

Preliminary evidence for the treatment of performance blocks in sport: The efficacy of EMDR With Graded Exposure

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12 Preliminary evidence for the treatment of performance blocks in sport: The efficacy of Eye

13 Movement Desensitisation and Reprocessing with graded exposure.

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Abstract

Sport psychologists are increasingly confronted with performance problems in sport where athletes suddenly lose the ability to execute automatic movements (Rotheram, Maynard, Thomas, Bawden & Francis, 2012). Described as *performance blocks* (Bennett, Hays, Lindsay, Olusoga & Maynard, 2015), these problems appear to manifest as locked, stuck, and frozen movements, and are underpinned by an aggressive anxiety component. The current research used both qualitative and quantitative methods in a single case-study design to investigate the effectiveness of *eye movement desensitisation and reprocessing* (EMDR) with graded exposure as a treatment method. Pre, mid, and post intervention performance success, and *subjective units of distress* (SUDs; Wolpe, 1973) revealed improvements in all associated symptoms, and these benefits transferred to training and competition environments. The current findings suggest that previous life experiences might be associated with the onset of performance blocks, and that EMDR with graded exposure offers an effective treatment method.

Key words: trauma, anxiety, yips, lost move syndrome, performance block.

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1 Preliminary evidence for the treatment of performance blocks in sport: The efficacy of Eye
2 Movement Desensitisation and Reprocessing with graded exposure.

3
4 A performance block is a phenomenon in sport in which physical movement is
5 momentarily disrupted, causing an inability to perform skills that were once so effortless.
6 Traditionally performance blocks have been considered under disparate labels, for example
7 the *yips* in sports such as golf and cricket, and *lost move syndrome* (LMS) in gymnastics,
8 trampolining, and diving (Day, Thatcher, Greenless & Woods, 2006; Rotheram, Thomas,
9 Bawden & Maynard, 2007). There is evidence to suggest that the root causes of these
10 problems are psychological in nature, and that they might in fact be forms of the same
11 disorder (e.g., Bennett et al., 2015; Bennett, Rotheram, Hays, Olusoga, Maynard & Lindsay
12 2016; Roberts, Rotheram, Maynard, Thomas & Woodman, 2013). Indeed, recent research
13 exploring these entities collectively has reported numerous psychological similarities between
14 them, including intense cognitive anxiety, loss of control, fear, intrusive thoughts, and
15 frustration, the primary factor being an extreme level of anxiety during, and following initial
16 onset of the problem (Bennett et al., 2015). Thus, it was proposed that the *yips* and LMS be
17 reconsidered as one and the same form of disorder and studied accordingly. The generic term
18 *performance block* was put forward, described as severe cognitive and somatic anxiety,
19 muscle spasms, locked, stuck, and/or frozen movement, and a momentary loss of cognitive
20 and motor control (Bennett et al, 2015).

21 Similarities have been drawn between performance blocks in sport, anxiety-related
22 disorders, and dystonia (cf. Rotheram et al., 2007). For example, typical symptoms associated
23 with dystonia include sudden and uncontrolled movement disruption, extreme anxiety, fear,
24 intrusive thought patterns, loss of control, and panic (Altenmuller, Ioannou & Lee, 2015).
25 Similarly, anxiety-based disorders involve components such as extreme cognitive and somatic

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1 anxiety, intrusive thoughts, obsessive behaviour, loss of control, and fear (American
2 Psychiatric Society; APA, 2013), all of which are major components of performance blocks
3 (Bennett et al., 2015). Dystonic problems have been explained using dissociation theories,
4 and the conversion of psychological pain into physical symptoms (i.e., spasms, jerks, and
5 freezing) as a form of defence against the painful emotional effects of remembering a
6 traumatic event (Thomas, Vuong & Janovic, 2006). It is suggested that the overwhelming
7 intensity of emotion experienced during trauma, floods the brain's capacity to effectively
8 process the event. Thus, rather than being stored appropriately in memory networks, an
9 imprint of the experience is stored in its raw emotional and sensory form (Scaer, 2014). In
10 accordance with dissociation theory, environmental stimuli vaguely connected to a past
11 traumatic experience (including emotion, image, sensation, cognition, belief, or
12 environmental), can cause the same emotional and sensory components attached to the past
13 event to resurface (LeDoux, 2014; Levine, 1997).

14 There is increasing evidence demonstrating a link between unprocessed memories and
15 psychological disorders (Logie, 2014), and it has previously been suggested that
16 psychologically significant life-events experienced away from the sporting context might be a
17 factor in the onset of the yips (Roberts et al., 2013; Rotherham et al., 2007). In their study
18 exploring the yips in golf, Rotheram and colleagues (2007) demonstrated a link between the
19 yips and a history of significant life-events (e.g. death of a loved one, relationship
20 breakdown). In another study, Bawden and Maynard (2001) found that psychologically
21 significant sport-related events (e.g., dropped catch, embarrassment, arguments) occurred
22 immediately prior to the first yips experience in cricket bowlers. Day and colleagues (2006)
23 also suggested that LMS was equivalent to a traumatic experience and might therefore trigger
24 comparable behavioural responses to those of trauma victims. Taken together, existing
25 literature suggests that psychological characteristics associated with the lived experience of

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1 performance blocks (e.g., loss of cognitive control, intense fear, panic, anxiety), as well as
2 reported coping mechanisms (e.g., avoidance behaviour, dissociation), might involve
3 subconscious processes, and be linked to a history of significant life-events that have been
4 stored as unprocessed imprints in the brain. Taking this into consideration, it is perhaps
5 unsurprising that researchers and applied practitioners have faced major difficulties in
6 identifying a successful treatment method for performance blocks (Klampfl, Lobinger &
7 Raab, 2013; Rotheram et al., 2007). Treatment has largely comprised of cognitive behavioural
8 techniques, and/or technical modifications to the affected skills (e.g., visualisation, self-talk,
9 changing hand-grip on the golf club, eliminating a specific rotation from a dive; Philippen,
10 Ledger, Land, Schuetz & Schack, 2014). If performance blocks are indeed psychologically
11 based, somewhat subconscious, and associated with significant life-events, it is essential to
12 explore more appropriate treatment methods that might address these factors.

13 Early treatment methods for anxiety-based disorders and trauma victims have
14 primarily revolved around talking therapies and drug prescription (Ho & Lee, 2012; Shapiro,
15 2001). Considering the growing body of research implying that memories associated with
16 traumatic experiences are associated with anxiety-based problems and psychological
17 disorders (Scaer, 2014), it is not surprising that increased interest is being directed towards
18 therapies that facilitate the identification, and re-processing of traumatic memories (e.g.,
19 *emotional freedom technique*; EFT, and EMDR) (Craig, 1999; Shapiro, 2001). Indeed, the
20 success of these therapies has been demonstrated with conditions such as *post traumatic*
21 *stress disorder* (PTSD; Church et al., 2013), fear (Waite & Holder, 2003), and phobia (Salas,
22 Brooks, & Rowe, 2011).

23 Despite widespread application in other domains, only one published study has
24 attempted to use one of these methods in sport. In their study, Rotheram et al. (2012) applied
25 EFT, to a yips-affected golfer. EFT is a brief exposure therapy incorporating the human

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1 electromagnetic energy system as an intervention point on the emotional and cognitive
2 systems (Feinstein, 2008). Following four sessions of EFT to address the cognitive and
3 emotional symptoms of the yips, the authors reported symptom relief and improved putting
4 performance. Whilst this research adds valuable evidence towards the potential success of
5 these therapies, the scientific evidence base for EFT is very much in its infancy, and much
6 further research is required.

7 Another, perhaps more familiar treatment method for anxiety-based disorders is *eye*
8 *movement desensitisation and reprocessing* (EMDR; Shapiro, 2007; 2012). Since its
9 discovery EMDR has been formerly recognised by a wide range of clinical organisations
10 including the APA (2004), the National Institute for Clinical Excellence (NICE; 2005), and
11 the World Health Organisation (WHO; 2013). The integrative eight-phase treatment design is
12 based on the *adaptive information-processing model* (AIP; Shapiro, 2001). This model
13 suggests that memories attached to traumatic experiences are not adequately processed but
14 instead stored in real time, as emotional and somatic symptoms. If left unprocessed, the
15 emotional and somatic symptoms attached to the original event will continue to re-surface as
16 if in the present, causing extreme hyperarousal, anxiety, and avoidance of stimuli even
17 vaguely connected to the original memory. Through directed dual attention (recalling the
18 memory whilst remaining grounded in the present, assisted by bilateral stimulation), the brain
19 can access the dysfunctionally stored memories, stimulate the brains natural processing
20 system, and bring the memory to an adaptive resolution. Once the memory has been fully
21 processed, the necessary information is assimilated, and new information can be appropriately
22 stored in memory, without the disturbing emotional and physical sensations that were
23 originally attached.

24 Unlike traditional cognitive therapies that deliberately challenge, restructure, and then
25 reframe negative beliefs into adaptive positive ones, EMDR facilitates the spontaneous

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1 shifting of the negative belief during subsequent processing (Oren & Solomon, 2012). EMDR
2 therapy requires the client to focus on the traumatic memory for only a short period of time,
3 gaining a sense of mastery through the ability to move between the present and the past event
4 during each set of bilateral stimulation. Since its initial application as a treatment therapy for
5 PTSD, EMDR has been successfully used to treat a variety of disorders, including *generalised*
6 *anxiety disorder* (Gauvreau & Bouchard, 2008) *depression* (Grey, 2011), and *obsessive*
7 *compulsive disorder* (OCD) (Marr, 2012). Considering the underpinning components of
8 performance blocks (i.e., anxiety, fear, intrusive thoughts, loss of control), it stands to reason
9 that a therapeutic intervention that has proven so effective in treating disorders underpinned
10 by anxiety, and those related to trauma, would be equally promising for performance blocks.

11 A common feature of treatment protocols for anxiety problems is *trauma-focussed*
12 *CBT* (NICE, 2005). This method is based on the premise that individuals who have symptoms
13 of an acute anxiety disorder as a result of a traumatic experience, also have unhelpful thoughts
14 and beliefs specifically related to the event. Consequences of these thoughts and beliefs
15 include avoidance behaviour, and hypervigilance to threatening situations. A major
16 component of trauma-focussed CBT is graded exposure that aims to reduce avoidance
17 through repeated exposure to the threatening cue, whilst challenging unhelpful/harmful
18 thoughts/beliefs associated with the stimuli (Craske, Treanor, Conway, Zbozinek & Vervliet,
19 2014). In essence, exposure treatment works on the premise that repeated re-exposure to
20 anxiety inducing stimuli effectively reduces a learned fear response by creating a new, more
21 appropriate response (Kindt, 2014). The context in which performance blocks are experienced
22 requires a direct need for the individual to re-enter the problem-associated environment to
23 train and compete. Thus, gradual supported exposure, might provide an effective framework
24 through which this process can occur.

25

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1 **Aims of the Current Study**

2 The primary aim of the current study was to explore the effectiveness of a combined
3 intervention of EMDR and graded exposure for the treatment of performance blocks. Due to
4 the lack of existing research using EMDR in sport, a second aim was to comprehend the
5 individual's experience of receiving EMDR within the context of elite sport, and to ascertain
6 any sport specific considerations that might need to be addressed. It is hypothesised that
7 reprocessing significant life-events, and attending to dysfunctional emotional symptoms will
8 eliminate the performance block and related symptoms, and the individual will regain their
9 ability to execute the affected skill.

10 **Method**

11 Following institutional ethics approval, qualitative and quantitative methods were
12 adopted to assess the effectiveness of EMDR with exposure therapy to treat a professional
13 golfer suffering a performance block that disabled him from executing the putting stroke.

14 **Pre- and post-intervention performance measures.**

15 This single subject case study design consisted of base line measurement, EMDR
16 treatment, and exposure therapy, interspersed with several quantitative data collections in the
17 form of performance outcome.

18 *Prevalence of performance block symptoms.*

19 Consistent with previous research (e.g., Marquardt, 2009; Rotheram et al., 2012), pre- and
20 post- intervention prevalence of the yips was assessed using visual inspection (where 0 = no
21 yips, and 1 = yips), and kinematic data. Specifically, the participant was required to perform
22 ten putts on a level putting green to each of two target holes at 0.91m (3 feet), and 1.22m (4
23 feet) distances. Distances were identified according to the participant's most anxiety-inducing
24 situation associated with the yips. Specifically, the participant identified experiencing most

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1 fear and anxiety at 3, and 4 foot putting distances. Three dimensional kinematic data were
2 captured using an electromagnetic sensor positioned 2.5 cm below the base of the putter grip
3 (Polhemus Liberty, Polhemus Inc, Colchester, VT). Data were sampled at 240Hz and
4 captured using Golf Biodynamics Ultimate system software (Version 11.0.5, GBD Pty,
5 Australia). As per manufacturer's instructions, an electromagnetic pointer was used to digitise
6 virtual markers used to define the target line. A local coordinate system for the putter was
7 aligned such that the x-axis was coincident with the target line (positive direction away from
8 the hole); y-axis was perpendicular to the target line (positive direction anterior to the
9 participant); z-axis vertically upwards. The key kinematic variables derived from
10 biomechanical analysis included putter face rotation angle and putter face rotation angular
11 velocity. These data were exported using customised Matlab script (The Mathworks Inc,
12 Natick) and graphed in Microsoft Excel software (Microsoft Corp, 2010).

13 ***Subjective Units of Distress (SUD) scores.***

14 SUD scores were recorded throughout EMDR and exposure treatment processes. This
15 was to identify the participant's subjective level of anxiety, and provided a means of
16 monitoring the success of each EMDR session where the aim was to reduce SUD scores to
17 under three (Shapiro, 1999).

18 ***Impact of Event Scale (IES; Zilberg, Weiss & Horowitz, 1982).***

19 Consistent with previous research (e.g., Bennett et al., 2016), the IES was adopted as
20 an additional measure of anxiety response to the EMDR treatment. The participant completed
21 the measure pre- and post-intervention, responding to each statement indicating the level of
22 distress experienced in relation to the problem. Distress level was reported using a scale of
23 zero (*not at all*) to four (*extremely*), with a total range of 0-88. Intrusive responses were
24 measured by items such as "I thought about it when I didn't mean to," avoidance was

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1 measured by items such as, “I stayed away from reminders about it,” and physiological
2 arousal was measured by items such as “my feelings about it were kind of numb”.

3 ***Social validation.***

4 Post-intervention interviews were conducted with the participant, sport psychologist,
5 and EMDR therapist, to provide assessment of observable changes during the intervention
6 that coincided with improved performance and symptom reduction. The interview schedule
7 was constructed using a deductive approach to create a pre-determined set of themes and
8 categories (Patton, 2002). Interview questions were designed to provide the following:
9 information relating to the participant’s experience of EMDR and its overall effectiveness for
10 the treatment of performance blocks (e.g., extent of symptom reduction); information from
11 the EMDR therapist outlining the procedure followed; and information from both
12 practitioners regarding overall effectiveness of the intervention. This process was supported
13 by the collection of session-by-session data. Interviews were conducted in the participant’s
14 natural performance environment on completion of treatment. Following data collection the
15 primary researcher transcribed all interviews verbatim. Where appropriate, extracts from the
16 raw data have been included in the results.

17 **Participant.**

18 The participant (X¹) was a 58-year-old male golfer who presented all of the criteria for
19 a type of performance block commonly referred to as the yips (Rotheram et al., 2007).
20 Specifically, X was experiencing involuntary spasms, shaking, muscle tension, and jerking in
21 the lower left forearm whilst executing a putting stroke. Physical symptoms were coupled
22 with extreme anxiety, panic, and frustration. When asked to describe his first experience of
23 this problem, he stated:

¹ To ensure anonymity, the participant in the current study will be identified using the pseudonym X.

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1 There was a sensation of a muscle spasm in my left wrist, a
2 vibration and tightness which I couldn't control there was
3 nothing I could do about it. It was like a brake and accelerator
4 fighting each other I've no idea where it came from it just
5 suddenly appeared. It's like a mental illness now, it's fearful and
6 I don't know when it's going to happen.

7 The problem first occurred in competition when the participant was attempting a 3ft putt on
8 the 18th green. For a few weeks after this he experienced no further disturbance, however the
9 problem later returned during a non-competitive game. X recalled how the problem suddenly
10 returned, and quickly escalated: "It came back absolutely out of nowhere and then built up
11 and up and up, to the point it got worse and worse, and bigger and bigger, and you can't
12 control it, you just can't play anymore." After 30 years competing at major championship
13 events, X was ultimately forced to retire.

14 X reported several attempts at overcoming the problem using different technical
15 adjustments (e.g., using a long putter, putting with one hand, standing at a different angle, and
16 using a weighted club), none of which had alleviated symptoms: "I've changed stances, used
17 longer putters, shorter putters, heavier putters, all these sorts of things but it's not worked
18 remotely, I can still feel it." X also described extreme and persistent anxiety, nervous dread
19 related to golf, disturbed sleep, avoidance of the environment and associated conversation,
20 ruminative thought patterns, fear of the skill, damaged relationships, and isolation. Finally,
21 when asked if he was able to visualise himself successfully putting he stated: "I can't even see
22 the positive image anymore."

23 **EMDR Therapist.**

24 The therapist involved in the delivery of EMDR was a Consultant Clinical
25 Psychologist registered with the Health Care Professions Council (HCPC), and certified in

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1 EMDR. He had over 15 years experience providing mental health care, and training to a range
2 of organisations. He also had experience providing mental health care in the context of elite
3 sport. On initial contact with the therapist, the primary researcher described the case, and
4 discussed the extent of his involvement should he wish to proceed. The therapist confirmed
5 his interest and an initial meeting with X was arranged.

6 **Sport Psychologist.**

7 The Sport Psychologist was a chartered member of the British Psychological Society,
8 and registered with the HCPC. He had over 15 years experience working in elite sport with a
9 variety of high performance teams. He was known to the primary researcher prior to the start
10 of the current study, and on discussing the case immediately expressed interest in supporting
11 the intervention.

12 **Intervention.**

13 The intervention consisted of eight sessions within which a combined intervention of
14 EMDR with exposure therapy was delivered to treat a performance block. Prior to the start of
15 the intervention the Sport Psychologist and EMDR Therapist familiarised themselves with the
16 environment, establishing rapport with X through general discussion about golf. The total
17 intervention period covered 27 weeks from inception to the final review session conducted 5
18 weeks post-treatment. Issues regarding confidentiality were discussed during the first
19 meeting, and X provided informed consent to continue. It was made clear that withdrawal
20 from the study was permitted at anytime up until the point of publication.

21 ***EMDR protocol.***

22 Consistent with previous research (Shapiro 2012), the eight-stage standard EMDR
23 protocol was adopted (c.f. Shapiro, 2001). Specifically, two sessions focussed on stages one
24 and two: client evaluation (including full mental health assessment and completion of the

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1 IES), case formulation, history taking, and client preparation. Additional focus was placed on
2 educating X on EMDR, performance blocks, and anxiety. Reprocessing of *target memories*
3 (TM's) was covered in two separate sessions, each lasting approximately 120 minutes. A final
4 review session took place five weeks post-treatment (including post-intervention IES
5 completion). Prior to each EMDR session the EMDR therapist and Sport Psychologist met to
6 review progress. This ensured consistent integration of EMDR treatment with graded
7 exposure, and allowed both practitioners to effectively monitor progress. Similarly, a meeting
8 took place following each session to discuss progress, actions, and follow up meetings.

9 ***Graded exposure.***

10 Exposure therapy involved weekly sessions of in vivo exposure to harmless but
11 distressing, problem-related stimuli. Exercises were hierarchically arranged from least to most
12 anxiety evoking, as identified by X (see Table 1). Specifically, X was guided through the
13 process of identifying a series of situations associated with the performance block, towards
14 which he experienced increasing levels of anxiety (*where SUD 0 = no anxiety experienced;*
15 *and SUD 10 = extreme anxiety*). These boundaries were more specifically defined by X as:
16 *SUD 0 = "feeling the speed of my arms, control of my arms, and inner calmness"; and SUD*
17 *10 = "electric shock in my arms, not in control of my arms, intense anxiety inside"). X*
18 identified seven levels, with lowest anxiety associated with putting on the green alone (SUD =
19 $\frac{2}{10}$), and highest anxiety associated with playing an individual event with a scorecard (SUD =
20 $\frac{10}{10}$). Once each level was identified, the importance of weekly practice sessions was
21 discussed, during which X would target each level progressively, recording relative SUDs.

22 ***Session one.***

23 The first session involved formulation of the problem between the Sport Psychologist
24 and X. In this session intervention goals were established. X stated that he wanted to be able
25 to "go back out and play a round of golf again, just be able to hit the thing like I used too

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1 without this disease in control of me.” Further to this, he identified wanting to compete again
2 in a local pro-amateur competition. An overarching goal was to recapture the level of
3 enjoyment he used to associate with golf. Once goals had been established the a graded
4 exposure plan was constructed (see Table 1).

5 *Session two.*

6 Following informal discussion the Sport Psychologist explored X’s current state of
7 well-being and performance. X discussed completing several practice sessions at the first two
8 levels of exposure, with SUD scores of $\frac{8}{10}$ and $\frac{9}{10}$ respectively. X recognised a felt urgency
9 to overcome the problem, and reported experiencing severe anxiety just thinking about going
10 out to practice.

11 After a brief review the EMDR therapist began stage one of the EMDR protocol: case
12 formulation and client history taking (Shapiro, 1999). During this session X identified several
13 significant-events, including the early death of his father when he was 2 years old, and
14 adjustment to his mothers remarriage at the age of 10. When recalling a particular period of
15 his life involving a major career transition, he described how he “completely flipped out and
16 just lost it.” Other life-events identified included family disruption following his father’s
17 death, the later death of his mother and sister, substantial work-related stress, and unstable
18 relationships. Importantly, X highlighted substantial emotional suppression throughout his
19 life, driven by the need to “not to be a burden to others or upset other people.” Sport specific
20 events identified included several performance blocks. The most notable of these was the first
21 experience that occurred during a team event in a professional competition when he was
22 attempting a 3ft putt on the 18th green; the final shot to secure the game for him and his team.

23 Symptoms reported at the time of these events included extreme fear, confusion, and
24 subsequent avoidance of situations that might cause embarrassment or failure (e.g., public
25 speaking, dancing, learning a new skill, and vomiting). Some of these symptoms might have

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1 been linked to the level of protection he received growing up: “I was over-cared for and never
2 ever allowed to take a risk or make a mistake.” X was unable to identify a time he had failed,
3 and stated: “no I would never attempt anything if I thought I might not be able to do it, that
4 would just be embarrassing.”

5 Following the session the EMDR therapist shared his formulation with the sport
6 psychologist providing the following summary:

7 It appears to be an anxiety-based difficulty in a performance context.

8 There are clear signs of an insecure-avoidant attachment style whereby
9 [participant] has learnt to suppress emotion that is likely accompanied
10 with beliefs about needing to care for others, avoid failure, and please
11 everyone. A number of significant events have been identified that
12 have only served to exacerbate his presentation of the problem.

13 This report was supported by scores revealed on the IES, for which X recorded a total score of
14 36 (total avoidance = 13, $M_{\text{avoidance}} = 1.6$; total intrusion = 11, $M_{\text{intrusion}} = 1.4$; total
15 hyperarousal = 12, $M_{\text{hyperarousal}} = 2$), indicative of the extreme trauma associated with
16 performance blocks.

17 ***Session three.***

18 Session three started with a review led by the sport psychologist during which X
19 discussed several practices over the preceding few days in which he experienced lower levels
20 of anxiety putting on the green alone ($SUD = 2/10$). As such, progression to the next level of
21 exposure was agreed. In accordance with stage two of the EMDR protocol the EMDR
22 therapist then explored X’s felt sense of safety associated with different contexts, before
23 identifying a suitable safe place to mentally return too after each re-processing set. The
24 therapist and X then worked together on developing an appropriate sequencing plan for TMs,

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1 present triggers, and future desired outcomes identified in the formulation stage. Three
2 memories were listed on the target-sequencing plan:

- 3 1. 2011- Missing a 3rd putt in a professional competition (SUDs = $\frac{8}{10}$)
- 4 2. 2006 - On a training course with fellow professionals and hitting a shot on the range
5 that skewed left. Embarrassment felt when he was asked if he wanted second attempt
6 in front of the other professionals who were all younger than him (SUDs = $\frac{9}{10}$)
- 7 3. 2004 – Missing a bunker shot in a game with the club captain (SUDs = $\frac{10}{10}$)

8 Processing then started on the first TM. SUD score was $\frac{8}{10}$, negative cognitions were “I have
9 to be perfect (and please everyone)” and “I am not in control of my own body.” Positive
10 cognition was “I can be myself,” and the validity of cognition was $\frac{5}{10}$. X identified associated
11 feelings of embarrassment and shock, as well as tightness in the chest, shaky legs, and feeling
12 hot in the face (embarrassment).

13 After approximately 12 sets of BLS, SUD score lowered from $\frac{8}{10}$ to $\frac{0}{10}$. X reported
14 absence of tightness in the chest and stomach; reduced warmth in the face/’flush’; stillness,
15 and mental clarity. X was unable to reactivate an image of the TM and reported “feeling
16 nothing” when the therapist revisited this memory. The therapist observed relaxed posture and
17 use of humour that he later described as a possible coping mechanism for underlying anxiety.
18 The session was drawn to a close activating X’s safe-place (stage 5), installing the positive
19 cognition “I can be myself” (stage 6), and completing a body scan (stage 7), through which no
20 remaining sensations were reported.

21 *Session four.*

22 Although he had not been able to practice as much as intended (causing additional
23 frustration), X reported having taken his first few days annual leave he had ever taken, and
24 that he had played two rounds of golf; one on his own, and one with a committee member,

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1 consequently progressing towards level five of exposure. The sport psychologist explored X's
2 level of anxiety, and perception of the EMDR treatment component. X said that he still "felt
3 nothing" when recalling the first TM (SUD = $0/10$). However, he said that he was due to play
4 on the same course twice in the next couple of weeks in a practice round, and then again in
5 the same event as the first TM took place. He attached a SUD score of $7/10$ to this event.

6 *Session five.*

7 Session five consisted of stage eight of the EMDR protocol. X recalled several other
8 memories from his past since the previous session, and additional details related to events
9 already discussed. On completing stage eight, the therapist was concerned about remaining
10 anxiety associated with the first TM that was readdressed with further processing. SUD score
11 was $3/10$, negative cognition was "I have to be perfect (and please everyone);" and positive
12 cognition was "I can be myself," with validity of cognition $3/10$. After several sets of
13 processing, SUD score lowered to $0/10$, validity of cognition increased from $5/10$. The session
14 was concluded at this point with stages five to seven.

15 *Session six.*

16 In session six, the sport psychologist met with X on the putting green at his club,
17 where he continued to practice throughout the meeting. X reported that he had played a
18 friendly round with three others at one of the courses he had experienced the problem several
19 years ago. He reported experiencing extreme levels of anxiety from the point of leaving his
20 house (SUD = $9/10$), and that these feelings escalated throughout the day (SUD = $10/10$).
21 Physical sensations were tingling and shaking in the forearms, jerky movements on the
22 putting green, and an "electric shock feeling" on the 18th; the same green of his initial
23 performance block. These symptoms resulted in an inability to putt, and subsequent
24 avoidance of finishing shots, suggesting his partner took them. This session lasted
25 approximately two hours, during which X talked about the emotional, cognitive, and physical

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1 sensations in great depth until he reported feeling much clearer about the experience and able
2 to put it into perspective.

3 *Session seven.*

4 Stage eight of the EMDR protocol was completed in this session. Treatment effects
5 identified included increased communication in X's relationships, and a need to understand
6 the context of early family bereavements. Although he wanted to contact his sister, he
7 recognised significant avoidance with negative cognitions of "not wanting to upset her," and
8 "not knowing how she will react." After much discussion X appeared to assess the situation
9 more appropriately.

10 On revisiting the TM's, X reported no further disturbance or distress, and complete
11 absence of physical sensations including flushness, tightness, and shakiness. It was agreed
12 that no additional processing was required for the three identified TMs, but that X would
13 consider addressing some earlier memories (e.g., death of his father and family disruption). A
14 future template was administered at the completion of stage five, synthesising X's use of the
15 positive cognition "I can be myself." X agreed to continue focussing on the use of his positive
16 cognition: "I can be myself," protecting personal time on a daily basis, and pursuing activities
17 considered to be risky options. The sport psychologist then joined the session, and when
18 asked to recall his first and most severe performance block experience, X reported no
19 emotional, cognitive, or physical sensations. Several upcoming competitions were identified
20 that X would enter, and he stated that he could see himself recovering fully.

21 *Session eight.*

22 Session eight was conducted five weeks post-treatment, and consisted of a full review
23 with X, the EMDR therapist, and sport psychologist. Prior to this session X had competed in
24 two competitive team events, during which he experienced mild performance related anxiety
25 (SUD = $\frac{4}{10}$) but complete absence of physical sensations associated with the performance

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1 block. X also reported decreased general anxiety and physical tension at all levels of graded
2 exposure. The sport psychologist observed signs of physical relaxation, calmness, and
3 verbalisation of emotion that he had previously suppressed. Additional outcomes included
4 absence of ruminative thoughts, memories, and worries associated with the identified TMs. X
5 reported that discussing each TM and performance block openly had helped him to reappraise
6 memories, and that since doing EMDR he perceived these experiences as unimportant.

7 The intervention came to an end when X's aims had been achieved. That is, he no
8 longer suffered from the physical, emotional, or cognitive symptoms associated with the
9 performance block, and performance had improved both in training and competition. X
10 discussed enjoying playing again, and had experienced significant improvement in social
11 functioning.

12 **Intervention Evaluation.**

13 **Performance success.**

14 Prior to the start of the intervention, putting success rate was $\frac{5}{10}$ at three feet, and $\frac{4}{10}$
15 at four feet distances. Post-intervention these scores were $\frac{10}{10}$ at both distances. Performance
16 improvements were also made according to graded exposure, along which X progressed to the
17 final level of exposure with complete absence of symptoms.

18 **Subjective Units of Distress (SUD; Wolpe, 1973).**

19 SUD scores recorded throughout EMDR treatment demonstrated reduced anxiety
20 levels associated with all TM's. For the first TM SUDs reduced from $\frac{8}{10}$ to $\frac{0}{10}$, from $\frac{9}{10}$ to
21 $\frac{0}{10}$ for the second TM, and finally from $\frac{10}{10}$ to $\frac{0}{10}$ for the third TM – although it should be
22 noted that no actual processing took place for this particular TM as SUDs had reduced prior
23 to it being targeted. This was likely a side effect of processing done on the first two TM's.
24 IES scores post-intervention were 0 on all aspects.

1 **Kinematic data.**

2 Figures 1 and 2 illustrate putter face rotation angle and putter face rotation angular
3 velocity, from the top of the backswing through to forward swing, impact is indicated by the
4 vertical line. Visual inspection of the data from baseline to post-intervention suggests
5 increased control over the putting stroke following treatment. More specifically, velocity of
6 putter face rotation following treatment is illustrated by close, smooth lines that are
7 characteristic of a smooth putting stroke, in comparison to the irregular data collected prior to
8 treatment (Marquardt, 2009). This data suggests that the involuntary movement disturbance
9 was causing the jerkiness of the club head on impact with the ball. This improvement also
10 coincides with lowered levels of anxiety, and increased performance success.

11 **Reflections on intervention.**

12 Following the intervention, X highlighted several improvements in performance and
13 social functioning. For example, when asked about his level of anxiety associated with the
14 performance block he reported:

15 I just don't feel it anymore; I can't feel it even if I try too. I am not
16 thinking about it at all, I don't worry about it I don't get the same
17 nerves I did because of it at all because there's no feeling there
18 anymore, no brake-accelerator feeling in my arms, nothing like that. I
19 don't think I'll ever fully understand yet why EMDR and talking about
20 memories has made all that freer and go away, but it has it's really
21 worked. I can comprehend now that it's totally a mental thing and how
22 the mental thing caused the physical thing.

23 The scores derived from the IES administered post-intervention further support this,
24 confirming no remaining anxiety. X indicated that he believed these improvements were a

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1 direct result of the intervention, and that as a result of treatment he was “in a better place than
2 I have ever been before.” He talked in particular about enhanced family relations, increased
3 communication with siblings, and an improved relationship with his wife. Improvements were
4 also reflected in his performance on the golf course where he was no longer ruminating,
5 losing focus, or avoiding taking putts. Interestingly, X also reported that he had stopped biting
6 his nails, something he reported having done since childhood:

7 My inner thoughts weren’t even given a look in before this treatment it
8 was just a mess but it’s beginning to get clearer; it’s just like little
9 boxes opening and suddenly I am doing other things, like I’ve stopped
10 nail biting which is completely off the wall; it was just a nervous thing
11 that I would never have related to it [performance block] but I’m
12 beginning to understand.

13 X’s perception of the problem also changed:

14 That’s another positive thing to come out of this; my change in
15 perspective. I know if I go out there now it’s just a completely
16 different feeling, I feel like a different player, it [performance block]
17 isn’t with me anymore, and I know that if I ever experienced it again,
18 that I would be able to manage my emotions way better, they just
19 wouldn’t effect me, thanks to this I understand all that now.

20 When asked about his overall performance in comparison to before the problem, he
21 recognised that he wasn’t at the same level, however he stated:

22 After the last couple of games I am excited to play again and my goal
23 now is to regain the level that I used to play at, I know this will come

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1 with increased pressure and expectation but I can manage that now I
2 have the coping strategies and I understand it all now.

3 When asked to talk about the impact of the intervention on social functioning:

4 I have realised it's ok to talk, I talk about my emotions now and I'm
5 not afraid of that, that has been such a huge turning point for me; I
6 never spoke to anyone about anything before [treatment].

7 In a three-month post-treatment follow-up X reported that he was competing in
8 professional competitions with complete absence of performance block symptoms: "I played
9 18 holes without a single bad feeling on the greens, it was the best I have felt for years, I have
10 a different mindset now it's magic!"

11 When reflecting on the effectiveness of EMDR, the Therapist said:

12 The value of EMDR in this context is in it's structure, specifically
13 around creation of a safe place; it gave the physical intimacy for
14 [participant] to connect with, and give feedback on his internal state,
15 where in the body the feeling was; I think initially there was a level of
16 embarrassment towards that but then to realise he could experience
17 that safely was an extremely powerful part of it.

18 The Therapist added to this that possibly the most important aspect with regards to
19 sport was sharing the formulation of the problem with the participant and sport psychologist,
20 and educating the participant on underlying components, and the impact of anxiety on the
21 body. In terms of specific challenges for use of EMDR in elite sport, the Therapist suggested:

22 Developing a safe therapeutic environment that is consistent is always
23 going to be a challenge in sport, coupled with maintaining the intensity
24 of sessions around training and competition. Also consideration of other

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1 stakeholders [e.g., coach/performance management etc.], they all need
2 educating, and they all have input into the outcome goals of the
3 treatment so you have to factor that in as well.

4 **Discussion**

5 The emerging similarities between performance blocks and anxiety-based disorders
6 posits that comparable treatment methods might also be effective. As such, the current study
7 adopted a combined intervention of EMDR and graded exposure for the treatment of
8 performance blocks in sport. Due to the lack of existing research using this method in sport,
9 the current research also hoped to comprehend the participant's experiences of receiving
10 EMDR. It was hypothesised that by reprocessing significant life-events, and addressing
11 associated psychological components that the physical symptoms of the performance block
12 would subside. Prior to the intervention, assessment by visual observation, self-report, and
13 performance success identified severe anxiety, involuntary movement, muscle tension,
14 shaking, and spasms. Post-intervention these symptoms were no longer apparent. Putting
15 success had also increased to 100% success rate at three and four feet, from 50% (3 feet), and
16 40% (4 feet) respectively.

17 Previous research using EMDR has shown that an individual's perceptions of an
18 event, and personality can alter through the course of treatment, as significant life-events and
19 associated emotions are processed (Greway, 2003). Interview data collected on completion of
20 treatment would appear to support this, as the participant identified less importance associated
21 with the problem, increased verbalisation of emotional experience, and considerably less
22 rumination and obsessive behaviour. Care must be taken interpreting these findings as no
23 direct measures can be provided to support these claims. However, one direction of future
24 enquiry would be to assess personality characteristics and social functioning prior to the
25 intervention, and again on completion. Indeed, previous research has drawn links between

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1 perfectionism, rumination, reinvestment, and performance block symptoms (e.g., Bennett et
2 al., 2016; Roberts et al., 2013). Appropriate psychometric measures might therefore be
3 adopted to assess these characteristics prior to, and on completion of the intervention. This
4 would extend existing literature and our understanding as to whether these characteristics
5 might be symptoms of performance blocks, or individual vulnerability factors to their onset.

6 A central tenet of EMDR is that if traumatic experiences are not processed effectively,
7 they will become the basis of dysfunction. The participant in the current study reported a
8 history of significant life-events, emotional suppression, and difficulty verbalising internal
9 experiences. Furthermore, reported symptoms included extreme anxiety, hypervigilance, fear,
10 and avoidance behaviour. EMDR posits that using eye movements to access and facilitate the
11 processing of trauma memories can alleviate dysfunctional symptoms, thus bringing them to
12 an adaptive resolution (e.g., Hout, Muris, Salemink & Kindt, 2001). During this process the
13 client is encouraged to verbalise any images, thoughts, or feelings that surface, thus
14 promoting communication of internal experience. Not dismissing the importance of talk
15 therapy and informal support in the current intervention, it is likely that EMDR treatment
16 contributed enormously to the participants improved understanding and verbalisation of
17 internal experience post treatment. Establishing a strong therapeutic alliance between the
18 participant, EMDR practitioner, and sport psychologist was of paramount importance in
19 addressing these symptoms, supported by the emphasis placed on establishing psychological
20 safety within the EMDR protocol.

21 The efficacy of exposure for reducing symptoms of re-experiencing, avoidance, and
22 anxiety has received wide support, yielding the highest success rate in overcoming PTSD
23 when compared with other forms of treatment (e.g., Taylor et al., 2003). The current findings
24 are consistent with substantial research supporting the use of graded exposure for the
25 reduction of avoidance and anxiety (Taylor et al., 2003). Although EMDR is favoured for its

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1 lack of homework and therefore reduced treatment time (Ho & Lee, 2012), the contextual
2 demands relating to competition calendars meant that EMDR treatment sessions were
3 intermittently spread over the course of a relatively long period (27 weeks). Furthermore,
4 multiple individuals were involved in the planning and delivery of the intervention
5 throughout, and therefore additional sessions in the form of education, reviews, and
6 performance assessment were required. Importantly, findings suggest that diluted EMDR
7 treatment with regular informal support might be as effective as more frequent sessions.

8 Although findings from the current case are profoundly important, by the very nature
9 of the single case-study design, the results cannot be generalised to larger populations.
10 Specifically, it should be recognised that no single treatment is a panacea for every individual,
11 and the success of the intervention might be the result of individual differences or exceptional
12 personal histories. Furthermore, it cannot be ascertained which component of the intervention
13 yielded most success. However, the use of objective measures, a formal treatment fidelity
14 protocol, and social validation all assisted in decreasing this risk. Furthermore, various
15 researchers have supported the value of integrating EMDR with other treatments (e.g.,
16 Maxfield, Shapiro & Kaslow, 2007; Shapiro, 2012). Moreover, the aim of the current study
17 was to provide an effective treatment method for performance blocks, and not to directly
18 compare the benefits of EMDR with graded exposure.

19 One of the potential side effects of EMDR treatment is cognitive and emotional
20 fatigue from the increased cognitive load of processing (Shapiro, 2001). As such, sessions had
21 to be carefully planned around the participant's training and competition schedule. Indeed, the
22 current findings highlight the necessity of adopting a team approach to planning and delivery
23 of treatment throughout, and that it cannot be as prescriptive as perhaps other contexts might
24 favour. Furthermore, the motivation for using EMDR in elite sport will often be driven by the
25 need to overcome a performance problem that is disrupting an individual's ability to train and

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1 compete. As such, there will be numerous stakeholders involved, all of whom should be
2 educated on the various factors associated with performance blocks and their treatment.

3 While EMDR evidently has a place in sport for the treatment of performance blocks, it
4 would be unwise to assume the readiness of sport psychologists to deliver this treatment
5 without appropriate clinical supervision. In many cases it is likely that highly traumatic
6 memories might surface, and it is imperative that the system around the individual is properly
7 equipped to manage that. Thus, when an individual presents all of the symptoms of a
8 performance block, it is recommended that both sport and clinical psychologists are involved
9 in a full assessment and history taking of the athlete, following which the level of therapist
10 experience, and practitioner supervision required for treatment is carefully assessed.

11 In summary, the current case study provides valuable evidence for the use of EMDR
12 and graded exposure for the treatment of performance blocks. More specifically, it
13 demonstrates a relationship between significant life-events, anxiety, and performance blocks
14 in sport, and that addressing these components facilitates substantial performance
15 improvement. The current intervention ended when the participant had achieved the goals
16 identified from the outset: overcoming the physical symptoms associated with the
17 performance block, and therefore alleviating maladaptive cognitive, behavioural, and
18 emotional symptoms. As a result of the intervention the participant returned to competition
19 with a complete absence of physical movement disruption, and improved social functioning in
20 all affected areas.

21

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1 Table Caption

2 *Table 1:* Situations attached to increased amounts of anxiety experience where SUD score of
3 0 = no anxiety experienced: “feeling the speed of my arms, control of my arms, and inner
4 calmness”; and SUD score of 10 = extreme anxiety: “electric shock in my arms, not in control
5 of my arms, intense anxiety inside.”)

6

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- 1 *Table 1:* Situations attached to increased amounts of anxiety experience where SUD score of
2 0 = no anxiety experienced: “feeling the speed of my arms, control of my arms, and inner
3 calmness”; and SUD score of 10 = extreme anxiety: “electric shock in my arms, not in control
4 of my arms, intense anxiety inside.”)

Step	SUD score (0-10)
Playing an individual event and entering a scorecard	10
Playing a round as part of a team	9
Game scenario with two other players	8
Putting with another pro on the green	7
Putting with another player on the green	6
Setting individual targets on the green alone	4
Putting on the green alone	2

5

6

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1 Figure Caption

2 *Figure 1.* Pre-intervention data illustrating face rotation angle and face rotation angular
3 velocity for putts from 0.91 m / 3 feet (1a & 1b) and 1.22 m / 4 Feet (1c & 1d). Data is shown
4 from the top of the backswing to the finish of the stroke, vertical line indicating impact.

5
6 *Figure 2.* Post-intervention data illustrating face rotation angle and face rotation angular
7 velocity for putts from 0.91 m / 3 feet (2a & 2b) and 1.22 m / 4 Feet (2c & 2d). Data is shown
8 from the top of the backswing to the finish of the stroke, vertical line indicating impact.

9

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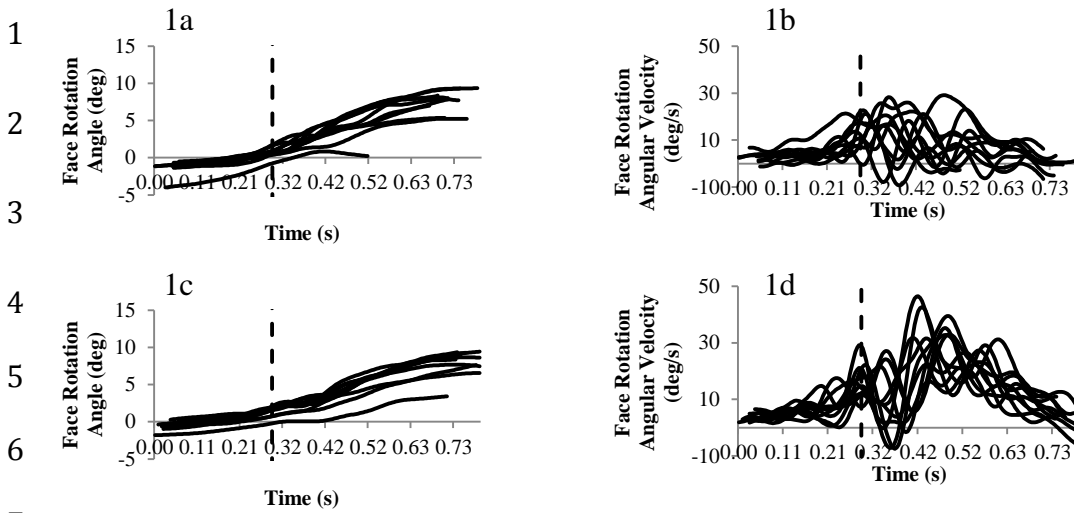


Figure 1. Pre-intervention data illustrating face rotation angle and face rotation angular velocity for putts from 0.91 m / 3 feet (1a & 1b) and 1.22 m / 4 Feet (1c & 1d). Data is shown from the top of the backswing to the finish of the stroke, vertical line indicating impact.

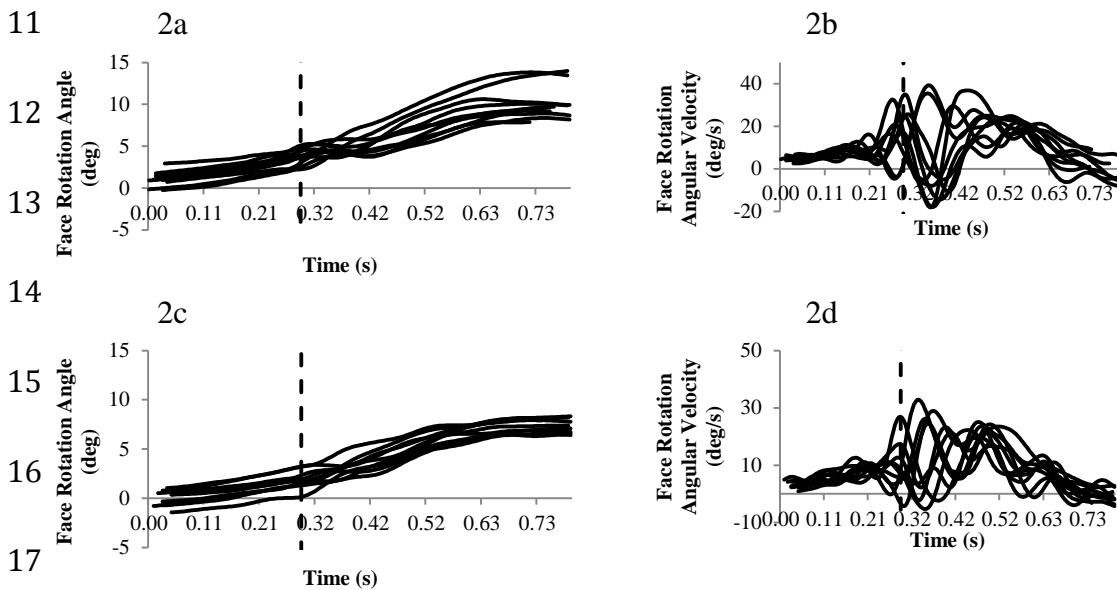


Figure 2. Post-intervention data illustrating face rotation angle and face rotation angular velocity for putts from 0.91 m / 3 feet (2a & 2b) and 1.22 m / 4 Feet (2c & 2d). Data is shown from the top of the backswing to the finish of the stroke, vertical line indicating impact.