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Damien Brevers & Pierre Philippot

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Damien Brevers and Pierre Philippot

Laboratory for Experimental Psychopathology (LEP), Psychological Sciences Research Institute, UCLouvain

ABSTRACT

Inhibitory retrieval has redefined the way that exposure therapy can help individuals cope with debilitating states of fear and anxiety. Here we propose that an inhibitory retrieval-based model of exposure therapy could also be applied to the context of sport competition. We first discuss the usefulness of applying inhibitory retrieval-based exposure to emotion regulation in sport environments and provide therapeutic strategies for adopting this approach for athletes with performance anxiety and states of fear of failure. This proposal is followed by a case description that illustrates how this inhibitory retrieval approach could be used to help athletes get better at coping with fear and anxiety during a sport competition. We conclude by providing further guidelines for helping practitioners apply the inhibitory retrieval approach while working with athletes who experience debilitating states of anxiety during sport competition.

Lay summary: This theoretical and case study paper discusses the application of inhibitory retrieval-based exposure for helping athletes who experience dysfunctional states of anxiety during competition. Inhibitory retrieval-based exposure aims to assist the athletes in creating new experiences when confronted with the pressure of sport competition. Here we aim to describe in detail how inhibitory retrieval-based exposure could be applied to sport environments by providing therapeutic strategies for adopting this approach for athletes with performance anxiety and states of fear of failure.

IMPLICATIONS FOR PRACTICE

- Inhibitory retrieval-based exposure helps athletes cope with states of debilitating anxiety.
- This approach should also help athletes focus on optimal ways to perform under anxiety.
- Inhibitory retrieval-based exposure should reinvigorate the athlete-environment dynamic.

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Introduction

Athletes are constantly challenged to progress, excel, and win. This dynamic is inherent in sport competition and usually triggers emotional states that foster challenges and assist performance (e.g., facilitative anxiety; Palazzolo, 2020). However, sport

CONTACT Damien Brevers  damien.brevers@uclouvain.be  Laboratory for Experimental Psychopathology (LEP), Psychological Sciences Research Institute, UCLouvain, Louvain-la-Neuve 1348, Belgium.

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performance also constitutes potential sources of threat and leads athletes to experience severe psychological distress throughout their career (Conroy et al., 2002, 2007; Gustafsson, Sagar, et al., 2017; Sagar et al., 2007, 2010). Athletes who have learned to associate specific situations of competition with aversive consequences might perceive competition as a threat, rather than a means to achieve personally meaningful goals (Conroy et al., 2002). This evaluative process typically stimulates the pursuit of avoidance or of self-handicapping strategies that, in turn, reinforce apprehension and fear of competition, leading to hampered performance and a reduced feeling of achievement in the long run (Conroy & Elliot, 2004; Ellmers et al., 2020; González-Hernández et al., 2021; Sagar et al., 2007, 2009; Sánchez-Romero et al., 2021).

In cognitive behavioral therapy, exposure-based interventions have proven to be effective for treating distress induced by states of fear and anxiety (Craske et al., 2014, 2022; Norton & Price, 2007). Exposure therapy was initially based on habituation-based models, emphasizing a progressive reduction in fear through an increase in intensity of fear-related stimuli across exposure sessions (e.g., Foa & Kozak, 1986; Foa & McNally, 1996; Salkovskis et al., 2007). However, because of the inherent variability of actions to be undertaken within the fast and dynamic environment pertaining to sport performance, the adoption of exposure-based therapy for sport competition has been largely discarded. Specifically, practitioners have reported using *in vivo* habituation-based exposure sessions to help athletes regulate stress and anxiety during training sessions, but not while performing during a competition (Driskell et al., 2014; Gustafsson, Lundqvist, et al., 2017). Comparable observations were obtained from experimental studies on pressure training (Low, Butt, et al., 2022; Low, Freeman, et al., 2022; Oudejans & Pijpers, 2009; Stoker et al., 2017), which allows athletes to perform better while being exposed to anxiety during sport performance. Indeed, these effects were observed under experimentally controlled practice training and in athletes who were not necessarily experiencing high levels of apprehension and fear for the sport competition. In other words, pressure training allows participants to adapt to pressure on their own (Low, Butt, et al., 2022; Low, Freeman, et al., 2022), but might be limited to helping athletes who experience debilitating states of anxiety toward sport competitions.

Here, we propose specific ways to help practitioners adopt exposure-based therapy when working with athletes who experience emotional distress during competition. We first discuss how inhibitory retrieval provides a tenable blueprint for maximizing the efficacy of exposure-based interventions in athletes. We then describe the case of an athlete to illustrate how this inhibitory retrieval approach can be adopted to address fear of failure during sport competition.

On the usefulness of applying inhibitory retrieval to the sport environment

Inhibitory retrieval is rooted in a Pavlovian conditioning model that encompasses repeated associations between a conditional stimulus (CS; e.g., entering the field during a sport competition) and an unconditional stimulus (US; e.g., a distressing negative performance), leading to a conditional response (CR; e.g., anticipatory fear of failure). The main tenet of the inhibitory retrieval approach is that, in contrast with traditional habituation-based exposure therapy, the extinction or reduction of the CR is not a key

determinant of therapeutic change during the exposure session, but rather across the exposure therapy sessions (Craske et al., 2008, 2014, 2022). Accordingly, the literature has highlighted that fear reduction during exposure does not predict long-term outcome of exposure therapy (for reviews, see Craske et al., 2014; Weisman & Rodebaugh, 2018). Inhibitory retrieval is about the inhibition of the initial CS-US association. It challenges the original CS-US association through behavioral exposure centered on actions (e.g., Craske et al., 2008, 2014, 2022; Foa & McNally, 1996). Although the CS still has its original association with the US, it also becomes associated with a new meaning (e.g., failure to perform an action, or missing an action, is not as distressful as expected), triggered by the newly formed inhibitory CS-noUS association (Bouton, 2002; Vervliet et al., 2013a, 2013b). Inhibitory retrieval theory postulates that the retrieval of the memory of the new CS-noUS association inhibits the original CS-US association. Notably, for this inhibitory retrieval to take place, the CS and its accompanying emotions must be activated—otherwise, there is nothing to inhibit.

Here we suggest that the retrieval of the CS-noUS association is of high relevance for athletes, as they usually have to perform under stressful environments. Specifically, learning to inhibit debilitating CS-US associations should help athletes perform under optimal levels of stress and anxiety, rather than habituating themselves to experience high levels of stress or anxiety states. Inhibiting debilitating CS-US associations is about disconfirming fear-related beliefs and anxiety-laden assumptions while facing the feared situation (e.g., making the athletes aware of a mismatch between anxiety-laden assumptions, “*I will miss the majority of my actions*,” and what actually happened, “*I succeeded in half of my actions*”; Craske et al., 2008, 2014). Another main interest in applying inhibitory retrieval to sport is that it makes exposure therapy more efficient when applied to dynamic changing environments, such as sport competition. Indeed, research has revealed that the CR can show “spontaneous recovery” (e.g., the return of the original fear response) when the CS-noUS has been trained in a limited number of contexts while the athlete undergoes exposure therapy (Culver et al., 2011; Mystkowski et al., 2002, 2003, 2006; Olatunji et al., 2017). In other words, fear extinction is specific to the context in which the extinction is being trained. It follows that the CS-noUS associations should be consolidated when CS-noUS pairings are being experienced under multiple contexts during exposure therapy. In the next section, we describe how inhibitory retrieval-based interventions can be adopted for sport performance.

Therapeutic strategies for optimizing inhibitory retrieval in sport

Capitalizing on expectation violation

This strategy is about creating a mismatch between the expectancies of the frequency or intensity of an aversive outcome and what is actually experienced by the individual (Craske et al., 2014; Deacon et al., 2013; Rescorla & Wagner, 1972). By highlighting the violation of expectancies related to CS-US pairings, exposure therapy aims to create new CS-noUS associations rather than to reduce the intensity of the CR linked with the original CS-US pairing (as proposed by the habituation-based model of exposure therapy). The key point here is to help athletes identify the expectancy to be violated and the CS that “predicts” it. In the case of “John,” described in the next section of the

paper, predicting that he would “feel tense” when creating a scoring opportunity was not sufficiently accurate, whereas stating that he would experience a high level of distress (expectancy) if he took and missed a scoring opportunity (CS) was more appropriate for him in order to experience a violation of expectation. This approach also implies that exposure sessions are not necessarily characterized by a decrease of the CR (e.g., a reduction in the fear of failure) during the session itself. Accordingly, exposure can continue until the expectation is most effectively violated, rather than aiming for the CR to decline. For John, this dynamic required that he seek game situations that were most hampered by his fear of failure (e.g., “missing a scoring opportunity”) rather than a situation associated with a lower level of discomfort (e.g., “entering the field”).

CS-noUS associations are created by focusing on whether the expected negative outcome occurred or not, or was as “bad” as expected (in the case of John: challenging the fact that he would experience a high level of distress after not scoring a basketball shot). Following each exposure session (in the case of John: a basketball game), it is thus important to consolidate the inhibitory retrieval process by asking athletes to rate what they have learned from the nonoccurrence of the feared event (e.g., experiencing no distress after “missing” an action), the discrepancy between what was predicted and what occurred (e.g., experiencing lower distress than expected after “missing”), or the degree of “surprise” from the exposure practice (e.g., feeling “OK” after having missed an action; Craske et al., 2014).

These post-exposure mental rehearsals are of key importance, as they consolidate long-term memories of the new inhibitory CS-noUS associations (Craske et al., 2014; McGlade & Craske, 2021; Meeter & Murre, 2004). This dynamic of post-exposure memory consolidation also implies that trying to lower expectancies prior to exposure can negatively affect inhibitory retrieval (Craske et al., 2014). This aspect contrasts with more traditional cognitive reappraisal interventions that seek to help athletes modify the overestimation of the probability of occurrence of the feared situation (e.g., “I am very likely to score my shot”) and related negative affective reactions (e.g., “Missing a shot is not so bad, it is part of the game”). It follows that cognitive bias modifications should be addressed after an exposure (rather than before or during one) to capitalize on the mismatch between initial expectancy and actual outcomes, which, in turn, should reinforce memory traces of expectation violation.

Dealing with reactivations of CS-US and spontaneous recovery

These strategies address situations where the expectancy violation occurs in the unwanted direction, that is, when the initial excitatory CS-US pairings are (partially) reactivated (Bouton et al., 2004; Hermans et al., 2005; Rescorla, 2004). In the case of John, these situations included games where he reexperienced intense states of negative emotions after not scoring on his shots.

Intriguingly, the literature on inhibitory retrieval reveals that the occasional reinforcement of the conditional fear might benefit from exposure therapy (Craske et al., 2014; Woods & Bouton, 2007). One explanation is that the learning of inhibitory CS-noUS associations leads to deepened renewed experiences of the extinction context, where the original CS-US coexists with new types of CS-noUS learning. Therefore, when

occasional US is presented in the context of extinction learning, such occurrences are embedded into the more general extinction context. The athlete might thus learn that US occurrence does not necessarily lead to the exclusive return of the anticipated fear of failure; that is, that memories of the CS-noUS inhibitory association remain.

As a result, states of fear and anxiety can optimally coexist with sport performance, even when it is not initially the case during the formation of the CS-US association. When embedded in inhibitory retrieval, states of fear and anxiety should thus not be seen as strictly overshadowing sport performance, but rather as representative of the large panel of emotional reactions to be experienced by an athlete throughout the competition. Notably, the dynamic pertaining to CS-US reactivity and spontaneous recovery also echoes the “*old way/new way*” of technical change in sport (Lyndon, 1989, 2000). Specifically, the main tenet of the old way/new way approach is that learning is much less useful when trying to change or improve a preexisting and well-practiced skill because athletes could fall back to their old incorrect ways or improve slowly (Maschette, 1985). This approach proposes instead that learning would be more efficient by practicing “alternative response patterns” in order to distinguish the difference between correct and incorrect skill execution (for further details, see Hanin et al., 2002). Hence, the old way/new way and inhibitory retrieval approaches both foster merging between established (old way; the original CS-US in inhibitory retrieval) and new learning (new way; the CS-noUS in inhibitory retrieval) in the generation of optimal sport performance.

Addressing safety signals and behaviors

Safety signals correspond to cues that alleviate aversive emotional states, but without challenging the SC-US association (i.e., creating SC-noUS associations; Craske et al., 2014; Laing & Harrison, 2021; Lovibond et al., 2000). Examples of safety signals include the presence of another person, the therapist, good luck charms, or talismans. Addressing safety signals is thus important, as it can mistakenly lead the client to end intervention after experiencing a significant decrease in fear or anxiety (Craske et al., 2014; Laing & Harrison, 2021). It is thus recommended to gradually phase out safety signals over the course of psychological intervention (Craske et al., 2014; Hermans et al., 2006; Sloan & Telch, 2002).

In athletes, addressing safety signals may be challenging, as doing so potentially encompasses default situational factors pertaining to sport competition (e.g., playing in safer environments, such as home games; choosing to participate in competitions with weaker opponents), the presence of loved ones (e.g., parents, friends), or even the use of idiosyncratic rituals (e.g., using lucky charms to feel safe; Craske et al., 2006; Brevers et al., 2011). Moreover, it might be difficult to identify safety signals per se, especially when linked to long-time idiosyncratic strategies used by athletes to deal with the pressure of sport competition. It should thus be important to discuss this subtle phenomenon with the athlete and, if feasible, to observe her or him during the competition to increase the odds of detecting safety signals. The athlete has to be made aware of the interfering effect of a safety signal on inhibitory retrieval, as it prevents athletes from fully exposing themselves to the situation that led them to experience states of

psychological distress, such as anticipatory fear of failure. This aspect is of key importance in the context of inhibitory retrieval, as performance rituals might be used as safety behaviors (i.e., actions that prevent or lower feared outcomes and associated distress; Craske et al., 2022; Telch & Lancaster, 2012) through which athletes avoid facing their disturbing emotions. It is thus possible that a performance ritual distracts athletes from the aversive emotional response, rather than helping them face it (e.g., Hutto & Sánchez-García, 2015). This dynamic could lower optimal levels of intensity, risk, and creativity that are needed to perform at an elite level.

Hence, although they could provide a sense of safety in the short term, safety signals and behaviors might also contribute to the maintenance of fear of failure in the long term. In this context, rituals should be used to trigger full commitment to action (i.e., generating retrieval cues), but not to distract oneself from the unwanted aversive emotional reaction (Barlow et al., 2004, 2016). Laboratory studies have provided direct evidence that avoiding or suppressing negative emotion leads to greater distress and anxiety, compared with emotion acceptance activities (Barlow et al., 2004, 2016). These findings are of key importance, as anxiety and fear of failure are inherent pathways in an athlete's career (e.g., Aoyagi & Bartley, 2019).

Endorsing stimulus variability and multiple contexts

A hallmark of the traditional habituation-based model is that it inflexibly progressed from one level of exposure to the next hierarchical level, each phase repeated until the CR eventually decreased. However, research has demonstrated that habituation, that is, the diminution of the CR due to the mere repeated presentation of the CS, occurs for physiological reflex-like conditioning, but not for evaluative conditioning, that is, conditioning of affective responses (Bouton, 1993, 2002). By contrast, inhibitory retrieval, in line with the newest findings pertaining to evaluative conditioning, fosters variable and flexible patterns of exposure by adopting a random hierarchy of CS paired with different levels of US expectancies (Craske et al., 2014). The clinical translation of endorsing stimulus variability also involves conducting exposures in multiple contexts, unfamiliar places, and at varying times of day. The exposure sessions are also undertaken at varying levels of intensity and with varying durations, rather than by steadily proceeding with one situation until the CR declines. Such variability in stimuli and contexts elicits a higher intensity of CR during exposure that eventually fails to habituate (Bandarian Balooch & Neumann, 2011; de Jong et al., 2019). Nevertheless, it has proven to be more efficient in preventing the return of the CR in the long run (e.g., Bandarian Balooch & Neumann, 2011; de Jong et al., 2019; Jacoby & Abramowitz, 2016; Kircanski et al., 2012; Lang & Craske, 2000). For instance, a variability in fear levels throughout repeated exposure (i.e., a minute-to-minute succession of increases and decreases in fear levels) is a predictor of positive therapeutic outcomes in individuals with public speaking anxiety (Culver et al., 2012).

Variability and flexibility components are highly relevant for applying inhibitory retrieval procedures to exposure therapy with athletes. Indeed, variability is an inherent part of sport competition, as it involves the repeated and fast succession of actions undertaken across dynamic contexts (e.g., various opponent levels, degrees of

importance of the competitive event, audience type, home vs. away games). Thus, by being variable in nature, the context of sport performance will inevitably trigger various levels of CR throughout exposures. When embedded into inhibitory retrieval, this variability will ultimately lead to offsetting of context renewal after exposure therapy is completed.

Inhibitory retrieval intervention should thus allow capitalization of the variable and flexible performer-environment system that characterizes sport competition. For instance, strategies pertaining to inhibitory retrieval should help renew individual-environment relationships (i.e., creating CS-noUS associations) by helping athletes expose themselves to the necessary risks for delivering elite performance. Inhibitory retrieval interventions should also help athletes (re)experience optimal states of anxiety (i.e., facilitate anxiety), as they foster the creation of new learning under various environment-performer interactions. Moreover, by ultimately accepting failure (i.e., dealing with occasional reactivations of CS-US pairing) and by challenging preestablished fear expectancies (i.e., capitalizing on expectation violation) across multiple individual-environment interactions (i.e., endorsing stimulus variability and multiple contexts), inhibitory retrieval should foster the emergence of “*know-how*” *reflectivity* during sport performance (i.e., knowing on what and when to reflect in order to master the sport environment; Gallagher, 2005, 2011, 2017). Specifically, inhibitory retrieval would allow the athlete to reflect on situations where, at every unfolding moment, information from the environment (e.g., changing position of teammates and opponents; alternating gaps in the playing area) invites a new set of action-oriented reflectivity (e.g., “seeing myself doing this [action],” “I decide to [action] instead of [action],” “feeling myself as if [action]”; Carvalho et al., 2013; Correia et al., 2012). All these aspects should be especially helpful for athletes when encountering fear-related stimuli throughout their career (e.g., playing in a new championship/country, new coach/teammates).

Moreover, by endorsing stimulus variability and multiple contexts, inhibitory retrieval fits well with training procedures derived from the ecological dynamic approach to sport performance (Araújo et al., 2006, 2010, 2019; Davids et al., 2001; Warren, 2006). Indeed, both approaches advocate the importance of an individual forming functional performer-environment relationships during competitions and practices. For instance, the ecological dynamic approach can be operationalized by using affective learning design, which features situation-specific constraints that mimic each athlete’s emotion-laden experience during sport competition in order to optimally merge emotion and action (for more details, see Headrick et al., 2015).

Generating retrieval cues

This strategy consists in using cues (e.g., wearing a swoosh wristband) to reactivate *memories* of the CS-noUS association when encountering a context not being trained for during exposure therapy (e.g., participating in an annual competition event; Brooks & Bouton, 1994; Craske et al., 2014; Dibbets & Maes, 2011; Vansteenwegen et al., 2007). Notably, a retrieval cue differs from a safety signal in that it acts as a trigger of the CS-noUS relationship (e.g., wearing a swoosh wristband as a retrieval cue for the onset of a new exposure), whereas a safety signal is directly associated with the nonoccurrence of the US (e.g., wearing a swoosh wristband as a “protection token” against bad performance).

Accordingly, the generation of retrieval cues could help athletes create rituals that remind them of what they (have) learned during exposure therapy, such as when facing previously feared sensations or situations. In order to decrease the risk of creating safety signals, retrieval cues are best used to prevent the return of the conditional fear response (de Jong et al., 2019; Dibbets et al., 2008). At a practical level, the retrieval cues strategy should be used sporadically and later in the psychological intervention, when extinction learning is well acquired throughout repeated experiences of expectancy violations (Craske et al., 2014).

Intermediate summary

Exposure therapy derived from inhibitory retrieval does not directly aim to decrease an aversive emotional response or linked cognitive distortions during exposure to the stressor. Rather, it seeks to allow the individual to experience that the fear outcome does not happen, despite the fact that all the warning (CS) signals are turned on (Craske et al., 2014, 2022). Moreover, inhibitory retrieval should not only help athletes better regulate anxiety and fear, but should also lead them to experience optimal states of activation during sport performance. The next section aims to illustrate these aspects by detailing the case of an athlete for whom an inhibitory retrieval approach was implemented in exposure-based therapy. The description is not intended to be exhaustive of the whole process of the psychological intervention; rather, it exemplifies the application of inhibitory retrieval to an athlete with performance anxiety.

Applying inhibitory retrieval to exposure therapy in sport: a case description

Transparency and openness

The study materials (questionnaires) are available at the following link: <https://osf.io/r6hxq/>. The case description follows national ethics standards and has been accepted by the Institutional Review Board (Reference Number: #20190509).

Case description

The client, John (fictional name), is a 19-year-old European basketball player who is playing his first year (i.e., freshman) in the Division 1 National Collegiate Athletic Association (NCAA) in the United States. He sought a psychological intervention (conducted by the first author of this paper) for “*better regulating his stress during the competition*” (see Table 1 for the specification of John’s anxiety problem).

During the first weekly psychological intervention session, John described himself as being highly stressed before competition, as well as feeling like he was “stuck” during the game. He felt that the staff, his teammates, and the media had high expectations of him. After having made a good season start, John felt that his performances had been progressively stagnating. He described experiencing a lot of pressure indexed by the fact that he was constrained to “*do things perfectly at every moment*.” The client perceived that this pattern even occurred during game situations that he had previously mastered.

Table 1. Specification of the psychological problem.**Description of the psychological problem**

- During the first two sessions, John described that, for approximately the previous 2 months, he no longer “felt able to act as he would like while performing.”
- In the hours before the competition, he developed anxious ruminations related to his forthcoming game (e.g., “I’m afraid of not being able to cope with the expectations put on me”; “I can’t only see myself failing my actions”; “I fear being judged by others or disappointing others,” “I have no credit left,” “I have no choice but to perform each time at my best”).
- During the game, John described feeling “stuck” and “all over the place,” including in situations where he used to perform well.
- He described having little or no anxiety outside of sport (e.g., “I feel good about the other aspects of my life in general”) and reported no sleep problems.

Components of the psychological problem

- **Emotion:** The *Sport Emotion Questionnaire* (SEQ; Jones et al., 2005; see Figure 1 for details) was used throughout the therapy sessions (starting at session 2) and prior to each game in order (i) to identify the intensity of pregame anxiety experienced by John in the beginning of the therapy (see Figure 1(A)); (ii) to help John identify the type and intensity of pregame emotions experienced across the therapy sessions (see Figure 1(A and B)), and (iii) to operationalize the change in pregame emotional response over time (see Figure 1(B)). SEQ scores highlighted that John experienced high levels of anxiety and excitement before the game.
- **Body sensations:** He described feelings of tension and weakness, as well as motor restlessness, before the competition.
- **Behaviors:** During the competition, John reported perceiving low levels of intensity while carrying out his actions, which generated frustration and anger.
- **Cognitions:** Before the competition, John experienced difficulty in focusing his attention on the present moment. He reported anxious ruminations (“I’m afraid that I won’t be able to face the expectations placed on me”; “I can’t help it. I am only seeing myself missing my actions”). During the competition, John reported impressions of weakness (“I am physically undertaking the action but without really being committed to it”) and of not having the right to make a mistake. He described feeling as if he were “outside the situation” while performing.

Session 3 entailed discussions about the nature of associative learning (e.g., CS = an opportunity to score; US = have to score, no margin for error; CR = anticipatory fear of missing) and about how avoidance (e.g., passing the ball instead of taking a shot; taking a shot, but without optimal focus) gradually imposed itself on his ability to deal with anxiety. As a precipitating factor, John revealed that, in the middle of the season, his performances were highlighted at a national level. According to him, this fact increased his chances of becoming a professional basketball player. Because then, however, he felt that a lot of expectations were placed on him. He reported experiencing difficulty in managing this new kind of pressure and perceived a decrease in the quality of his performance. He also felt that, as a European and young adult, the culture of “*every man for himself*” that, for him, characterizes sport culture in the United States, as well as the fact that he had to live abroad far from his family in Europe, has diminished his ability to “*take a step back*” to face his problem. During sport performance, as a way of coping with his problem, John described using avoidance strategies (e.g., “passing the ball instead of taking a shot”). He felt like just “*doing the job*,” as if he were behaving outside the situation. As a result, John’s performances on the court were not meeting expectations (from his coaching staff and from his manager), which led him to believe that he had no choice but to perform well in order to maintain a chance of becoming a professional basketball player “*within the next two years*.” By the end of session 3, John revealed that he felt alienated from his own identity as a basketball player (e.g., “*I am behaving in autopilot mode*,” “*I feel like I am just doing the job*,” “*It feels like I am outside of my body*”).

Session 4 focused on the planning of the inhibitory retrieval exposure intervention. After a discussion on the meanings and values associated with John’s way of perceiving

sport performance, it was agreed that the operational goal of the intervention was to enhance the frequency and repetition of what he felt were optimal ways of performing. John and his psychologist agreed that the main obstacle to achieving these optimum levels of performance was John's (sometime subtle) avoidance reactions to possibly distressing emotion. In this context, exposure appears as the best intervention option. John was then introduced to the main dynamic of inhibitory retrieval, that is, as a method to assist him in creating new experiences when performing under pressure. The main goal here was to start making John understand that new learning would arise from his performance (i.e., expectation violations).

Sessions 5 to 9 focused on in vivo exposures. Table 2 gives an overview of exposure trials based on the proposed inhibition learning approach. Each session started with a post-exposure mental rehearsal. John was informed that this step

Table 2. Example of exposure exercises.

Session 4	
Pre-exposure	
Goal (action commitment):	<i>To take "three-point" shots when I have an opportunity.</i>
What are you most worried will happen?	<i>That I miss all my shots, that I lose confidence and feel embarrassed about my performance.</i>
On a scale of 0–100, how likely does this seem?	<i>60%.</i>
What could be the best-case scenario?	<i>That I score all my shots and that I receive positive feedback from the coach and my teammates.</i>
On a scale of 0–100, how likely does this seem?	<i>20%</i>
Goal (quality of experience):	<i>Enacting what I feel is the optimal way of taking my "three-point" shots.</i>
On a scale of 0–100, how likely would you be able to do that?	<i>70%. I know how to shoot but I might still be nervous.</i>
Session 5	
Post-exposure mental rehearsal	
Goal (action commitment):	<i>I took the three-point shots when I had the opportunity to do so.</i>
Did what you were most worried about occur?	<i>No. I actually scored two of my four three-point shots.</i>
Did the best-case scenario occur?	<i>Moderately. I'm glad that I was able to take my shots. It has been a while. But I think I am still too impacted by my mistakes, especially when I lose the ball and when I make a bad offensive choice. I have difficulty directly switching to what I have to do next, such as going on defensive transition.</i>
What have you learned?	<i>That I have to play my game and that missing a good shot or a good action is not entirely missing.</i>
Pre-exposure	
Goal (action commitment):	<i>The next game is against a very good team. I will continue to undertake actions that correspond to my style of playing. I like to play against high-level opponents. I still have to improve my transitions between offensive and defensive plays.</i>
Goal (quality of experience):	<i>I will focus on what I feel is the optimal way of playing basketball and enjoy myself whether I score or not from my actions.</i>
Session 8	
Post-exposure mental rehearsal	
What happened? What were the coach's and teammates' reactions?	<i>They told me I am playing very well again even though I'm not playing at my best position on the pitch.</i>
How did you experience the last games?/What have you learned?	<i>I feel better. I think I've learned to accept that I can't do everything perfectly and that doesn't necessarily compromise my skills. I feel stronger now. I feel proud of what I have achieved in recent weeks.</i>

aimed to question whether the negative consequences were as bad as he expected and to reflect on whether facing negative experiences was manageable for him. These discussions led to the formulation of performance-centered reflections, featuring questions such as, *“Is there actually a big difference between so-called ‘failed’ action and ‘successful’ action?”*, *“Does missing several actions necessarily lead to a bad game?”*, or *“Does the way you feel after missing actions seem unmanageable to you?”*

Throughout the intervention, John had to complete (online on his smartphone) the Sport Emotion Questionnaire (SEQ; Jones et al., 2005) within 90 minutes before each game (while reflecting on how he felt in the present moment) and the Short Flow Scale (SFS; Jackson et al., 2008) within 90 minutes after the game (while reflecting on how he felt during his performance). The SFS was used as a proxy measure for indexing the quality of John’s experience while performing. Specifically, the concept of “flow” refers to a positive psychological state characterized by a merging between action and consciousness (a feeling of “being one with the action”; Csikszentmihalyi, 1975, 1990, 1997; Nakamura & Csikszentmihalyi, 2014). The flow state is often associated with extreme states of self-fulfillment as the individual is feeling in control over a challenging and meaningful task (Jackman et al., 2019; Kawabata & Mallett, 2011; Nakamura & Csikszentmihalyi, 2002, 2014). Experiencing a flow state is thus, by definition, an uncommon and ephemeral experience in the (sporting) life of the athlete. Nevertheless, flow can also be operationalized as a continuum (i.e., low to high; Csikszentmihalyi, 1975). For instance, experiencing a high degree of flow states can signal the high quality of an experience, without necessarily reaching the maximum state of flow per se (Csikszentmihalyi, 1990). Accordingly, flow state was used as a quantitative index (i.e., the SFS) for measuring the quality of John’s experience during his basketball performance.

As a whole, this “collaborative empiricism” between John and the psychotherapist allowed them to operationalize the emotions that John was experiencing before a game (using SEQ scores) and the experiential quality of his performances (using SFS scores) throughout exposure therapy. Figure 1(B) presents the scores on the SEQ across the 11 games that took place between sessions 3 and 9 (1 or 2 games per week). These scores indicate that John still felt pregame anxiety by the end of intervention sessions, but at a lower intensity. Notably, he reported a higher intensity of happiness before a game. Figure 1(C) presents the scores on the SFS and indicates that John experienced an elevated degree of flow states, that is, an increase in the experiential quality of his performance. In addition, in line with the therapeutic objective to increase the frequency of “optimal action” during a game, John’s performance statistics (available on espn.com) demonstrated an increase in the frequency and accuracy of free throws (average accuracy the month before the first session consultation: 60%; average across the 11 games that took place during the intervention: 70%) and in three-point shots (accuracy the month before consultation: 20%; across the 11 matches that took place during the intervention: 36%). The exposure therapy ended after 10 sessions (undertaken across 3 months, until the end of the NCAA season). John was then recruited by another university to perform his second (i.e., sophomore) season in the Division 1 NCAA basketball championship.

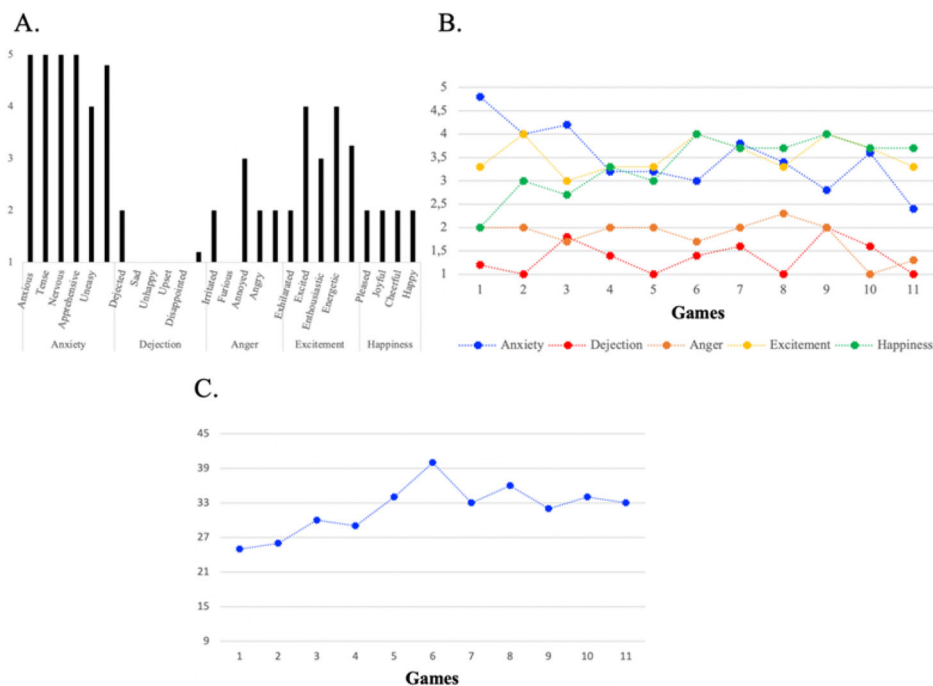


Figure 1. (A) Scores on each item of the Sport Emotion Questionnaire (SEQ) between sessions 2 and 3 of therapy. The SEQ includes 22 items divided into 5 categories of emotional experiences, with varying levels of intensity (5-point Likert scale: “not at all” to “extremely”). (B) SEQ scores for the 5 categories of emotional experiences across the 11 games that occurred throughout exposure therapy. (C) Scores on the Short Flow Scale (SFS) across exposure therapy. The SFS includes 9 items (5-point Likert scale: “strongly disagree” to “strongly agree”) resulting in one sum score of flow state (minimum = 9, maximum = 45).

Discussion

The case example of John illustrates how inhibitory retrieval exposure-based therapy can play a critical role in helping an athlete better regulate states of anxiety and fear related to sport competition. Specifically, the inhibitory retrieval approach allowed this athlete to challenge the original CS-US association in order to create new CS-noUS associations, which eventually might have led to a reduction in pregame anxiety and to an increase in the quality of experience during sport competition. As a whole, inhibitory retrieval reinvigorated John’s environment-performer dynamic. Although experiencing more optimal states of pregame anxiety, John was able to be anchored in the “here and now” (“How do I feel?” rather than “Why?,” “Which cause?,” or “What consequence?”). The inhibitory retrieval approach helped him challenge the perceived uncontrollability and uncertainty of a situation by focusing on operational components rather than on general aspects of the feared situation.

It is important to assume that the improvements and changes observed in John’s case can be attributable to other covarying factors, such as time, the mere motivation to change (asking for a psychological intervention), the specification and conceptualization of John’s state of performance anxiety (Philippot, 2013), and other common processes

of psychological intervention (e.g., alliance, empathy, clinical expertise of the psychotherapist; Wampold, 2015; Willemsen, 2022). Moreover, we could not infer whether the inhibitory retrieval approach produced a stronger impact than other forms of psychological intervention. The case of John (who reported having little or no anxiety outside of sport and reported no sleep problems; see Table 1) also calls into question whether the inhibitory retrieval approach is transferrable to athletes with more severe symptoms of anxiety disorders or with high trait anxiety. Nevertheless, although the impact of exposure therapy might take longer for individuals with trait anxiety, it has also been shown that this psychological intervention is more effective with individuals with severe anxiety (for a review, see Böhnlein et al., 2020).

The case description also highlighted some challenges and limitations pertaining to the adoption of this exposure therapy procedure. First, the psychotherapist was not present during the games, and it was therefore more difficult to identify John's safety signals (e.g., passing the ball instead of shooting; taking mostly open/easy shots). Second, even if physically present, it would not have been possible for the psychotherapist to intervene directly during the exposure session. This aspect can be useful, for example, to help the client mentally reactivate the learnings achieved in the previous exposure sessions (Mystkowski et al., 2006). Third, by directly adopting exposure-based therapy for sport competitions, it was not possible to undertake deepened extinction procedures, which consist in exposing the client to one type of feared stimulus (e.g., a specific type of action) before combining multiple cues during later exposure sessions. This strategy has been shown to reduce spontaneous recovery and reinstatement of fear (Coelho et al., 2015; Culver et al., 2015). Fourth, we used a measure of flow state for assessing the quality of John's experience while performing. Nevertheless, the concept of flow is not directly linked to the main outcome of the inhibitory retrieval approach, which aims to help athletes perform under optimal levels of stress and anxiety (i.e., negative emotional states). Here, the results related to flow states has to be seen as a complementary index of the quality of John's experience while performing.

Inhibitory retrieval-based exposure was applied to John's case after steps were taken to specify and conceptualize his anxiety problem. It follows that inhibitory retrieval-based exposure interventions described here should be undertaken by trained sport psychologists and its principles applied to states of debilitating anxiety that are specific to sport performance. Nevertheless, this aspect does not preclude inhibitory retrieval from being merged with other types of psychological interventions. One possibility is to apply inhibitory retrieval under the framework of acceptance and commitment therapy (ACT; Hayes et al., 1999, 2013). Indeed, when applied to sport performance (e.g., Henriksen et al., 2019), ACT implies acceptance of the idea that what comes next is not always going to be easy, enjoyable, or efficient (i.e., a committed action; Aoyagi & Bartley, 2019). When an athlete is struggling with anxiety and fear, acceptance entails a shift from a controlling and judgmental position to a nonjudgmental stance characterized by the acceptance of encountering unpleasant emotional experiences (Birrer et al., 2019). In allowing an individual to realize that it is "OK" to feel anxious or nervous, acceptance helps prevent ironic mental processes (e.g., trying to stop thinking about missing the next action or losing the game; Koster et al., 2008). Specifically, the goal here is not to stop the athlete from feeling anxious or to experience the "right" emotions or thoughts, but to allow him

or her to focus on the task, to challenge expectancies, and to be willing to experience a large range of emotional responses. Hence, both inhibitory retrieval and ACT emphasize the importance of cognitive flexibility in the therapeutic process (Harris, 2009).

Although clinicians rightfully design exposure sessions with a particular objective in mind (e.g., that the athlete will experience that the feared outcome is unlikely to occur or that the level of distress is less than anticipated), they might also consider loosening control over the strict adoption of exposure parameters (Krompinger et al., 2019). The most useful exposures should therefore be those that fit with precepts of inhibitory retrieval as guidelines, not constraints, to build exposure treatment plans. Our hope is thus that the theoretical and applied perspectives of inhibitory retrieval can set the stage to further develop innovative interventions that aim to help athletes who are dealing with debilitating states of anxiety and fear of failure.

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