
# On winning the 'lottery': Psychological preparation for football penalty shootouts

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**RUNNING HEAD:** PREPARING FOR PENALTY SHOOTOUTS

# On winning the 'lottery': Psychological preparation for football penalty shootouts

**Abstract**

The outcome of penalty shootouts is often referred to as a 'lottery', with the determining factor being luck rather than the skill level of the player. Throughout this article we hope to show why such attitudes towards physical and psychological preparation can diminish the perceived control of penalty takers and can negatively affect their behaviour and subsequent performance. From the synthesis of this evidence we provide task-specific recommendations that are structured around the dynamic nature of emotions that players are likely to experience during each phase of the shootout and which can be implemented or adapted to suit the individual needs of the player. These recommendations are designed to help applied professionals to optimise the psychological preparation for this scenario with the overall aim of helping players to take back control of the situation.

**Keywords:** Soccer, Perceived Control, Choking, Anxiety, Penalty Kicks

## Introduction

*"Penalties are always a lottery." Luiz Felipe Scolari (Former Coach of Portugal)*

*"Penalties are a lottery" Fabio Capello (Former England Manager)*

As these quotes testify, the outcome of football penalty shootouts is often referred to as a 'lottery' with success dependant on luck rather than the skill of the penalty taker. Consequently, a considerable amount of controversy and scepticism exists – even from individuals charged with the responsibility of preparing players for such situations - surrounding the type, utility and effectiveness of practice and preparation for penalty shootout scenarios. The aim of this paper is not to review the full scientific literature base on football penalty kicks (see Memmert, Hüttermann, Hagemann, Loffing, and Strauss, 2013), but to focus specifically on the role of perceived control. By synthesising this research we hope to provide evidence-based recommendations that applied practitioners can use to aid the psychological preparation for one of the most highly pressurised situations in world sport.

## Penalty shootouts: Luck or skill?

As much of the scepticism about the utility of preparing for penalty shootouts is related to an inflated perception of the role of luck in determining outcome success, we will tackle this perception from the outset. If penalty shootout success is predominantly based on luck we would expect success rates between teams to be around chance levels. However, since 1982, the German national team has won all six major shootouts that the country has participated in (1982, 1986, 1990, 1996, and 2006) accumulating a success rate of 85%. In contrast, with one exception (in 1996 against Spain), England has lost all penalty shootouts they have taken part in (in

1990, 1996, 1998, 2004, 2006 and 2012) which is a success rate of 14%. Similarly, with respect to individual players' success rates, players from England score on significantly fewer of their shots (67%) than Germans (92 %, $p < .03$) (Jordet, 2009). This disparity between the success rates of these teams suggests that luck is not a major predetermining factor that underpins outcome success.

Second, a kick from the penalty mark is a task that requires the player to take a free shot at goal from a distance of 11 metres. The goal area measures 24ft (7.32 m) wide by 8ft (2.44 m) high, giving a total target area of approximately 192ft$^2$ (18 m$^2$) for the kicker to hit. Furthermore, a shot struck with typical speed (20 m.s$^{-1}$) to distal areas of the goal should reach the goal in around 600ms and be physically impossible for the goalkeeper to save due to constraints on their reaction time (Frank and Hanvey, 1997). Despite these positive statistics, a surprisingly large number of penalty kicks are not converted (~25%; McGarry and Franks, 2000) and more are hit within two metres either side of the goalkeeper (~70%; Bar-Eli and Friedman, 1988). A further study has shown that shots directed toward the upper third of the goal have a save rate of 0%; yet only 13% of shots are hit to these areas, probably due to the inflated risk of missing the goal completely (Bar-Eli and Azar, 2009). Similarly, Miller (1996) examined the penalty kicks taken during the 1994 World Cup finals and concluded that 59% of penalty kicks landed relatively centrally and resulted in 26% being saved by the goalkeeper. Conversely only 41% of shots landed 6ft inside each post and of these only one was saved (8%). This evidence again undermines the role of luck in this scenario and suggests that luck may only be a significant factor in outcome success during inaccurate shooting. For example, as shots become less accurate (centralised) some players may get 'lucky' and the goalkeeper will dive to the wrong side, whereas other players will suffer bad luck

and the 'keeper will guess correctly. The only way to minimise the role that luck plays is by optimising shooting accuracy.

**Research evidence**

If penalty shootouts were totally determined by luck rather than the skill or the behaviour of the penalty taker then we would expect no correlation between player behaviour and performance success. However, a number of observational studies using video analysis of elite football penalty takers; qualitative studies that have interviewed elite penalty takers; and lab-based experimental studies have all shown that there are certain behaviours and psychological variables that are associated with performance success in football penalty shootouts. What follows is a review of this literature followed by evidence-based recommendations designed to minimise the role of luck in this scenario and reduce the impact that this component has on the perceptions of control in penalty takers.

**Observational studies**

Jordet, Hartman, Visscher, and Lemmink (2007) explored whether poor performance in penalty shootouts was attributable to stress, skill level, physical fatigue or chance. Data were collected from 41 penalty shootouts comprising of 409 penalty kicks from major international competitions. Results indicated that the importance of the kicks (indicative of stress) was negatively related to the outcome, whereas skill and fatigue had little or no relation to outcome. Jordet and colleagues have since gone on to explore exactly how this increase in anxiety affects the behaviours of penalty takers and what affect these behaviours have on subsequent shooting performance.

For example, Jordet, Hartman and Sigmundstad (2009) investigated how anxiety disrupted the timing of the penalty and also negatively influenced players' pre-shot behaviour. Video analysis of 366 penalty kicks explored the effects of different time periods typical in penalty shooting (walking to the penalty spot, ball placement, back-up, waiting for the referee's whistle, responding to the whistle, and run-up duration) on subsequent performance. Results indicated that longer times to respond to the referee's whistle were related to more goals and shorter times were related to fewer goals. Specifically, players who took less than one second to place the ball on the penalty spot score on about 58% of their penalties whereas those who took longer score on about 80% of their penalties. Similarly, taking about a second or more to respond to the referee's whistle to initiate the shot is associated with a higher probability of scoring than rushing to take the shot. The authors concluded that extreme levels of pressure cause performers to exhibit escapist thoughts where they strive to get the situation 'over and done with' as quickly as possible. Interestingly such behaviour can make goalkeepers form negative impressions of the penalty taker and in turn, increase their confidence in saving the subsequent shot (Furley, Dicks, Stendtke, and Memmert, 2012).

Finally, Moll, Jordet and Pepping (2012) investigated whether post-goal celebrative behaviours influence team success in a penalty shootout. Interestingly, 82% of those players who substantially celebrated their successful penalty ended up on the winning team. The authors concluded that such positive displays of emotion are contagious and are likely to 'infect' a positive attitude on team-mates taking subsequent kicks. Conversely, such behaviours also seem to have a negative effect on the opposition. Specifically, when players displayed substantial celebratory

behaviours the opposing team were more than twice as likely to miss their next shot (Moll et al., 2012).

**Qualitative studies**

As well as studies that have linked non-verbal behaviours with performance success, a few studies have gained access to elite players that have experience of taking penalty kicks in intentional tournament shootouts. These studies give a unique insight and a first-hand account of the psychological demands experienced by elite players in shootout scenarios and highlight that the subjective feelings of anxiety that players experience during penalty kicks is influenced by their perceived control over the situation.

Perceived control can be defined as the perception of one's capacities to be able to cope and attain goals under stress (Skinner, 1996) and is related to more favourable interpretations of anxiety symptoms (Hanton, O'Brien and Mellalieu, 2003) and superior performance under pressure (Cheng, Hardy, and Markland, 2011; Otten, 2009). In order to measure and conceptualize perceived control it has been argued that separate assessments of the perceived outcome contingency and personal competence is crucial (Skinner, 1996). Contingency expectations relate to beliefs regarding the relationship between actions and outcomes ("do my behaviours affect the result?") and competence ("can I perform at the required level?") relates to perceptions of ability (Skinner, 1996).

In an attempt to apply this to football penalty shootouts, Jordet, Elferink-Gemser, Lemmink, and Visscher (2006) interviewed ten international football players regarding their perceptions of contingency (the belief that the outcome was attributable to luck or skill) competence (their perceived ability at penalty taking)

and control (their perceived ability to cope with the anxiety experienced) whilst watching video footage of an international penalty shootout in which they had previously competed. Results indicated that participants with low perceived competence and contingency (who attributed outcome to be determined by luck rather than skill) before the penalty shootout experienced significantly higher or more debilitative anxiety symptoms than those who perceived their competence and contingency to be high.

More recently Jordet and Elferink-Gemser (2012) interviewed eight elite professional football players who had taken penalty kicks in a UEFA European Championship penalty shootout. Players were interviewed regarding their experiences of stress, coping and emotions during each of four temporal phases of the penalty shootout (the break after extra-time prior to the shootout beginning; standing in the centre circle during the shootout waiting for their turn to shoot; the walk to the penalty mark; and the shot itself). Results indicated the dynamic nature of stress, coping and emotions during each of these phases. The most stressful phases reported were the break after extra time that preceded the start of the shootout and the time interval between the shootout beginning and the player's turn to shoot. During these periods players experienced higher levels of anxiety due to (a) contingency beliefs about penalty shootouts being a lottery, (b) lack of control regarding penalty taker selection and shooting order, and (c) lack of control experienced by having to passively wait and watch teammates perform. During the walk to the penalty spot to take their kick, players reported feelings of loneliness and concentration disruption. Finally at the penalty mark players reported relatively few stressors in comparison to earlier phases of the shootout, but common stressors

reported were the fear of failure and worry about the goalkeeper's performance or behaviour.

**Experimental studies**

A further body of experimental research has explored anxiety's effect on cognitive mechanisms that underpin successful performance in this task. When taking a penalty, players generally have the option to (a) try to watch for which direction the goalkeeper dives during their run-up to the ball and shoot to the opposite side of the goal at the last moment, or (b) to use a more traditional aiming approach and look where they intend to shoot (see Wood and Wilson, 2010a). The consensus of studies that have explored the effectiveness of such strategies has repeatedly shown that aligning gaze with aiming intention promotes more accurate shooting (Binsch, Oudejans, Bakker, and Savelsbergh, 2010; van der Kamp, 2011; Wilson, Wood and Vine, 2009; Wood and Wilson, 2010a, 2010b, 2011, 2012). Indeed, researchers have also suggested that the neural mechanisms that regulate goal-directed movements benefit from the availability of accurate and timely spatial information of the foveated target (Land, 2009). Quite simply, in order to aim accurately performers need to look where they are shooting so that the information regarding the target (i.e., velocity, force, direction) can be processed and accurate responses programmed. Denying this information by not focusing on the target or by focusing on the goalkeeper impairs accuracy.

Interestingly, anxiety has been shown to negatively impact the aiming behaviour of players in precisely this way (i.e., by predisposing players to focus on the goalkeeper rather than looking to where they wish to aim). In a study by Wilson, Wood and Vine (2009), players took kicks under high and low threat conditions in

an effort to explore how anxiety would alter their aiming behaviour. When anxious, players were quicker to focus on the centralised goalkeeper and spent significantly longer looking in this location compared to the low threat condition. Furthermore, this disruption is increased if the goalkeeper actively attempts to attract the kicker's attention by using distracting behaviours (waving the arms; Wood and Wilson, 2010b). This centralisation of aiming behaviour caused a corresponding tendency to shoot centrally at the goalkeeper - an effect that resonates with the findings discussed earlier from penalty shootouts (Bar-Eli and Azar, 2009; Miller, 1996).

To summarise; if players hit optimal areas of the goal their chances of success increase dramatically and that in order to shoot with such accuracy they need to aim effectively. Anxiety has a negative impact on the aiming behaviour of the player creating an attentional bias towards looking at the goalkeeper. Therefore there may be utility in training players to optimise their aiming behaviour to perform well under pressure.

Two recent studies by Wood and Wilson, (2011, 2012) taught players to focus on optimal target areas of the goal (top-corners) for a sufficient amount of time in order to process the aiming information needed for accurate shooting (Quiet-eye training see Vickers, 2007). Compared to a practice group who just received uninstructed practice time, the quiet-eye trained players hit more accurate shots during training and maintained this performance advantage under the pressure of a 'live' penalty shootout Wood and Wilson (2011). Wood and Wilson (2012) also explored the impact this training regime had on the control beliefs of the penalty takers. Quiet eye trained participants significantly reduced their perceptions of outcome uncertainty (contingency) and increased their perceptions of shooting ability (competence) and ability to score and cope with the pressure (control),

compared to players who received uninstructed practice. Furthermore, there was an overall and significant relationship between high perceptions of control beliefs and aiming behaviour. Specifically, those participants with high control beliefs were more likely to aim optimally and further from the goalkeeper, whereas participants with low control beliefs experienced suboptimal and more centralized aiming behaviour (Wood and Wilson, 2012).

## So what can be done? Applying research to practice

### In training

*Education*: Jordet (2010) proposed a three-point strategy that is designed to help athletes to prepare to perform in highly-pressurised competitions. This strategy suggests that any psychological invention designed to elevate the negative effects of anxiety on performance should focus on reducing ego-threat, normalising emotional distress and optimising self-regulation. In order to help football players to cope with the level of ego threat inherent in penalty shootouts, we suggest that coaches should communicate with their players that mistakes under pressure *will* occur and rather than focusing solely on reducing individual errors, the coach should focus on having individual and team coping strategies in place in the event of personal and team failure. Being proactive in recognising, accounting for, and supporting mistakes has the potential to reduce ego-threat and the possibility of 'choking' under pressure (Jordet, 2010).

A natural consequence of admitting that mistakes may happen is an acceptance of the emotional distress that might occur as a result (Jordet, 2010). To facilitate this process players and coaching staff need to be educated regarding the typical stressors and emotions experienced by penalty takers in shootouts scenarios.

Such information will not only help to normalise the emotional distress players are likely to experience, but it can also be used to create more realistic training regimes that will help to prepare players to cope with the thoughts and emotions that they are likely to experience during the shootout (Jordet and Elferink-Gemser, 2012). To supplement this, players should be made aware of behaviours linked to outcome success in penalty shootouts and taught how to incorporate these behaviours into a pre-performance routine (see below). These considerations are likely to make players feel more mentally prepared to deal with potential sources of stress and increase their beliefs that outcome success is within their control (contingency) rather than being attributable to luck. Both aspects are likely to enhance perception of control and reduce potential anxiety symptoms.

*Organisation*: Not knowing who is going to take the penalties and the kicking order of these takers is a major stressor for players immediately prior to taking part in the shootout (Jordet and Elferink-Gemser, 2012). Therefore coaches should have a predetermined list of each penalty taker together with a specific running order for all 11 players. Obviously, injury, substitution or a red card may have an influence on how closely this order is followed but such changes to a running order would be minimal considering a maximum of three substitutions are allowed. Alleviating uncertainty from the outset is likely to have two benefits. First it is likely that all players will take every aspect of any psychological intervention more seriously when given the responsibility of a kick number. This has obvious motivational benefits for their application and dedication to various aspects of a training programme (the educational and practice aspects particularly). Second, by predetermining the kicking order players will be given more time to mentally prepare themselves for competing in the shootout and greater opportunity to seek help from

applied professionals who can tailor interventions to suit their needs. The cumulative effect of both aspects should be that if a match goes to penalty kicks then each player will know what is expected of them and will understand their role in the team. This will allow for more time to be spent on problem-focused or emotional-focused coping strategies and help to maximise perceptions of control (Jordet and Elferink-Gemser, 2012).

*Pre-performance routines*: The ability to hit optimal areas of the goal under pressure is one of the best predictors of performance success in penalty shootouts. Therefore players not only need help in developing strategies to regulate their physiological arousal but in order to maximise shooting accuracy they need help in developing strategies to regulate and control their aiming behaviour. This can be achieved by developing individualised pre-performance routines (PPRs). While the structure and content of such routines is best tailored to the individual, we suggest that PPRs should incorporate a gaze-control element in order to optimise aiming behaviour and prevent anxiety-induced disruptions in attentional control (see Wilson and Richards, 2011). Specifically, players should be encouraged to look where they are aiming. An intuitive concern for players when presented with such instruction may be to worry about what predictive information this gives to the goalkeeper. To alleviate these concerns players should be made aware that goalkeepers generally use information from lower limb kinematics of the kicker to aid their anticipation rather than the kickers gaze (Dicks, Button and Davids, 2010) and that an accurately struck shot to the corners of the goal should be almost impossible for the goalkeeper to save regardless; unless they dive really early which then leaves enough time for the kicker to change kick direction (van der Kamp, 2006). Not only will a structured PPR routine help players to optimise their aiming behaviour, it is also a useful way to

guide the timing of their shot, preventing players from rushing; a tendency which has been linked to poor performance in this task (Jordet et al, 2009).

*Practice:* One of the common criticisms of the utility of practice is that it is virtually impossible to recreate the anxiety experienced in real competition. This widely held view draws a dichotomy been physical and mental preparation and suggest the two concepts are unrelated. However this is not the case, as physical practice has psychological benefits for the performer. For example, practicing penalty kicks increases perceived competence (Wood and Wilson, 2012), perceived competence is positively related to perceived contingency and perceived control (Jordet et al 2006; Wood and Wilson, 2012) and perceived control is related to the intensity of anxiety symptoms experienced (Jordet et al 2006) and subsequent performance under pressure (Wood and Wilson, 2012). Therefore it is imperative that players are afforded time to practice prior to competing in games where a shootout is a possibility. Specifically, practice that promotes target-focused shooting drills to each corner of the goal would be particularly appropriate (e.g., Wood and Wilson 2011, 2012). Such practice would help players to rehearse their PPR so that it is robust under pressure; would help players to strengthen eye-shot coordination so that they hit where they were aiming; and would increase competency and contingency expectations that will aid overall perceptions of control.

While it is true that it is impossible to recreate the anxiety felt in real competition, that is no excuse for not attempting to manipulate the training environment in order to be as representative of a real shootout as possible. In fact research suggests that practicing under relatively low levels of anxiety can help to alleviate feeling of anxiety in competition and help to insulate performance from disruption (Oudejans and Pijpers, 2009; 2010). Therefore, coaches need to be

innovative in relation to how they design penalty kick practice in order to try to manipulate levels of anxiety, distraction and perceptions of control. For example, coaches may manipulate anxiety through introducing competition between players or by inviting audiences (press and supporters) to watch penalty shootout practice prior to competition. They can mimic a distracting goalkeeper to test the durability of players' aiming behaviour; a practice that will have the added benefit of helping to desensitise players from such antics. Finally, players could be forced to tell the goalkeeper which way they will shoot. Such practice will provide a live demonstration of the constraints on the goalkeeper, thus helping players to realise that if they hit the optimal areas of the goal (particularly the top-corners) then it is extremely unlikely that the goalkeeper can stop it – even when pre-warned.

**In Match**

*Prior to the shootout commencing:* The interval between when extra time ends and the shootout begins is a critical period when players report the highest amount of stressors (often linked to feelings of uncertainty); report a lack of perceived psychological support; and an absence of communication (Jordet and Elferink-Gemser, 2012). Hopefully, by having a predetermined kicking order that staff and players are familiar with will help to decrease the uncertainty that is often rife during this period, which may then have positive effect on the anxiety symptoms experienced. This should leave more time for coaching staff – and also other members of the team - to remind players of appropriate and personalised coping strategies and provide generalised psychological support. Finally, players are likely to benefit from positive affirmations that seek to enhance their perceptions of competence, contingency and control. Specifically, a reiteration of the points stated in the education section above should reinforce the belief that an accurate shot is

almost impossible to save (contingency), that their preparation, practice and ability has equipped them to shoot accurately (competence) and that both of these factors will help them to deal with the pressure and perform to their maximum (control). The adoption of these suggestions will help players to feel supported, enable them to optimise their arousal for their upcoming performance and enhance their overall perceptions of control.

*The walk to the penalty spot:* During this period players generally report an increase in intrusive thoughts and consequent disruptions in concentration (Jordet and Elferink-Gemser, 2012). Therefore it is important that players remain focused on their performance and do not allow themselves to be distracted by worrying thoughts or negative emotions. Some psychological techniques that will help to facilitate such a focus could include relaxation exercises such as deep breathing, positive self-talk that focuses on control beliefs (e.g., "If I shoot accurately the goalkeeper has no chance"), mental rehearsal of their PPR (imaging themselves executing a successful penalty kick) or players could start to plan how they are going to celebrate with their teammates. Finally, players may use this period to commence the early initiation of the aiming phase of the shot by focusing on where they intend to shoot by picking a location or object behind the goal that could act as a target. Such methods will help players to remain focused on the processes behind accurate shooting and need to be practiced during representative training exercises that simulate competitive situations as closely as possible.

*At the penalty mark:* During this final stage the biggest source of stress for the penalty taker is worry about the performance of the goalkeeper and how this may negatively affect their chances of success (Jordet and Elferink-Gemser, 2012). However, players that have utilised our interventions, that actively attempt to

enhance perceptions of contingency and competence, should feel less outcome uncertainty and more confidence in their ability to hit the optimal areas of the goal. This should help players to take their time in following their PPR, trust their preparation and focus solely on the process behind hitting an accurate shot.

*After the shot:* After scoring, players should demonstrate celebratory behaviours in the direction of their teammates (Moll et al., 2012). Such behaviours are likely to elicit positive emotions that may help other teammates or they may elicit negative emotions that may hinder the opposition. Practical ways to achieve this would be to ask successful takers to display overt celebratory behaviours towards their goalkeeper (who is to face the next kick) or with the other penalty takers on their team – particularly with the player who is next in line to shoot.

**Conclusion**

Throughout this article we have synthesised research evidence that shows that anxiety influences the non-verbal behaviour of penalty takers and that this negatively affects performance. We have outlined research that shows that anxiety creates an attentional bias towards the goalkeeper, disrupting aiming behaviour and negatively affecting shooting accuracy. Finally, we have discussed findings which state that the intensity of anxiety experienced during shootout competition is dynamic in nature and changes as the situation unfolds. As a result we have provided a list of task-specific recommendations that are structured around the dynamic nature of emotions that players are likely to experience during each phase of the shootout and which can be implemented or adapted to suit the individual needs of the player. These recommendations are designed to help applied professionals to optimise the psychological preparation for this scenario with the overall aim of helping players to

take back control of the situation. We believe that structured, and representative, practice is the key to helping players to prepare for one of the most highly anxious situations in world sport. It is only in the absence of such preparation that the 'lottery' truly begins.

## Acknowledgements

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