Journal of Rational-Emotive and Cognitive-Behavior Therapy,13,* 85-89. https://doi.org/10.1007/BF02354453

Friese, S. (2014). Qualitative data analysis with ATLAS.ti™. Sage.

Gould, D., &Maynard, I. (2009). Psychological preparation for the Olympic Games.*Journal of Sport Sciences, 27,*1393-1408. https://doi.org/10.1080/02640410903081845

Gustafsson, H., Lundqvist, C., & Tod, D. (2017). Cognitive behavioral intervention in sport psychology: A case illustration of the exposure method with an elite athlete. *Journal of Sport Psychology in Action, 8,* 152-162. https://doi.org/10.1080/21520704.2016.1235649

Haberl, P., &McCann, S. (2012). Evaluating USOC sport psychology consultant effectiveness: A philosophical and practical imperative at the Olympic Games.*Journal of Sport Psychology in Action*, *3,* 65-76.https://doi.org/10.1080/21520704.2012.683095

Hanin, Y. L. (2010). Coping with anxiety in sport. In A. Nicholls (Ed.),*Coping in sport: Theory, methods, and related constructs* (pp. 159–175). Nova Science.

Hays, K. F. (2012). The psychology of performance in sport and other domains. InS. M. Murphy (Ed),*The Oxford Handbook of Sport and Performance Psychology* (pp. 24-45). Oxford University Press.

Hyland, P., Boduszek, D. (2012). A unitary or binary model of emotions: A discussion on a fundamental difference between cognitive therapy and rational emotive behaviour therapy. *Journal of Humanistics & Social Sciences, 1,* 49-61. http://www.jhss.eu/index

Jacob, C., Keyrouz, C., Bideau, N., Nicolas, G., Hage, R. E. I., Bideau, B., &Zouhal, H. (2015). Pre-exercise hyperventilation can significantly increase performance in the 50-meter front crawl. *Science & Sports, 30,* 173-176. https://doi.org/10.1016/j.scispo.2015.02.006

Juslin, P. N., &Västfjäll, D. (2008). Emotional responses to music: The need to consider underlying mechanisms. *Behavioral and Brain Sciences,31,* 559-575. https://doi.org/10.1017/S0140525X08005293

Mahoney, M. J., &Avener, M. (1977). Psychology of the elite athlete: An exploratory study. *Cognitive Therapy and Research,1,* 135-141. https://doi.org/10.1007/BF01173634

Middleton, T. R. F., Ruiz, M. C., &Robazza, C. (2017). Regulating pre-performance psychobiosocial states with music. *The Sport Psychologist,1,* 227-236.https://doi.org/10.1123/tsp.2016-0081

Miles, A. J., Neil R., &Barker J. (2016). Preparing to take the field: A temporal exploration of stress, emotion, and coping in elite cricket.*The Sport Psychologist, 30,* 101-112.https://doi.org/10.1123/tsp.2014-0142

Moran, A. (2012). Thinking in action: Some insights from cognitive sport psychology. *Thinking Skills and Creativity,7,* 85-92. https://doi.org/10.1016/j.tsc.2012.03.005

Norsworthy, C., Gorczynski, P.,& Jackson, S. A. (2017). A systematic review of flow training on flow states and performance in elite athletes. *Graduate Journal of Sport, Exercise & Physical Education, 6,* 16-28.https://www2.worc.ac.uk/gjseper/663.htm

Ntoumanis, N., &Jones, G. (1998). Interpretations of competitive trait anxiety symptoms as a function of locus of control beliefs. *International Journal of Sport Psychology, 29,* 99-114.

Robazza, C., & Ruiz, M. C. (2018). Emotional self-regulation in sport and performance. *Oxford Research Encyclopedia of Psychology*. Retrieved 1 August 2018, from http://psychology.oxfordre.com/view/10.1093/acrefore/9780190236557.001.0001/acrefore-9780190236557-e-154.

Ruiz, M. C., Hanin, Y., & Robazza, C. (2016). Assessment of performance related experiences: an individualized approach. *The Sport Psychologist, 30*, 201–218. https://doi.org/10.1123/tsp.2015-0035

Ruiz, M. C., Raglin, J., &Hanin, Y.L. (2017). The individual zones of optimal functioning (IZOF) model (1978–2014): Historical overview of its development and use. *International Journal of Sport and Exercise Psychology, 15,* 41–63, https://doi.org/10.3390/sports6040175.

Ruiz, M. C., Robazza, C., (2020). Emotion regulation. In D. Hackfort & R. Schinke (Eds.), *The Routledge International Encyclopedia of Sport and Exercise Psychology* (Vol 2, pp. 263-280). Routledge.

Smith, B., & McGannon, K. R. (2018). Developing rigor in qualitative research: Problemsand opportunities within sport and exercise psychology. *International Review of Sport and Exercise Psychology, 11*, 101–121.https://doi.org/10.1080/1750984X.2017.1317357.

Sofia, R.,& Cruz, J. F. A. (2016). Exploring individual differences in the experience of anger in sport competition: The importance of cognitive, emotional, and motivational variables.*Journal of Applied Sport Psychology*, *28,* 350-366.https://doi.org/10.1080/10413200.2015.1121170

Suri, H. (2011). Purposeful sampling in qualitative research synthesis. *Qualitative Research Journal, 11,* 63-75. https://doi.org/10.3316/QRJ1102063

Tracy, S. J. (2010). Qualitative quality: Eight "Big Tent" criteria for excellent qualitative research. *Qualitative Inquiry, 16(10),* 837–851. https://doi.org/10.1177/1077800410383121

Turner, M. J., & Barker, J. (2014). Using rational-emotive behaviour therapy with athletes. *The Sport Psychologist, 28,* 75-90.https://doi.org/10.1123/tsp.2013-0012

Turner, M. J., & Bennett, R. (2018). *Rational Emotive Behaviour Therapy in sport and exercise.* Routledge.

Turner, M. J., & Davis, H. S. (2019). Exploring the effects of rational emotive behavior therapy on the irrational beliefs and self-determined motivation of triathletes. *Journal of Applied Sport Psychology, 31,* 253-272.https://doi.org/10.1080/10413200.2018.1446472

Van Raalte, J. L., Vincent, A., &Brewer, B. W. (2016). Self-talk interventions for athletes: A theoretically grounded approach. *Journal of Sport Psychology in Action, 8,* 141-151.https://doi.org/10.1080/21520704.2016.1233921

Vealey, R., S. (2007). Mental skills training in sport. In G. Tenenbaum& R. C. Eklund. (Eds),*Handbook of Sport Psychology*(3rd ed., pp. 287-309). John Wiley & Sons.

Weaver, A., Himle, J., Steketee, G.,& Muroff, J. (2014). Cognitive Behavioral Therapy. *Encyclopedia of Social Work.*National Association of Social Workers Press and Oxford University Press.http://dx.doi.org/10.1037/rmh0000075

Weinberg, R. S., & Gould, D. (2015). *Foundations of Sport and Exercise Psychology*(6th ed.).Human Kinetics.

Whelan, J. P., Mahoney, M. J., &Meyers, A. W. (1991). Performance enhancement in sport: A cognitive behavioral domain. *Behavioral Therapy, 22,* 307-327.https://doi.org/10.1016/S0005-7894(05)80369-7

Williams, J. M., &Andersen, M. B. (2007). Psychosocial antecedents of sport injury and interventions for risk reduction. In G. Tenenbaum&R. C. Eklund (Eds),*Handbook of Sport Psychology* (3rd ed.,pp. 379-403). John Wiley & Sons.

Williams, S. E., Cooley, S. J., Newell, E., Weibull, F.,& Cumming, J. (2013). Seeing the difference: Developing effective imagery scripts for athletes. *Journal of Sport Psychology in Action*, *4,* 109-121.https://doi.org/10.1080/21520704.2013.781560

Table 1: Main themes and sub-themes for swimmers' best and worst performances.

Main Themes	Sub-themes
Cognitive model	Functional / Dysfunctional cognitions before race; Pleasant / Unpleasant emotions before race; Functional / Dysfunctional cognitions during race; Pleasant / Unpleasant emotions during race; Consequences on performance.
Psychological techniques	Types of techniques used; How the techniques were executed; When the techniques were used; Purpose of using the techniques.
Perceptions about cognitions-emotions relationship and the influence on performance.	Relationship between cognitions and emotions; Influence of cognitions and emotions on performance; Responding to dysfunctional cognitions and unpleasant emotions.

Table 2: Cognitive model for the best and worst performances.

	Best performances	*Worst performances*
Before the race		
Functional cognitions	*"This is where I supposed to be" (#5)* *"I am ready"(#1)*	*"Maybe there is a chance"* (#1)
Dysfunctional cognitions	*"The importance of perform well" (#11)*	*"I was thinking that it was bad, and I did not know how to change the process. I saw everything happening and I did not do anything" (#2)*
Pleasant emotions	*"Happiness" (#4)* *"Confidence" (#9)* *"Certain" (#1)*	*"Euphoria" (#11)* *"Confidence" (#9)*
Unpleasant emotions	*"Anxiety" (#3)*	*"Anxiety"*(#7) *"Uncertain"* (#6) *"Feel inferior to opponents"* (#4)
During the race		
Functional cognitions	*"Pull as much water as possible" (#1)*	*"Maybe I have a chance"* (#1)
Dysfunctional cognitions	*"I started comparing myself with who was by my side and thought about the end of the race" (#2)*	*"I am falling behind. I cannot make it" (#1)*
Pleasant emotions	*"Confidence"(#4)* *"Weightlessness" (#8)* *"Calm" (#12)*	*"Relief"(#7)*
Unpleasant emotions	*"Pain" (#5)*	*"Tiredness" (#10)* *"Hopelessness" (#2)* *"Desperation" (#1)*
Consequences on performance	*"I did personal best time, and could execute the strategy I wanted" (#2)*	*"I swam 20 seconds slower than my usual time" (#12)*

Table 3: Psychological techniques used in best performances.

Technique		How it was used	When it was used	For what purpose
Imagery	*n*=12	Race start, turn, and end Ideal race Ideal race/time Ideal race/time, using crowd noises and the stopwatch How to overcome some obstacle	On competition day In hotel Warm-up Call room One day prior to race Week of competition Throughout season	Feel secure Feel confident Feel calm Manage muscle pain Focus Rehearse race strategy Increase arousal level Prepare for unexpected situations
Breathing	*n*= 9	Deep & fast breathing Deep & slow breathing Short breathing Rhythmic breathing With body relaxation With meditation	Call room Warm-up During race In hotel	Calm down Relax Race strategy Increase arousal level Prepare for race
Music	*n*= 7	Calming songs Meaningful songs Upbeat songs With imagery	Warm-up Call room Going to competition site Throughout season	Feel happy Relax Focus Increase arousal level Increase confidence Distract oneself
Self-talk	*n*= 7	Motivational Instructional With imagery	During race Warm-up Call room	Give instructions Feel calm Focus Increase confidence Motivate Narrate race strategy
Cognitive Restructuring *n*= 5		Evaluation of cognitions	Warm-up During race Hotel Throughout season	Manage internal factors (e.g., emotions, pain) Focus Find the source of cognition

Note. *n* = number of athletes that used the technique.

Table 4: Psychological techniques used in worst performances.

Technique		How it was used	When it was used	For what purpose
Imagery	*n*= 6	Race start, turn and end Whole race Visualize victory Ideal race/time, using stopwatch	On competition day Warm-up Call room One day prior to race Throughout season	Feel hopeful* Calm down Motivate Manage anxiety*
Breathing	*n*= 6	Deep & fast breathing Deep & slow breathing With meditation Rhythmic breathing	Call room Warm-up In hotel During race	Calm down* Race strategy*
Music	*n*= 5	Calming songs Upbeat songs	Warm-up Going to competition site Call room	Calm down Focus* Relax* Increase activation * Distraction
Self-talk	*n*= 5	Motivational Positive Instructional Negative	Warm-up Call room During race	Calm down Focus Motivate Feel hopeful
Cognitive Restructuring *n*= 1		Evaluation of cognitions	Warm-up	Focus* Find source of cognition*

*Note. * = Intended purposes achieved using the technique.*