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**Crowd reception influences avoidance behavior during football penalty-kicks, but you
wouldn't know it: A retrospective analysis of professional games**

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Abstract

For most soccer players, penalty-kicks are unpleasantly valenced, but the extent to which intensity of emotions affects their decision-making is unclear. We hypothesised that a hostile crowd raises emotional intensity more than a supportive crowd during penalty-kicks, which causes players to make avoidance based decisions more often in the presence of a hostile crowd. We sourced video footage of penalty-kicks during professional games between 2000-2005 (N=91), during which the goalkeeper was marginally off-center (1.6%-3.0%) or obviously off-center (>3.0%). Taking the easiest option is a marker of avoidance behavior, so we analysed the proportion of penalty-kicks directed towards the larger side of the goal. Players kicked towards the larger side more often in front of a hostile crowd than a supportive crowd, but only when the goalkeeper was marginally off-center. The findings suggest that in the high-pressure environment of penalty-kicks, emotional intensity moderates the decisions that kickers make, without their awareness.

Keywords

Avoidance motivation, valence, arousal, football penalty-kicks, off-center goalkeeper paradigm

Introduction

Penalty-kicks in soccer are compelling viewing. Often the outcome of a penalty-kick can decide who wins or who loses. Consequently, psychological influences on players during penalty-kicks can result in pleasant (positive) or unpleasant (negative) emotional valence (e.g., Jordet, Elferink-Gemser, Lemmink, & Visscher, 2006). Theories of achievement motivation suggest that negatively valenced stimuli (e.g., objects/situations/possibilities) elicit adaptive avoidance behaviors; whereas, positively valenced stimuli elicit adaptive approach behaviors (e.g., Elliot, 1999; Elliot & Covington, 2001). Such behaviors comprise mental or physical orientation towards pleasant stimuli or away from unpleasant stimuli (e.g., Elliot, Eder, & Harmon-Jones, 2013).

Jordet and Hartman (2008) argued that approach behaviors are probable if the potential outcome of a penalty-kick is positively valenced (e.g., scoring results in an immediate team win), but avoidance behaviors are probable if the potential outcome is negatively valenced (e.g., not scoring results in an immediate team loss). Analysis of 359 penalty-kicks from World Cup, European Championship and UEFA Champions League games (1972–2004) showed that penalty-kickers displayed significantly faster kick-preparation times and faced away from the goalkeeper more (avoidance behaviors) when the potential outcome was negatively valenced compared to positively valenced.

The absolute outcome of a penalty kick is either success (scoring) or failure (not scoring). As a result, it could be argued that positive and negative valence are equally likely, especially if the result of scoring/not scoring is not an immediate win or loss. However, in our view, the prevailing emotion during penalty-kicks (especially during shoot-outs) is likely to be negatively valenced due to emotional asymmetry. In psychology, emotional asymmetry is the notion that

pain is experienced more intensely than pleasure. In behavioral economics, for instance, loss aversion refers to the idea that losses loom larger than gains (see prospect theory, Kahneman and Tversky (1979)).¹ Empirical studies indicate that loss aversion *is* apparent when the stakes are high (e.g., Ert & Erev, 2013; Yechiam & Hochman, 2013), although the evidence is less clear when the stakes are low (see Yechiam, 2019 for a review). Consequently, during a penalty-kick, when the stakes are extremely high, the possibility of failure (not scoring) is likely to be more aversive than the possibility of success (scoring)– enough to tip the balance for penalty-kickers to perceive the situation as negatively valenced. Jordet and Hartman (2008) even concluded that behaviors in neutrally valenced conditions (i.e., the outcome of the kick did not decide the game) were more similar to avoidance than approach, suggesting that penalty-kicks are generally negatively valenced.

Theories of achievement motivation assume that positive or negative appraisal of a stimulus plays a key role in approach and avoidance (Elliot & Covington, 2001; Elliot & Thrash, 2001); however, appraisal of a stimulus is guided not only by *emotional valence* (positive or negative affect) but also *arousal* (high or low activation of associated emotions). *Pleasure-arousal theory* (Russell, 1980) proposes that appraisal of a stimulus cannot possibly be captured on one dimension (i.e., pleasure/displeasure). For instance, the complex emotional experiences that accompany penalty-kick situations arise from core affective feelings associated with the interplay between *valence* and *arousal* (Feldman Barrett & Russell, 1999). Consequently, avoidance motivation is more likely to occur during (negatively valenced) penalty-kicks when arousal levels are higher rather than lower.

¹ For example, the pain of losing one hundred dollars is often greater than the joy of gaining one hundred dollars, which makes people want to avoid losses or reduce potential risks.

To examine this possibility, we conducted retrospective analysis of penalty-kick situations in which the crowd behind the goal was either predominantly supportive or hostile. A hostile crowd should raise arousal levels more than a supportive crowd in the negatively valenced environment of penalty-kicks, so we hypothesized that avoidance behaviors would be more common when penalty-kicks were taken with a hostile crowd behind the goal. There are various reasons for believing that a hostile crowd will raise arousal levels compared to a supportive crowd. For instance, angry faces (and gestures), which are common at soccer games, tend to be processed preferentially (e.g., Hansen & Hansen, 1988; Öhman & Mineka, 2001). This can amplify the intensity of the emotions that are perceived (the crowd-emotion-amplification effect; Goldenberg, Weisz, Sweeny, Cikara, & Gross, 2021).

We indexed avoidance motivation differently to Jordet and Hartman (2008). Elliot, Maier, Moller, Friedman, and Meinhardt (2007) asked students to choose easy or difficult tasks to complete during an IQ test. They argued that greater choice of easy tasks indicated the use of avoidance motivation as a self-protective measure to circumvent feelings of inadequacy associated with a poor IQ score. Consequently, we examined choice of kick direction by players. Goalkeepers seldom stand in the exact center of the goal during penalty-kicks, but not by intention (Masters, van der Kamp, & Jackson, 2007). Goalkeepers appear to inadvertently create a side of the goal with more space (and thus a side with less space). Kicking towards the larger side of the goal is generally regarded to be the easier option, whereas kicking towards the smaller side of the goal is regarded to be the harder option. In this study, we assessed how often players kicked towards the easier side of the goal (avoidance behavior) when taking penalty-kicks in the presence of a hostile crowd thought to raise arousal levels more than a supportive crowd.

We also examined how often players kicked towards the easier side of the goal when they were likely to have been consciously aware that there was an easy option and when they were less likely to have been consciously aware that there was an easy option. We did this by leveraging the off-center goalkeeper paradigm (Masters, Van der Kamp, & Jackson, 2007). Masters et al. (2007) showed that when a goalkeeper stands marginally off-center, penalty-kickers are unlikely to be aware that there is greater space on one side of the goal; nevertheless, they can identify that side if forced to choose.² More importantly, they are more likely to kick to the side with more space despite being unaware that they are doing so. This phenomenon occurred even when participants were asked not to search for the side with more space, but rather to kick only when the goalkeeper was in the exact center (Experiment 3). Remarkably, when the goalkeeper was off-center by very small margins (1.6–3.0% left or right), kickers claimed that he was in the exact center of the goal, yet they directed kicks to the side with more space more often than would be expected by chance.³ Thus, we examined penalty-kick behavior when the goalkeeper was marginally-off-center (between 1.6–3.0%) and obviously off-center (>3.0%).⁴

To reiterate, we hypothesised that during negatively valenced (unpleasant) penalty-kicks, higher arousal levels will be elicited by the presence of a hostile crowd compared to a supportive

² These findings have been replicated by Noël, van der Kamp, and Memmert (2015).

³ Essentially, there was no easier/harder option when the goalkeeper was off-center by $\leq 1.6\%$, because participants were unable to discriminate which side had more space.

⁴ More recent studies have examined the off-center goalkeeper effect (e.g., Noel, van der Kamp, & Memmert, 2015; Noel, van der Kamp, Weigelt, & Memmert, 2015; Noel, van der Kamp, & Memmert, 2016). However, these studies required participants to position the goalkeeper in the center of the goal (a line bisection task), rather than to perceive when the goalkeeper was off-center. The latter task is slightly more relevant to our question, so we decided to stick with the original work by Masters et al. (2007) who examined the range/threshold at which the goalkeeper was imperceptibly off-center (1.6%-3.0% off-center) and noticeably off-center (greater than 3.0%). Their work was replicated by Weigelt and Memmert (2012) who reported that participants were unaware that the goalkeeper was off-center at 1.5% off-sets but became increasingly aware at 3.0% off-sets and greater.

crowd. This will cause greater avoidance motivation, indexed by more kicks to the side of the goal with more space (i.e., the easier option).

Method

We sourced 314 online videos of penalty-kicks across 144 professional matches between 2000 and 2020.⁵ We included penalty-kicks triggered by a draw at the end of extra time (during a shootout) or triggered by a foul in the penalty-box.⁶

Goalkeeper Position

We screen captured each football penalty-kick and calculated the position of the goalkeeper relative to the center of the goal (in pixels). We captured the final moment at which the penalty-kicker appeared to be looking at the goalkeeper prior to initiating the run up (see Figure 1).

Using the Weber fraction (Δ initial value/ initial value) identified by Weber's Law of Just Noticeable Difference (Fechner, 1860, 1966), we calculated the extent to which the goalkeeper was off-center by subtracting the distance (pixels) from the inside of the left-side goal-post to the

⁵ Alphabetical order: Audi Cup 2011, Campeonato Nacional de Liga de Primera Division (or La Liga) 2013-2014, English Football League (or Carling Cup, Capital One Cup or Carabao Cup depending on sponsorship), EFL (English Football League) League One 2011-2012, English Premier League (or Barclays Premier League) 2005-2007, 2013-2015, 2017-2020, FA Cup (or Football Association Challenge Cup) 2014, FA (Football Association) Community Shield 2007, 2014, FAI Ford Cup (or Football Association of Ireland Senior Challenge Cup) 2010, Franz Beckenbauer Cup 2010, FIFA (Fédération Internationale de Football Association) World Cup (South Africa 2010, Brazil 2014, Russia 2018), UEFA (Union of European Football Association) Champions League 2004-2005, 2006-2008, 2011-2012, 2015-2016, UEFA Euro (or European Football Championship) 2000, 2004, 2012, 2016.

⁶ Of 314 penalty-kicks, 195 were from penalty shootouts and 119 were in-game penalty-kicks. The exclusion criteria reduced the total number to 91 penalty-kicks (shootouts = 51, in-game = 40). The videos were sourced from public platforms such as YouTube, official club/tournament websites or Facebook pages (e.g., video footages from TV broadcast which has been uploaded on these platforms after the match).

center of the goalkeeper's head (x) from the distance from the inside of the right-side goal-post to the center of the goalkeeper's head (y) and divided it by the total width of the goal (w). We expressed the value as a percentage ($GK\%$). A positive value indicated that the goalkeeper was off-center to the right, whereas a negative value indicated that the goalkeeper was off-center to the left. An absolute $GK\%$ between 1.6-3.0% (5.86-10.98cm) was used to classify the marginally off-center condition, whereas a $GK\% >3.0\%$ ($> 10.98\text{cm}$) was used to classify the obviously off-center condition. Images in which goalkeeper was $<1.6\%$ off-center were excluded ($N=58$).



Figure 1. Example image of a football penalty-kick (Watford versus Manchester United, English Premiere League 2019/2020). Measurements for the width of the goal (w), height of the goal (h), left side of the goal (x), and right side of the goal (y) are shown.

Crowd Classification

Each penalty-kick was labeled using the penalty-kicker's perspective (the same crowd behind the goal could be classified as supportive or hostile depending on the team for which the penalty-

kicker played). Classification was based on club colors, reactions to the kick outcome, and auditory cues, such as cheering/booing. Another researcher independently classified 84 of the 314 kicks, with 100% agreement. Cases that were unclear or did not have a relevant crowd (e.g., Brazil fans during Netherlands versus Costa Rica, FIFA World Cup 2014) were excluded from the study (N=59).

Exclusion Criteria

The official height and width of the goal-posts is 2.44 meters and 7.32 meters, respectively (International Football Association Board, Laws of the Game 2020/21). This results in a goal-post ratio of 0.33 approximately. Accordingly, images with a goal-post ratio of <0.32 or >0.34 were excluded to ensure that distorted images (due to camera angle being non-perpendicular to the center of the goal) were not analysed (N=64). In addition, penalty-kicks that were directed to the center of the goal (N=6)⁷ were excluded, since we were only interested in the number of kicks directed either to the larger or smaller side of the goal.

To double-check goalkeeper position, we also calculated the distance (pixels) from the inside of the right-side goal-post to the center of the goalkeeper's head (y) by subtracting the distance from the inside of the left-side goal-post to the center of the goalkeeper's head (x) from the width of the goal ($w-x$). There was an average discrepancy between the two measurements of 6.174 pixels, possibly due to minute camera angle distortions (that were not initially filtered out). Our analysis only required us to discriminate the side of the goal with more space when the penalty-kick was taken (i.e., left or right), so if the two measurements provided conflicting evidence of

⁷ Any kicks that landed within ± 50 cm from the center of the goal ($\pm 13.67\%$ off-center) were classified as kicks directed to the center of the goal.

which side of the goal was larger we excluded that case (N=5). We also excluded cases in which the goalkeeper did not stand symmetrically (i.e., pointed to one side or the other) (N=6).

After exclusion, a total of 91 penalty-kicks were available for analysis (N=43 marginally off-center, N=48 obviously off-center).

Analysis

A general statistical analysis (supportive/hostile conditions collapsed) was conducted to examine the average conversion rate and direction of kicks to the larger and smaller side of the goal in the marginally off-center condition, the obviously off-center condition, and in both conditions collapsed. Avoidance motivation was indexed by the number of times that a penalty-kick was directed towards the larger side of the goal relative to the number of times that a penalty-kick was directed to the smaller side of the goal (i.e., proportion of times in which the easier option was chosen, %). Given the specified direction of our hypothesis, we used a one-tailed z-test for two population proportions (significance set as $p < 0.050$) to examine whether differences existed in the number of penalty-kicks to the larger side when the crowd was hostile compared to supportive, both when the goalkeeper was marginally off-center (1.6-3.0%, subconscious) and obviously off-center (>3.0%, conscious). We also conducted one-sampled t-tests to examine whether the proportion of kicks towards the larger side of the goal was significantly above chance (50%) in each condition. Cohen's d effect sizes are reported and broadly defined as small (0.20), medium (0.50) or large (0.80) (Cohen, 1988).

Results

General Analysis

The average conversion rate of penalty-kicks was 71.43% for both the marginally off-center and obviously off-center conditions combined (25.27% were saved, 3.30% missed). In the marginally off-center condition, the average conversion rate was 67.44% (27.91% were saved, 4.65% missed), whereas in the obviously off-center condition, the average conversion rate was 75.00% (22.92% were saved, 2.08% missed).

Overall, penalty-kicks were directed to the larger side (i.e., easier option) and the smaller side (i.e., harder option) equally often (54.95% and 45.05% respectively, $t(90) = 0.94$, $p = 0.174$, $d = 0.10$, 90% CI [-0.04, 0.14]), with an average absolute off-center GK% of 3.46%. Differences in side choice were not evident when the goalkeeper was marginally off-center (48.84% and 51.17% respectively, $t(42) = -0.15$, $p = 0.440$, $d = -0.02$, 90% CI [-0.14, 0.12]; average absolute off-center GK% 2.26%) or obviously off-center (60.42% and 39.58% respectively, $t(47) = 1.46$, $p = 0.075$, $d = 0.21$, 90% CI [-0.02, 0.22]; average absolute off-center GK% 4.53%).

Goalkeeper off-center (marginally and obviously off-center collapsed)

As shown in Figure 2, the proportion of times that players kicked to the larger side (i.e., the easier option) was significantly greater when facing a hostile crowd (66.67%) compared to facing a supportive crowd (46.15%), ($z = 1.95$, $p = 0.026$). A one-sample t-test revealed that the proportion of times that penalty-kicks were directed to the larger side was significantly above chance level (50%) when facing a hostile crowd, ($t(38) = 2.18$, $p = 0.018$, $d = 0.35$, 90% CI [0.04, 0.30]), but not when facing a supportive crowd, ($t(51) = -0.55$, $p = 0.292$, $d = -0.08$, 90% CI [-0.16, 0.08]).

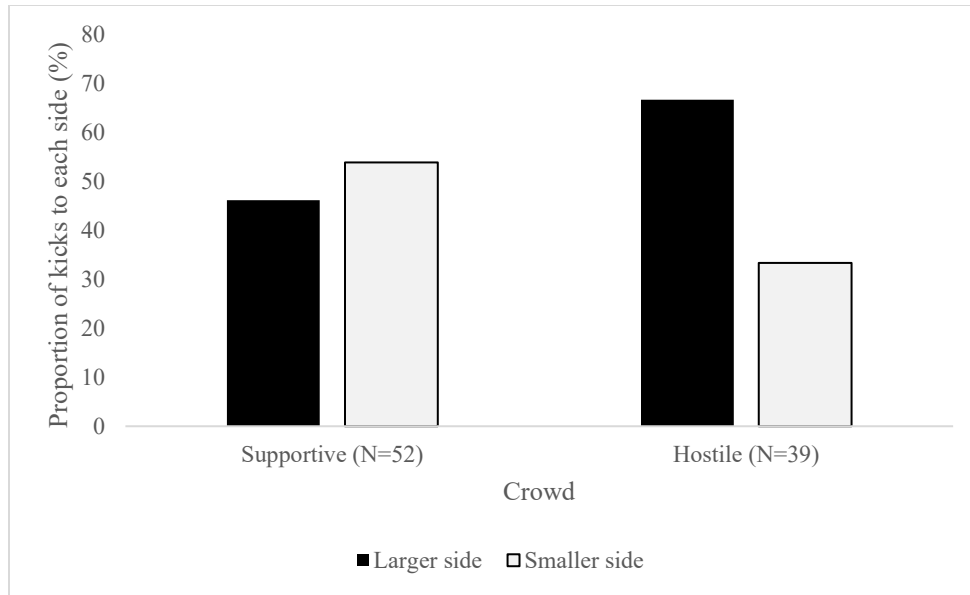


Figure 2. Proportion of penalty-kicks to the larger side or the smaller side of the goal (%) when facing a supportive crowd (N=52) or a hostile crowd (N=39).

Goalkeeper marginally off-center

Figure 3 shows the proportion of penalty-kicks to the larger or smaller side as a function of marginally off-center goalkeepers (between 1.6-3.0%) (left panel). The proportion of times that players kicked to the larger side was significantly greater when facing a hostile crowd (73.33%) compared to when facing a supportive crowd (35.71%), ($z = 2.35$, $p = 0.009$). When facing a hostile crowd, penalty-kickers directed their kicks to the larger side more often than the smaller side; whereas, when facing a supportive crowd, penalty-kickers directed their kicks to the smaller side more often. One-sample t-tests showed that the proportion of kicks directed to the larger side was significantly above chance (50%) when facing a hostile crowd ($t(14) = 1.97$, $p = 0.034$, $d = 0.51$, 90% CI [0.03, 0.44]), but not when facing a supportive crowd ($t(27) = -1.55$, $p = 0.066$, $d = -0.29$, 90% CI [-0.30, 0.01]).

Goalkeeper obviously off-center

Figure 3 shows the proportion of penalty-kicks to the larger or smaller side as a function of obviously off-center goalkeepers (>3.0%) (right panel). The proportion of times that players kicked to the larger side was not significantly different when facing a hostile crowd (62.50%), compared to when facing a supportive crowd (58.33%), ($z = 0.30, p = 0.382$). One-sample t-tests revealed that for both hostile and supportive crowds, the proportion of kicks directed to the larger side was not different from chance (50%), (hostile crowd: $t(23) = 1.24, p = 0.114, d = 0.25, 90\%$ CI [-0.05, 0.30] and supportive crowd: $t(23) = 0.81, p = 0.213, d = 0.17, 90\%$ CI [-0.09, 0.26]).

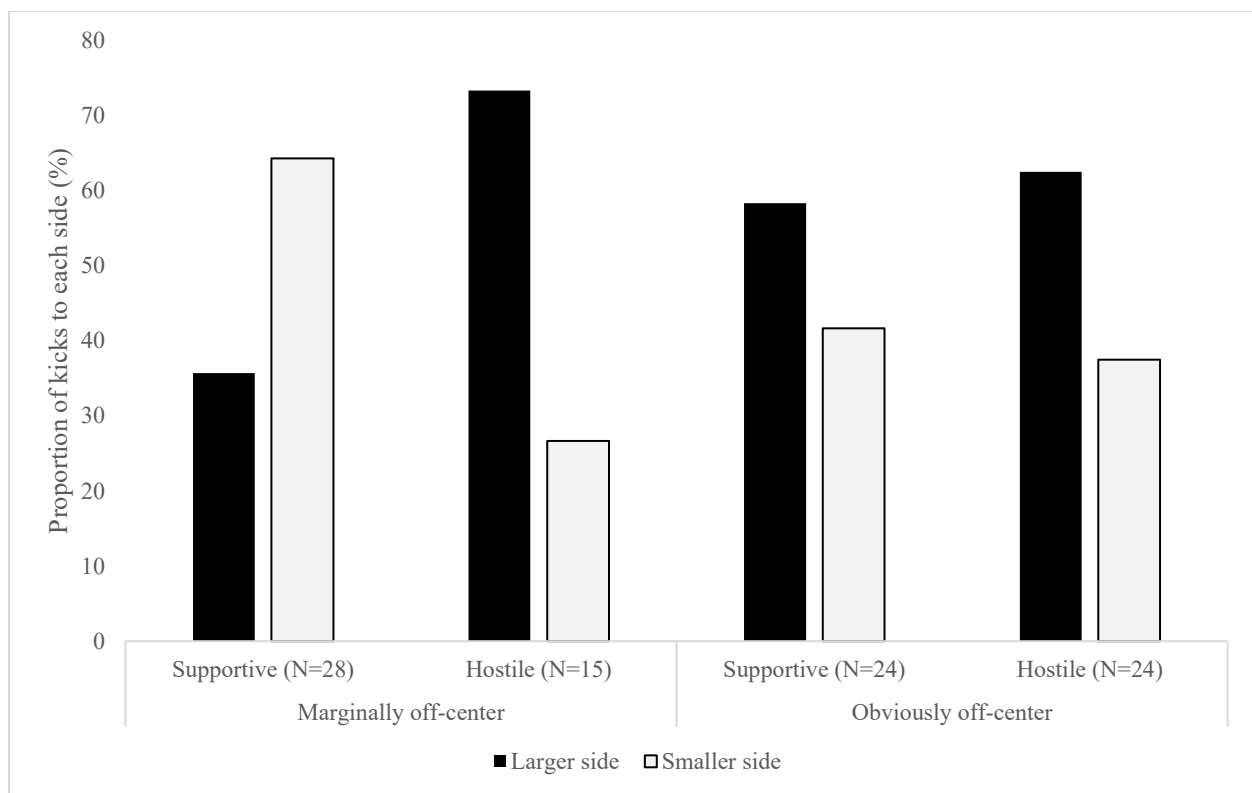


Figure 3. Proportion of penalty-kicks to the larger side or the smaller side of the goal (%) in the marginally off-center (1.6-3.0%) and obviously off-center (>3.0%) goalkeeper conditions.

Discussion

We conducted retrospective analysis of the direction of penalty-kicks during important soccer games to examine the effect of crowd hostility on avoidance motivation. Avoidance motivation

was indexed by the number of times kicks were directed towards the larger side of the goal (i.e., the easier option). We hypothesized that in the negatively valenced (unpleasant) environment created by high-pressure penalty-kick scenarios, the extent to which the crowd behind the goal was hostile would intensify arousal levels and thus increase the likelihood of avoidance motivated behavior.

We first considered the collapsed data (marginally off-center goalkeeper with obviously off-center goalkeeper / hostile crowd with supportive crowd). The average penalty-kick conversion rate was 71.43%, which is consistent with Dalton, Guillon, and Naroo (2015) who reported an average conversion rate of 70.50%. The proportion of penalty-kicks directed to the larger side of the goal was not significantly above chance level (50%) in our study (54.95%), whereas it was in the Masters et al. (2007) study (59.20%). Our results revealed that the larger side (i.e., the easier option) was chosen significantly more often when the penalty-kicker faced a hostile crowd, compared to a supportive crowd, so it is possible that the discrepancy between the two studies can be accounted for by differences in the number of penalty-kicks completed when facing a hostile or a supportive crowd, which Masters et al. (2007) did not report.

When we examined only penalty-kicks to an obviously off-center goalkeeper (>3.0%), we found that the proportion of penalty-kicks to the larger side was not statistically different when facing a supportive crowd or a hostile crowd. It is likely that kickers were explicitly aware that one side had more space than the other, which made the decision to kick to that side a logical choice, regardless of whether the crowd was hostile or supportive.

However, when we examined only penalty-kicks to a marginally off-center goalkeeper (1.6-3.0%), we found that kicks were directed to the larger, easier, side significantly more often when facing a hostile crowd compared to a supportive crowd, suggesting that in the presence of a

hostile crowd avoidance behavior was greater. Masters et al. (2007) reported that when the goalkeeper was marginally off-center by 1.6-3.0%, penalty-kickers were unaware that there was more space on one side of the goal, yet still kicked to that side. Our findings suggest that the difference between hostile and supportive crowds when the goalkeeper was marginally off-center may have been a function of penalty-kickers being more likely to subconsciously discriminate the space differences when facing a hostile crowd. Robinson, Storbeck, Meier, and Kirkeby (2004) argued that negative stimuli that are high in arousal capture attention more readily and are automatically processed as a threat— it is safer to assume a stimulus is hazardous than harmless (Öhman, 1997; Robinson, 1998). Detection of such stimuli occurs at a pre-attentive stage of processing, outside conscious awareness (Osgood, Suci, & Tannenbaum, 1957; Zajonc, 1998). Consequently, in the negatively valenced environment of penalty-kicks, avoidance behavior may have been higher because pre-attentive processes facilitated detection of space differences when the presence of a hostile crowd raised arousal levels. In contrast, avoidance behavior may have appeared to be less common in the presence of a supportive crowd because lower arousal levels meant that detection of space differences was not facilitated. In short, penalty-kickers were unable to take the easier option when their arousal levels were less elevated, because they did not know which side had more space.

An alternative explanation exists. When facing a hostile crowd or a supportive crowd, penalty-kickers equally detected space differences, but pre-attentive processes evaluated the hostile crowd as more of a threat, which resulted in more avoidance behavior. Valence and arousal function interactively, rather than independently. Stimuli that are negatively valenced (e.g., a spider) or high in arousal (e.g., a fast-approaching ball) elicit avoidance behavior because they are perceived as threatening, whereas stimuli that are positively valenced (e.g., a flower) or

low in arousal (e.g., ‘House & Garden’ magazine) elicit approach behavior because they are perceived as safe. Consequently, stimuli that are congruent (e.g., negative valence with high arousal) interact to more potently elicit avoidance behaviors than stimuli that are incongruent (e.g., negative valence with low arousal) (Citron, Gray, Critchley, Weekes, & Ferstl, 2014; Robinson et al., 2004). Accordingly, the congruent (highly threatening) combination of a negatively valenced penalty-kick situation with a hostile crowd may have elicited more avoidance behavior than the incongruent (less threatening) combination of a negatively valenced penalty-kick situation with a supportive crowd.

It is also possible that a supportive crowd will trigger a high arousal level because penalty-kickers pick up on the emotional expressions of the fans. This transference of emotions from one to another (i.e., emotional contagion) has been reported in football penalty-kicks. In a retrospective analysis, Moll, Jordet, and Pepping (2010) found that display of positive emotions (i.e., enthusiastic celebrations) by fellow teammates was positively associated with overall team performance—possibly because positive emotions were transferred to fellow teammates. Although it is likely that transference of positive emotions (from a supportive crowd) resulted in positive emotional valence in penalty-kickers, it is unlikely that it would have elicited high arousal in penalty-kickers, because positive emotions may be intrinsically less arousing than negative emotions. According to Lang (1995), startle reflexes are inhibited when people view pleasant emotional stimuli but provoked when people view unpleasant emotional stimuli, making it difficult to find examples of stimuli that are both positive *and* highly arousing. Indeed, an empirical study by Furley, Moll, and Memmert (2015) found that players anticipate negative emotions when viewing a post-performance expressions of shame compared to neutral expressions. The authors concluded that “expression of shame seemed to have stronger effects on

observers compared to the expression of pride. ... suggesting that there may be asymmetries in the relative strength of negative vs. positive emotional expressions” (pp. 18).

Another interpretation of our findings is that rather than more often taking the easier option when facing a hostile crowd (i.e., kicked to the larger side), penalty-kickers more often took the harder option when facing a supportive crowd (i.e., kicked to the smaller side). Perhaps a supportive crowd evoked greater confidence in kickers and/or approach motivation, which resulted in increased risk-taking behavior.⁸ Evidence suggests that higher approach motivation is associated with reduced responsiveness to risk (via decreased bilateral insular cortex activation—see Clark, Bechara, Damasio, Aitken, Sahakian, & Robbins, 2008) and increased risk-taking behavior (Li, Lauharatanahirun, Steinberg, King-Casas, Kim-Spoon, & Deater-Deckard, 2019).

Butler and Baumeister (1998), on the contrary, found that participants adopted a more cautious (less risky) strategy when solving mental arithmetic or playing a video game in front of a supportive audience. Their findings do not align with ours, unless kicking to the smaller side of the goal represents caution rather than risk-taking.

The recent COVID-19 global pandemic has caused professional soccer games to be played in the absence of crowds. Harris, Wilson, and Vine (2020) observed that in many leagues more goals have been scored during COVID-19. They suggested that this is a consequence of reduced performance pressure in the absence of a crowd. Additionally, McCarrick, Bilalic, Neave, and Wolfson (2020) reported a reduction in the home team advantage (usually attributed to the supportive home crowd). We wonder about the role of arousal and avoidance in these trends.

⁸ This argument assumes that kicking to the smaller side of the goal is a riskier behavior than kicking to the larger side of the goal, since it is harder to score inside a small area than a large area.

An important factor that has been shown to influence performance in soccer games is the home team advantage (e.g., Goumas, 2014; Pollard, 2006; Pollard & Pollard, 2005). It is therefore possible that game location (home/away/neutral) is a factor that influences penalty-kicking behavior; however, the proportion of times that players kicked to the larger side of the goal was not significantly different between home and away locations, $z = 1.506, p = 0.066$, home and neutral locations, $z = 0.263, p = 0.396$, or away and neutral locations, $z = -0.945, p = 0.172$ (one-tailed). Another factor that has been shown to influence kicking behavior is footedness (right/left). López-Botella and Palao (2017) found that there was a bias for right-footed players to kick to the left side (from the kicker's perspective) and for left-footed players to kick to the right side. According to our data, 77 players kicked with their right foot and 14 players kicked with their left foot (84.6 vs. 15.4%); shots were directed to the right on 51 occasions and to the left on 40 occasions (56.0% vs. 44.0%). However, there was no significant relationship between footedness and shot direction ($r = -0.071, p = 0.505; x^2 = 0.163, p = 0.686$), indicating that there was no bias in shot direction due to footedness in our current study. Other factors worth examining in future studies might include kicking strategy (e.g., goalkeeper independent vs. dependent strategy—Noël & Van der Kamp, 2012; Wood & Wilson, 2010a) and distraction by the goalkeeper (e.g., asymmetrical goalkeeper, moving goalkeeper—Furley, Noël, & Memmert, 2017; Wood & Wilson, 2010b).

A penalty-kicker's belief in his or her ability to score in different situations (e.g., self-efficacy, Bandura, 1997) is also likely to have an influence. Low self-perceived competence (when combined with ego-involvement), for instance, is thought to be associated with greater avoidance behavior (e.g., Bortoli, Bertollo, Comani, & Robazza, 2011; Elliot & Church, 1997; Elliot & McGregor, 1999; Nicholls, 1984), and Butler and Baumeister (1998) found that

individuals with low private expectation of success (low self-efficacy) were negatively affected by a supportive audience, whereas individuals with high private expectation of success (high self-efficacy) were unaffected by audiences of any type (e.g., supportive/hostile/neutral). As a result, subjective reports of self-competence may provide further insights into the effect of crowd hostility on motivational behavior.

In the meantime, our findings consolidate Masters et al. (2007) off-center goalkeeper paradigm. Imperceptibly off-center goalkeepers can induce penalty-kickers to unwittingly kick to the larger side of the goal. However, we recommend that goalkeepers do this only when emotions are running high and the crowd behind the goal is hostile to the penalty-kicker.

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