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Referees' Decision Making Behavior and the Sport Home Advantage Phenomenon

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Abstract The aim of this investigation was to examine the decision making behavior of soccer officials (referees) in English Premiership matches to establish whether a bias, as perceived by the media and professional players, does or does not exist. Using notational analysis, this investigation used three trained professional soccer referees to assess the decisions made by match-day officials in favor of home and away teams during the entirety of ten-matched Premiership soccer fixtures. Results revealed a non-significant trend, x2 = .843, p > .05, where the number of decisions awarded by the referees favored the home team. However, significant differences were observed in the number of contentious and incorrect / missed decisions awarded in favor of the home teams compared to away teams, $\chi^2 = 4.17$, $p < .05$ and $\chi^2 = 3.86$, $p < .05$, respectively. Conclusions from this investigation indicate that soccer referees exhibit bias in favor of home teams and suggest that referee decision making behavior may be one mechanistic explanation of the home advantage phenomenon in soccer.

Keywords: *home advantage, referees, soccer, decision making*

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1. Introduction

As professional soccer becomes increasingly pressurised with the fine line between success and failure exhibiting vast financial repercussions for many top flight teams, referees are ever more accountable for their decisions. Reflecting the increased importance of referees' performances, governing bodies now sanction, or even demote, referees when they apply the laws inconsistently [1]. In a bid to raise English refereeing standards, the 2001 / 02 season experienced the introduction of professional referees by the Football Association for the first time. Despite this action, media reports still frequently allege that referees make so-called concession decisions and are more likely to award a dubious penalty to the same team if no decision was given to that team in an earlier similar situation [2]. The point of interest for this study is that if referee decision making behaviour can be influenced by the environmental context (see [1]), can referee decision making behaviour partially explain the home advantage phenomenon? Home advantage has been defined as "the consistent finding that home teams win over 50% of the games played under a balanced home and away schedule" [[3], p.13]. In over thirty years of research, home advantage in the sporting environment has been repeatedly demonstrated in different team sports including: Football; [4,5]; baseball [6]; ice hockey [7]; and basketball [8,9,10]. Further evidencing the extent and reliability of home advantage in soccer, Nevill and Holder [11] reported that 68.3% of the 40,493 soccer matches they examined resulted in wins for the home team. Due to the accepted role of home advantage in contributing to the outcome of sporting contests, the strength and consistency of the home advantage has made it a popular topic of study in sport and especially soccer. Edwards and Archambault [12] concluded that more references are made to the difficulty of defeating a home team than to any other single factor, including prior record, player talent, injuries, and momentum. Despite home advantage being one of the longest established and deep-rooted aspects of soccer lore, it remains one of the least understood [3].

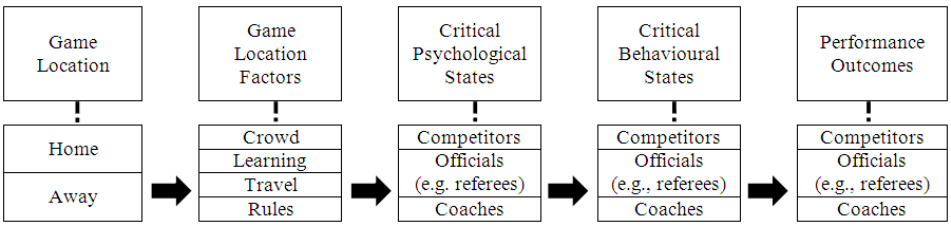

Figure 1. Courneya and Carron's [3] Conceptual Framework of Home Advantage

It would appear that the question of whether or not the home advantage exists in sport has been clearly answered by the research, the more relevant and interesting, and as yet still not completely answered question [13,14], is why? In light of the limited understandings of the mechanism underpinning the home advantage Courneya and Carron [3] were amongst the first to propose a conceptual framework to explain home advantage (see Figure 1). The framework has largely been accepted as a useful approach to guide the design of investigations examining home advantage; helping to provide structure and direction for future research in this topic area. The key components of Courneya and Carron's [3] framework included: Game location; game location factors (i.e. crowd, familiarity, travel, and rules); critical psychological states of competitors, coaches, and officials; critical behavioural states of competitors, coaches, and officials; and performance outcomes.

Ten years after Courneya and Carron's proposed model [3], Carron, Loughhead, and Bray [15] reviewed the model based on subsequent research. Despite the review by Carron et al. [15] supporting the framework first proposed by Courneya and Carron [3], only making two major changes; namely the removal of officials' roles and the inclusion of physiological states, results to research attempting to explaining home advantage were still sparse and frequently contradictory [14]. For example, research examining game location factors and the impact of crowds has been equivocal; Nevill, Newell, and Gale [15] observed that in English soccer that crowd size was positively related to team success, while Agnew and Carron [17] suggested crowd size was not contributor to home advantage, but crowd density was. Further research introduced additional confusion [18,19] with findings that home teams' performances were not enhanced by crowd cheering. With regard to travel factors, it has been assumed that travel is both fatiguing and also disruptive of familiar routines and habits, thus affecting a home advantage effect. However, research has again produced mixed results with Smith, Ciacciarelli, Serzan, and Lambert [20] showing that that increasing the length of the road trip for the visiting team decreased the home advantage for the home team. Conversely, other soccer research [5,21] found significant results supporting that as distance travelled increases so did the home advantage effect, but accounting for only a very small percentage of performance. While research has also examined familiarity and learning factors such as size and nature of the playing surface [22] and familiarity with the venue [23,24], little empirical evidence has been reported to support the role of such factors in determining home advantage.

Whilst game location factors (i.e. crowd, familiarity, travel, and rules) along with competitors' (e.g., [25]) critical psychological and behaviour states have received substantial research attention, but with mixed results, officials' critical psychological and behavioural factors have been neglected [15]. Indeed, in Carron et al's [2005] review the role of officials including referees in affecting home advantage has been deleted by Carron et al's revised [3] conceptual framework. However, this removal of referees as a potential contributor to home advantage may be erroneous and deserves further examination. Indeed Nevill and associates argue that home advantage is largely due to officials' bias in favour of the home team, especially where there are subjective performance evaluations or subjective assessments / applications of the rules or code [11,26,27,28,29]. Furthermore, a recent review of home advantage [13] also concludes that match officials do play a key mediating role in home advantage suggesting that referees are more lenient to the home side; a belief also held by soccer players and coaches [30]. This suggestion by top class soccer players [30] well limited previous empirical research [e.g., [27,29]], although not in soccer, does support the notion that referee bias may contribute towards the sports phenomenon of home advantage. The attractiveness of research, as such as that by Waters and Lovell [30], is that it suggests a substantive, if not exclusive, mechanism responsible for the home phenomenon, although further research is required to support such a contention.

With regard to the need for such further research examining the role of officials in affecting the home advantage effect, Mascarenhas et al. [1] in critiquing previous sports officials' based research proposed that future research on referee performance should be conducted in the natural environment, demanding ecologically valid research methodologies. Notational analysis is one research methodology which can assess referees actual decision behaviours made under natural game settings, subjected to real crowd noise as opposed to simulated audio environments and test the full level of the referees' expertise. Notational analysis is a method where critical events in a performance can be quantified in a consistent and reliable manner, usually through observation [31,32].

In summary, home advantage appears to be a consentient phenomenon in the sport of soccer. For the sporting participant, understanding the mechanisms that cause the home advantage is important for the optimisation of performance. For sporting organisations, understanding the mechanics of home advantage is also important so that procedures and strategies may be developed to ensure that home teams are not placed at any unfair disadvantage due to factors beyond the control of the players such as bias officiating behaviours; conscious or subconscious. Therefore, in light of the need to understand home advantage, coupled with the lack of research examining the potential role of referees in determining home advantage in soccer, this research aimed to further the current body of knowledge by addressing the question of whether the decision making behaviour of English Premiership referees' during actual Premiership fixtures favour the home sides. The specific hypothesis examined was that referees' decision making behaviours would favour the home side. The rationale for this prediction being that due to the greater numbers of home team supporters, that they would perceive greater pressure to make decisions in favour of the home side.

2. Materials and Methods

2.1. Procedure

Referee decisions from 10 English Premiership fixtures were analysed post-event via video playback by three professional soccer referees. The use of video recordings

has been considered to provide valuable means of establishing and assessing intra and inter observer reliability [31,32]. The 10 games consisted of five pairs of teams (Chelsea vs Manchester United, Everton vs Tottenham Hotspur, Leeds United vs Manchester City, Middlesbrough vs Southampton, and Newcastle United vsLiverpool) with each team playing at both home and away (thus a total of 10 games analysed in total).

The assessing referees, in isolation, assessed and tallied each decision made by the match referee for every game as either correct, contentious, or incorrect / missed. Secondly, for each match referee decision classed as correct or contentions, the side benefiting from the decision, as determined by the match referee, was noted. For decisions determined by the assessing referees as incorrect or having been missed by the match referee, these were tallied in favour of the team that was failed to be penalised. Data pertaining to when and in which part of the pitch each decision was made were also recorded.

2.2. Data Analysis

Scores from each of the assessing referees were then averaged to produce the mean total number of correct referee decision, contentious decisions, and incorrect / missed referee decisions in favour of home and away sides. Chi-square analyses were then employed to assess for significant differences ($p < .05$) between the number of correct, contentious, and incorrect / missed referee decisions awarded in favour of the home and away sides.

2.3. Reliability Checks

To ensure the validity of the assessing referees' evaluations of the match referees' decision making behaviour, intra and inter-rater reliability was checked. To assess intra-rater reliability a test-retest method was employed whereby the same fixture was analysed twice by each assessing referee, separated by a one week interlude. Intraclass correlations between the two assessments were computed using SPSS. Intra-rater reliability was demonstrated for each of the dependent variables of correct, contentious, and missed / incorrect decisions (.98, .95, and .97 respectively).

Inter-rater reliability was assessed via Cronbach alpha and produced scores of .98 for correct referee decisions, .82 for contentious decisions, and .89 for incorrect / missed decisions, demonstrating suitable reliability.

3. Results

Of the 10 matches analysed, six were victories for the home team and four were draws, demonstrating a home advantage effect. There was an occurrence of 317 referee decision making situations throughout the duration of the ten analysed matches. Of these, most decisions, 267 (84%), were deemed to be correct (see Table 1). Although there was a greater incidence of awarding correct decisions which benefited the home team (total of 141, 53%) rather than benefiting the away team (total of 126, 47%), this difference was not significant, $\chi 2 = .843$, $p > .05$.

Table 1. Number of Correct, Contentious, and Incorrect / Missed Referee Decisions in Favour of Home and Away Teams

	Home	Away	Total
Correct	141 (53%)	126 (47%)	267
Contentious*	20 (69%)	9 (31%)	29
Incorrect / missed*	15 (71%)	6 29%)	21
Total	176	141	317

Note: * significant at $p < .05$

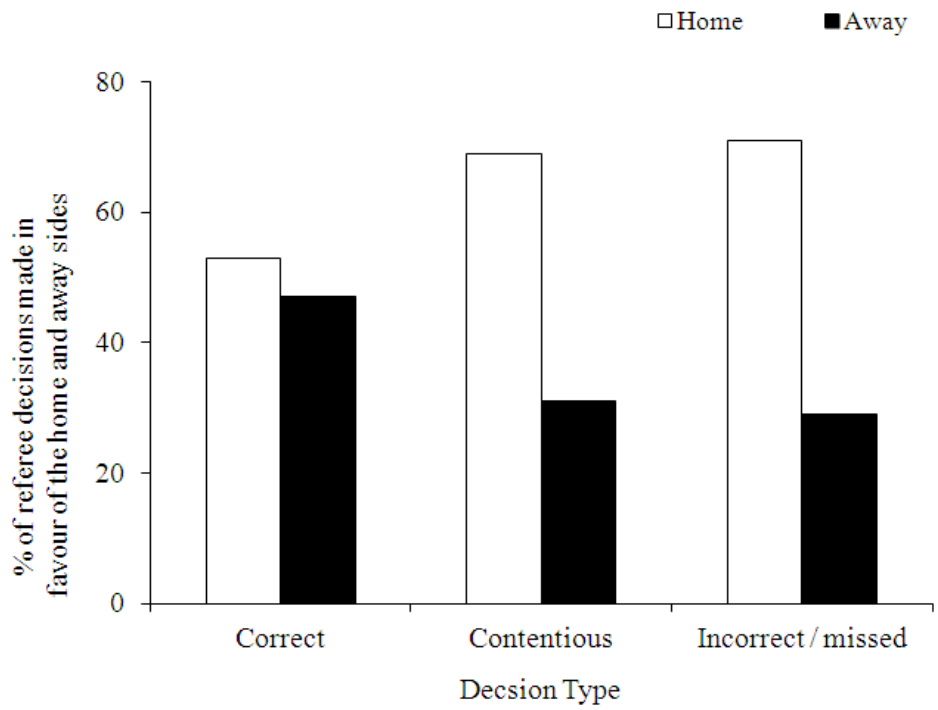

Figure 2. Percentage of Correct, Contentious, and Incorrect / Missed Referee Decisions in Favour of Home and Away Teams. Home Teams Shown as Hollow Bars, Away as Filled

Of the remaining 50 recorded decisions from the 10 matches, 29 (9%) were deemed as contentious and a further 21 (7%) were notated as incorrect or missed. In both instances of contentious and incorrect / missed

decisions, the number of referee decisions awarded in favour of the home sides were significantly higher than the number of decisions awarded in favour of the away sides, $\chi^2 = 4.17$, $p < .05$ and $\chi^2 = 3.86$, $p < .05$ respectively (see Table 1 and Figure 2). The home teams were awarded 69% of the contentious decisions and 71% of the incorrect / missed decisions.

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4. Discussion

The increased incidence of correct decisions awarded in favour of the home team compared to the away team showed that, in the majority of matches, the visiting teams committed a greater number of infringements. Although the observed difference was not significant, the results provide support for previous studies by Greer [8] and Thier and Rampey [33] which suggested that competing away from home caused teams to commit more infractions and a general detriment in the teams' performances. These inferred differences could be due to, in part, factors including aggression or frustration exhibited by the away team, or the employment of more defensive tactics of the home team [11].

The most prominent results from the present study suggest that significantly more contentious and incorrect or missed referee decisions are awarded to the benefit of the home side. These findings confirm the contention held by many players and coaches that referees award more contentious decisions in favour of home teams (e.g., [30]). Even though the number of 'biased' decisions made within one match may be relatively low, the importance of this observation is supported by the statement of Nevill and Holder, "it only takes two or three crucial decisions to go against the away team or favour of the home team to give the side playing at home the edge" [[11], p.236].

The main objectives and expectations of referees when officiating in the Premier League are to enforce the game's laws, firmly, fairly, consistently and impartially, and to earn respect from all concerned [2]. However, it is apparent that referees are not being successful in the consistent and impartial application the laws of the game and perhaps indicates why the media has an increased negativity towards refereeing performances and why managers and players alike, continue to exhibit failing confidence in officials duties. Clearly, a bias should not exist in the ideal sports environment, so why does it? The observation of a bias towards the home team cannot simply be explained as a function of task difficulty, time pressure, or event importance. Such explanations should predict that decision errors would be made in equal frequency to the benefit of both the home and away team. A more attractive explanation would be an interactional model incorporating several contributing factors, but with a strong social-cognitive component perhaps focusing on impression management issues. Support for this proposal is offered by Rainey [34] who reported that the most extensive sources of stress for officials included: making poor decisions; receipt of verbal abuse or threats from coaches, players and spectators; media criticism; and supervisory evaluation. Furthermore, Lehman and Reifman [35] deemed spectators as the group that formed the most intense source of stress among referee's and highlighted referees' subjectivity was a direct result of reacting to crowd pressure. Similarly, Glamser stated "the hostile atmosphere can clearly produce a dysfunctional aggressive response on the part of the visiting player and a less-than-objective view on the part of officials" [[36], p.48]. Jones in discussing Nevill and associates summarises "the effect [home advantage] originate with the home team crowd and its mediating effect on the officials. Consciously or unconsciously, they tend to accommodate to the home team crowd [[13], p.403]. All of these factors may be seen to contribute referees' conscious or unconscious decision making bias.

In conclusion, this study has demonstrated a referee bias in English Premier League soccer matches and that this factor contributes to the home advantage phenomenon. It must be stated that further research into referee bias would benefit from a sample encompassing other English and International divisions. Establishing the degree to which referee bias exists and the underlying mechanisms for its existence may well help to design appropriate solutions to precipitate the type of consistency that is desired by players, fans, the media, and ultimately, the officials themselves. For example, providing referees with greater training and support, particularly in terms of psychology skills training to better remain immune to the pressures that soccer referees have reported that appear likely to affecting the decision make behaviours and thus causing, to some extent, the home advantage effect.

Statement of Conflict Interests

The authors have no conflicting interests.

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