Journal of Sports Sciences

ISSN: 0264-0414 (Print) 1466-447X (Online) Journal homepage: http://www.tandfonline.com/loi/rjsp20

# The home advantage in sport competitions: Courneya and Carron's (1992) conceptual framework a decade later

Albert V Carron , Todd M Loughhead & Steven R Bray

**To cite this article:** Albert V Carron , Todd M Loughhead & Steven R Bray (2005) The home advantage in sport competitions: Courneya and Carron's (1992) conceptual framework a decade later, Journal of Sports Sciences, 23:4, 395-407, DOI: 10.1080/02640410400021542

**To link to this article:** https://doi.org/10.1080/02640410400021542

Published online: 18 Feb 2007.

*Journal of Sports Sciences*, April 2005; 23(4): 395–407

Taylor & Francis
Taylor & Francis Group

# The home advantage in sport competitions: Courneya and Carron's (1992) conceptual framework a decade later

ALBERT V. CARRON[1], TODD M. LOUGHHEAD[2], & STEVEN R. BRAY[3]

[1]*University of Western Ontario, London, Ontario,* [2]*McGill University, Montreal, Quebec, and* [3]*University of Lethbridge, Lethbridge, Alberta, Canada*

**Abstract**
This paper had three aims. The first was to review research carried out on the home advantage from 1992 to the present. The second was to examine the extent to which a conceptual framework proposed by Courneya and Carron (1992) was/is viable as a tool to highlight and organize an understanding of the home advantage. The final aim was to provide suggestions for future research.

**Keywords:** *Crowd effects, facility familiarity, officiating decisions, travel factors*

## Introduction

In 1992, Courneya and Carron defined the home advantage as ''the term used to describe the consistent finding that home teams in sport competitions win over 50% of the games played under a balanced home and away schedule'' (p. 13). In that same article, they reviewed research conducted to that point and proposed a conceptual framework designed to ''highlight and organize the major components involved in the home advantage process'' (Courneya & Carron, 1992, p. 14). While the conceptual framework was useful for Courneya and Carron to organize their literature review, it also served as a catalyst for research over the past decade. Thus, it may be timely in this special issue of the *Journal of Sports Sciences* on the home advantage to examine the extent to which research has provided support for the various components of the Courneya and Carron conceptual framework. This paper had three aims. The first was to review research carried out on the home advantage from 1992 to the present. The second was to examine the extent to which a conceptual framework proposed by Courneya and Carron (1992) was/is viable as a tool to highlight and organize an understanding of the home advantage. The final aim was to provide suggestions for future research.

## Framework for home advantage research

The conceptual framework proposed by Courneya and Carron incorporates five major components: game location, game location factors, critical psychological states, critical behavioural states and performance outcomes (see Figure 1).

As Figure 1 illustrates, *game location* simply represents the site – home versus away – for the competition. Courneya and Carron suggested that their conceptual framework would not be relevant for understanding competitions played at neutral sites, even though one of the two competitors might be designated the ''home team''.

The *game location factors* (see Figure 1) represent four major conditions that differentially impact on teams competing at their own versus an opponent's venue. These include: (a) *crowd factors*, an acknowledgement that generally competitors at home have more support from spectators than do visiting competitors; (b) *learning/familiarity factors*, an acknowledgement that competitors at home are generally more familiar with their own venue and also have the opportunity to modify that venue temporarily in order to capitalize on their perceived strengths (e.g. soften the pitch through excessive watering); (c) *travel factors*, an acknowledgment that visiting competitors generally must undergo the inconvenience of some travel; and (d) *rule factors*,

Correspondence: A. V. Carron, School of Kinesiology, University of Western Ontario, London, Ontario N6A 3K7, Canada. E-mail: bcarron@uwo.ca

ISSN 0264-0414 print/ISSN 1466-447X online 
DOI: 10.1080/02640410400021542

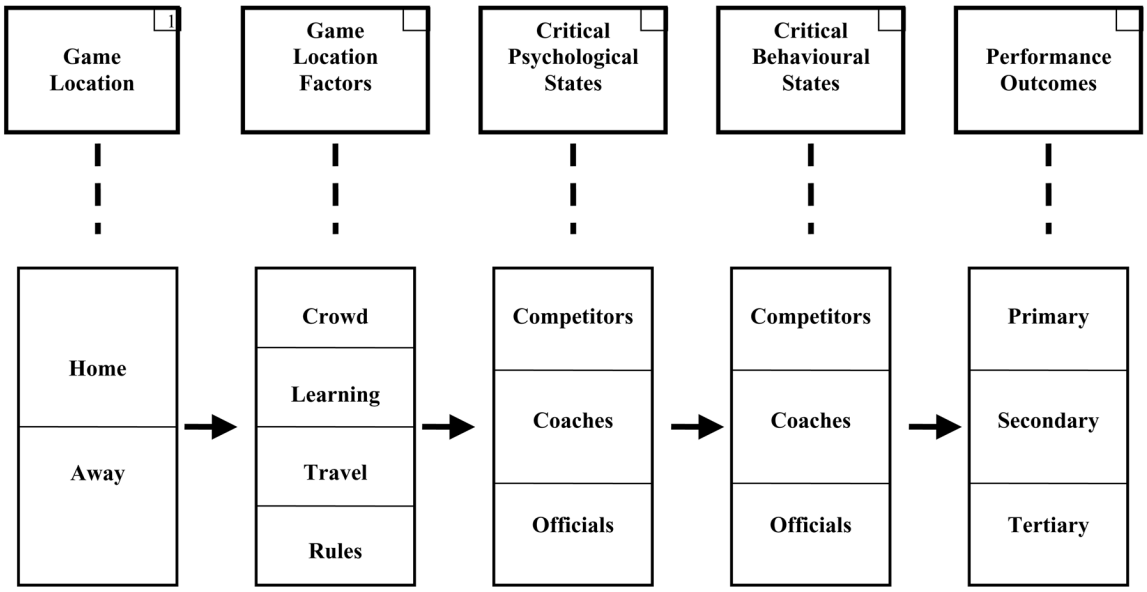


Figure 1.

an acknowledgment that in some sports the rules may favour the home team (e.g., last line change in ice hockey).

The four *game location factors*, in turn, are considered to influence first *critical psychological states* and then *critical behavioural states* of three groups of actors involved in the outcome – coaches, competitors and officials.

Finally, Courneya and Carron noted that three levels of *performance outcomes* (see Figure 1) are potentially influenced by game location, game location factors, critical psychological states and critical behavioural states. These three levels are: *primary*, which is the fundamental level of performance (e.g. free throw percentage in basketball); *secondary*, which is the intermediate or scoring aspect of performance (e.g. points scored in basketball); and *tertiary*, which is the traditional outcome measure (e.g. win–loss ratio).

## The home advantage: Quantitative perspective

Courneya and Carron reviewed studies that documented the extent of the home advantage and provided a quantitative synthesis of results from major team sports. The mean percentage home winning percentages and effect sizes (ES) for decided games (i.e. drawn games were excluded from consideration) they presented were: baseball, 53.5%, ES = 0.07; American football, 57.3%, ES = 0.15; ice hockey, 61.1%, ES = 0.22; basketball, 64.4, ES = 0.29; and soccer, 69.0%, ES = 0.38.

Subsequently, using the Courneya and Carron review of the literature as a basis, Carron and Hausenblas (1998) provided the following generalizations about the extent of the home advantage:

1. A home advantage is present in both professional and amateur sports . . .
2. A home advantage is present in individual [and team] sports . . .
3. The home advantage is generalisable across gender . . .
4. Competing in a home territory positively benefits countries in international competitions . . .
5. The home advantage is not a recent phenomenon; for example the extent of the home advantage in English soccer has remained relatively unchanged in [*sic*] since 1888. (p. 51)

Subsequent to the Courneya and Carron review, other researchers have provided insight into possible moderators of the extent of the home advantage in sport. In their analysis of the number of medals won by competing nations in the Winter Olympic Games (1908–1998), Balmer, Nevill and Williams (2001) found that when all events were combined, a significant home advantage was present. However, there were substantial differences across events with little or no advantage observed in a number of the events. A critical factor was the protocol for measuring performance; a significantly greater home advantage was present in judged events (e.g. figure skating) than in more objectively determined events (e.g. short-track speed skating).

Under the assumption that the ''opening day in major league baseball represents a highly ritualistic and festive occasion'', Ward (1998, p. 280) assumed that players and fans would be more strongly motivated to create a positive impression. Therefore, he hypothesized that the home advantage would be greater in first games in a season – events characterized by ritual and festivity – than during regular season games or even championship games. His results supported this hypothesis; the winning percentages in games played (a) in front of large crowds during the regular season, (b) in ''must win'' World Series and league championships, and (c) on the opening day were 57%, 70% and 75% respectively.

Studies by Bray (1999) and Clarke and Norman (1995) also show that the home advantage is not universal for all teams. For example, in his analysis of the performance of *individual teams* in the National Hockey League for the period 1974 to 1993, Bray (1999) found that teams won 17.3% more games at home than on the road. However, over the same period, 37.7% of the teams won fewer than 50% of their home games. Similarly, Clarke and Norman (1995) reported that 14% of the teams in English soccer in any given year in any one division had a negative home advantage.

## Game location factors

### *Crowd factors*

Before 1992, crowd support had received only modest attention and the research findings in those studies were equivocal. On the one hand, research focusing on crowd size found that absolute crowd size (Dowie, 1982) and crowd density (i.e. the number of people in the audience relative to the facility's capacity [Pollard, 1986]) did not have an effect on the home advantage in professional English soccer. On the other hand, Schwartz and Barsky (1977) found that crowd density in Major League Baseball had a positive effect on the home advantage. In fact, home team winning percentages increased significantly from 48% when crowd density was operationalized as small (i.e. crowd density smaller than 20%) to 57% when crowd density was large (i.e. larger than 40%).

Crowd behaviour has been examined to determine *why* the crowd factor may influence the home advantage. Greer (1983) found that during both normal and booing crowd behaviour conditions, the home team's performance was better than that of the visiting team. Thirer and Rampey (1979) showed that during normal crowd behaviour conditions, visiting teams committed more infractions. However, during antisocial crowd behaviour conditions (e.g. swearing, chanting obscenities, throwing objects on playing surface, fighting), home teams committed more violations. After 1992, research continued to examine crowd factors such as density, absolute crowd size, absence of spectators, athletes' perceptions of supportive crowds, and decision-making by officials.

Agnew and Carron (1994) examined several factors associated with the presence of crowds at ice hockey games. More specifically, the authors measured the absolute size of the crowd, crowd density, inter- versus intra-divisional rivalry, and the time of year of the game. The results indicated that only crowd density was related to game outcome. That is, as crowd density increased so did the extent of the home advantage.

In contrast to the findings of Agnew and Carron (1994), Nevill, Newell and Gale (1996) found that absolute crowd size was positively related to the home advantage in English and Scottish soccer. Home teams had increased home winning percentages where crowd size was large, whereas the home advantage was nearly absent in two leagues (i.e. GM Vauxhall League, Scottish Second Division) where crowd sizes were small.

A unique opportunity to study crowd effects occurred when a measles epidemic resulted in a quarantine that prevented spectators from attending eleven games for two university basketball teams. Using total points scored, field goal percentages and free throw percentages as performance measures, Moore and Brylinksy (1993) compared the two teams in the presence and in the absence of spectators. The results indicated that the performances of both teams improved in the absence of spectators. Specifically, for one of the teams, the total points scored (ES = 0.93) and free throw percentage (ES = 1.75) were superior in the absence of spectators. As for the second team, the results also showed improvements in total points scored (ES = 1.32), field goal percentage (ES = 0.75) and free throw percentage (ES = 0.45) in the absence of spectators.

Another line of study has been to examine the perceived influence of supportive behaviours by spectators. In their study, Bray and Widmeyer (2000) asked female collegiate basketball players to indicate which factors contributed to the home advantage. Over 25% of the athletes indicated that support from the home crowd was an important factor in winning at home. Despite this belief among players, findings from field studies have shown that spectator support for the home team (i.e. cheering) is not related to greater home team success in soccer, ice hockey, basketball (Salminen, 1993) or American football (Strauss, 2002).

Nevill, Balmer and Williams (2002) examined whether the presence or absence of crowd noise

influenced officiating assessments of the legality of 47 challenges/incidents during a recorded English Premier League match between Liverpool (home) and Leicester City (away). The officials ($n = 40$) were exposed to either an audible crowd noise group (i.e. the match was shown with audible crowd noise) or a silent condition group. The results showed that the officials in the audible crowd noise group called significantly fewer fouls against the home team than referees in the silent group condition. Furthermore, the decisions made by the referees in the audible crowd noise group were in close agreement with those of the match referee. However, it is interesting to note that officials in both conditions did not penalize the away team more often. Taken together, the results indicated that the presence of crowd noise reduces the number of fouls awarded against the home team rather than increasing the number of infractions called against the visiting team.

*Learning factors*

Up to 1992, the role of familiarity in contributing to the home advantage had received limited attention. Pollard (1986) noted that between 1981 and 1984 the two English professional soccer teams playing on the largest playing surface and the two playing on the smallest playing surface experienced a 65.6% home advantage. Also, one club competing at home on artificial turf had a 63.9% home advantage. However, the home advantage enjoyed by teams on these ''special'' fields was not significantly different from that of teams in the rest of the league (64.9%).

In a more recent study in which the home results were reanalysed for a 10-year period between 1981 and 1990, Clarke and Norman (1995) found a trend ($P = 0.076$) towards a higher than average home advantage when team quality was controlled; in short, teams playing on larger or smaller playing surfaces may have a higher than average home advantage. Furthermore, both Clarke and Norman (1995) and Barnett and Hilditch (1993) indicated that teams playing on artificial turf playing surfaces had significantly ($P < 0.01$) higher home advantages than teams playing on natural grass. Although the results of the English soccer studies provide some evidence that facility familiarity may be associated with the home advantage, interpretation of the findings should be tempered due to limitations in experimental control (Courneya & Carron, 1992; Moore & Brylinsky, 1995).

Another line of inquiry has been to examine the role of intervening factors that lead to a reduction in the home team's familiarity with its own venue. One such event took place when both a men's and women's varsity basketball team had to play their nine home games at five different locations for an entire season while a new facility was being built. Moore and Brylinsky (1995) hypothesized that if facility familiarity is a contributor to the home advantage, then having to play at different venues would eliminate this advantage. The results indicated that despite playing their games in unfamiliar venues, both home teams enjoyed a home advantage. The authors concluded that being familiar with one's venue was not a cause of the home advantage.

Although the results of Moore and Brylinsky (1995) suggest that facility familiarity is not a contributor, caution should be exercised when interpreting their findings, since results of only 18 basketball games were used. Also, the study was characterized by a lack of experimental control – there was no baseline against which to compare the results in the unfamiliar venue. Two more recent studies directly compared the home advantage in teams' old (i.e. familiar) versus new (i.e. relatively unfamiliar) venues.

In the first, Pollard (2002) compared the home winning percentages for the entire season before and after a facility change using 37 teams that had moved to new venues between 1987 and 2001 from the National Basketball Association, National Hockey League and Major League Baseball. The author found that for 26 teams there was a decrease in the home advantage following a move, while 10 teams enjoyed an increase in the home advantage, and one team showed no change. Given that Pollard compared entire seasons, he suggested that there might be a greater decrease in the home advantage immediately after the move whereby an increase in the home advantage would be greater as teams become more familiar with their new environment.

In a second study, Loughead, Carron, Bray and Kim (2003) classified game results into three blocks: (a) a block of 10 games immediately before relocating to a new venue; (b) a block of 10 games immediately after relocating to a new venue; and (c) a block of 10 games when teams had become better acclimatized to their new surroundings. For the 57 teams that had relocated to a new venue from the National Basketball Association (1991 – 2000), National Hockey League (1982 – 2000), and the English and Scottish Professional Football Associations (1988 – 2000), an overall home winning percentage of 55.2% was noted before relocating to a new venue. Immediately after relocating, teams had a reduced home winning percentage of 53.9%, which remained virtually unchanged (53.1%) once those teams were acclimatized to their new environment. However, the analyses indicated that there were no significant differences between the three blocks; thus indicating that the home advantage was similar before and after relocating to a new venue.

Others (Barnett & Hilditch, 1993; Schwartz & Barsky, 1977) have suggested that team quality may be a moderator variable in the game location–game outcome relationship. As a result, Loughead *et al*. (2003) also conducted *post hoc* analysis to examine the interrelationship between team quality, facility familiarity and the home advantage. Teams were classified as either high quality (i.e. a home winning percentage greater than 50% before relocating) or low quality (i.e. a home winning percentage lower than 50% before relocating).

The findings from this analysis showed that high-quality teams experienced a significant reduction in home advantage from the block of games before moving to the block of games immediately after moving (i.e. 70.6% to 59.2%). Furthermore, no significant change occurred from the block of games immediately after moving to the block of games where teams were more acclimatized to their new venue (i.e. 59.2% to 58.0%). In contrast, low-quality teams showed a significant increase in the extent of the home advantage from the block of games before moving to the block of games immediately after moving (i.e. 34.1% to 46.8%). Similar to the effects found for high-quality teams, no significant change was seen for low-quality teams between the block of games immediately after moving to the block of games where teams were more acclimatized to their new venue (i.e. 46.8% to 46.4%). In summary, the results indicated that moving to a new facility was beneficial for low-quality teams but reduced the home advantage of high-quality teams.

### *Travel factors*

Before 1992, only a handful of studies had examined travel as a contributor to the home advantage. Some earlier studies examined the effect of distance travelled on the home winning percentage (Pollard, 1986; Snyder & Purdy, 1985). For collegiate basketball, Snyder and Purdy (1985) found a home winning percentage of 58.8% when visiting teams travelled less than 200 miles to their opponent's venue. In contrast, when visiting teams travelled more than 200 miles for a contest, the home advantage increased to 84.6%. However, the findings should be interpreted with caution given that only 64 games were sampled for teams travelling less than 200 miles and 26 games for teams travelling more than 200 miles. Using a similar approach, Pollard (1986) examined nearly 3500 professional English soccer games. When visiting teams travelled less than 200 miles, the home winning percentage was 64.3%. Interestingly, when visiting teams travelled more than 200 miles, the home advantage was an identical 64.3%.

Carron and his colleagues comprehensively examined the effects of travel on the home advantage in two studies. Using professional minor league baseball, Courneya and Carron (1991) assessed the impact of six travel variables on the home advantage. Using a similar design, Pace and Carron (1992) investigated ten travel-related factors on the home advantage for the National Hockey League. Similar results were found in that travel factors accounted for less than 1.5% of the variance in the home advantage in both baseball and hockey. In baseball, as the visiting team's road trip got longer, home teams had a greater advantage in terms of winning percentage. In hockey, the combination of having to cross more time zones and having more days off was positively associated with a lower chance of visiting teams winning games. Given that only a small amount of variance was explained by travel factors, Courneya and Carron (1992) concluded that the effects of travel on the home advantage were minimal. This conclusion might have been overstated, however. The home advantages in baseball and ice hockey are approximately 54% and 61% respectively. Therefore, any factor that accounts for 1.0–1.5% of the variance must be given serious consideration.

Before 1992, the majority of travel-related research had utilized samples from the professional ranks. However, Gayton and Coombs (1995) broadened the scope of this research, examining the home advantage in high school varsity basketball. The authors found that the extent of the home advantage was similar to that in collegiate and professional basketball. Based on their results, the authors suggested that since high school teams do not travel as far as collegiate or professional teams, the effects of travel on the home advantage might be minimal.

In a study of the home advantage of individual teams in English soccer, Clarke and Norman (1995) examined the relationship of distance travelled with the home advantage using what they labelled the ''paired home advantage''. The authors provided the following illustration to highlight the benefit of using a paired home advantage protocol to determine whether distance travelled has an effect on the home advantage:

> suppose that the HA [home advantage] is due entirely to distance travelled. A particular club would travel a short distance to some clubs (with no HA) and a long distance to others (with a consequently large HA). As its HA is an average of these it would have an average HA and the effect of distance would be lost. Thus the HA of one club is really the average of all its paired HAs with the HAs of the other clubs removed. It includes matches with nearby clubs, far clubs etc. and so to some extent averages out the effects (of distance). (Clarke & Norman, 1995, p. 515)

Using grid coordinates from a map and calculating the straight-line distance between each pair of teams

involved in a game, Clarke and Norman found a significant correlation ($r = 0.07$, $P = 0.0001$) between distance and the home advantage. Although the correlation is relatively small in magnitude, the number of observations ($n = 10{,}153$ paired match games) increases confidence in the effect (Clarke & Norman, 1995).

Using soccer teams that had qualified for the 1998 World Cup, Brown, Van Raalte, Brewer, Winter and Cornelius (2002) examined several factors related to the home advantage including distance travelled to a game. The results revealed that distance travelled was significantly related to goals against ($r = 0.09$, $P < 0.001$), goals scored ($r = -0.08$, $P < 0.001$) and goal differential ($r = -0.11$, $P < 0.001$). That is, teams scored fewer goals, had more goals scored against them, and showed an increased differential for goals scored versus allowed as the distance they had to travel increased.

In one of the most comprehensive studies of travel and the home advantage since 1992, Smith, Ciacciarelli, Serzan and Lambert (2000) analysed data for two seasons from the National Hockey League, National Baseball Association and Major League Baseball. For each league, the authors investigated the effects of game number in the home stand, days off for home team before the game, whether the home team travelled to the game, distance travelled by the home team to the game, the home team's cumulative travel distance before the game, number of days of visitor's current road trip, distance travelled on current road trip, days off before the game for the visiting team, distance travelled by the visiting team to the game, visiting team's cumulative travel before the game, and the visiting team's distance from home. For the National Baseball Association, none of the travel indicators were significant. Two travel indicators were significant for the National Hockey League. First, increases in the length of the road trip of the visiting team decreased the probability (by 0.162) that the home team would win. That is, during initial games of the road trip, visiting teams had less success; however, as the road trip progressed, they had more success. Second, increases in the distance travelled to the venue reduced the odds that the home team would win. Although the results seem counter-intuitive, Pace and Carron (1992) offered possible explanations as to why there is a positive relationship between success and length of the visiting team's road trip. First, changes in routines would be greatest during the initial games of a road trip. Consequently, players may have trouble acclimatizing to these new routines at the beginning of a road trip. The second explanation may be related to the team's cohesiveness. As teams spend more time together over the course of a road trip, the players are more likely to interact and communicate more with each other. Interaction and communication are associated with increased cohesion For Major League Baseball, as the number of days off for the visiting team increased, so did the probability that the home team would win. Similar to Carron and colleagues (Courneya & Carron, 1991; Pace & Carron, 1992), travel factors accounted for approximately 1% of the variance in the home advantage.

Another line of inquiry has been to examine the possible effects of ''jet lag'' on the home advantage. It is documented that the severity of jet lag and subsequent recovery is a function of the number of time zones crossed and the direction of travel (Pace & Carron, 1992). Typically, the body readjusts faster for travel in a westward direction. Using archival data from three seasons in Major League Baseball, Recht, Lew and Schwartz (1995) compared the performance of teams based in the Eastern time zone and teams based in the Pacific time zone (i.e. a three-hour time difference). The only significant finding was that home teams based in the Eastern time zone scored on average 1.24 more runs per game against visiting teams from the Pacific time zone who had just completed eastward travel. A similar finding also emerged in data gathered from the National Football League (NFL). Jehue, Street and Huizenga (1993) found NFL teams from the Pacific time zone lost more games when visiting teams from the Eastern and Central time zones.

### *Rule factors*

Before 1992, limited attention was paid to whether rule differences in certain sports contribute to the home advantage. In their study of softball, Courneya and Carron (1990) found that batting last did not provide a home advantage. We could find no studies since 1992 that examined the impact of rules on the home advantage.

### *Summary and future directions*

Since 1992, research examining game location factors has made moderate progress. The majority of research has examined crowd and learning-related factors, followed by travel factors. In contrast, no new studies have been conducted examining the impact of rule differences on the home advantage. To date, findings regarding the impact of crowds have produced mixed results. The results have shown that absolute crowd size is not a contributor to the home advantage in amateur hockey (Agnew & Carron, 1994) but is positively related to team success in professional English and Scottish soccer (Nevill *et al.*, 1996). However, crowd density was positively related to the home advantage (Agnew &

Carron, 1994). What is now required is an examination of crowd density and absolute crowd sizes using a wide variety of sports and competitive levels. One potential avenue of research is to examine professional minor league and collegiate sports (e.g. hockey, basketball, baseball, soccer) where typically crowd sizes and density vary from venue to venue.

Some research has demonstrated that teams perform better in the absence of spectators. This result is in contrast to athletes' perceptions that playing in front of a supportive crowd is beneficial to a home team's performance. In fact, empirical evidence by Salminen (1993) and Strauss (2002) found that cheering for the home team did not translate into greater success by the home team. Consequently, future research should examine *why* athletes seem to perform better in the absence of crowds and if this trend is generalizable across sports. In a related point, it appears that officials are affected by crowd noise, evidenced by soccer referees awarding fewer fouls to the home team. Given that only one sport was examined, future research should examine other sports in which the playing characteristics may have an impact on an official's decision-making. For instance, referees in hockey are shielded by the boards that surround the playing surface and may be less influenced by crowd noise. On the other hand, officials in basketball are not shielded from the spectators by any physical barrier, thus making them more susceptible to crowd noise.

Since 1992, research examining the influence of learning factors has received some attention. It would appear that soccer teams playing on non-traditional pitches (e.g. irregular size, artificial surfaces) enjoy a greater home advantage than teams playing on traditional natural grass pitches. To expand our knowledge base, one avenue of research would be to examine game outcomes of National Hockey League teams that have played on irregular sized ice surfaces. Traditionally, ice hockey surfaces are approximately 200 $\times$ 85 feet. However, some teams (e.g. Chicago Blackhawks, Boston Bruins, Buffalo Sabres) have played on smaller ice surfaces. Therefore, a comparison of these different sized ice surfaces seems warranted. As well, it appears that there is a decrease in the home advantage when superior teams relocate to a new venue but an increase when inferior teams do so. Future research should attempt to examine the relationship between team quality and type of sport with larger samples when they become available. Also, an examination of athletes' psychological states may prove beneficial in determining the differences between high-quality teams and low-quality teams and its effect on the home advantage.

Research examining travel factors since 1992 has shown that travel does contribute to the home advantage; however, its impact is relatively small. Future research on physiological effects (e.g. jet lag) associated with travel may be enlightening.

There has been virtually no research on rule factors since the introduction of Courneya and Carron's (1992) conceptual framework. The lack of research may be attributed to the fact that rules relating to rights and privileges of the home versus visiting teams are present in certain sports only. However, it would be unwise at this time to conclude that rule differences do not influence the home advantage based on the results of only one study (i.e. Courneya & Carron, 1990). Furthermore, in hockey, there is a rule that requires the visiting team to substitute its players first. Anecdotal testimony from coaches and players indicates that they believe that this rule favours the home team, since it is able to match players according to the line-up the visiting team has on the playing surface.

## Critical psychological states

### *Competitors*

As of 1992, there was very little in the way of research examining the psychological states of competitors in sport. In fact, only one unpublished study by Jurkovac (1985) was identified at that time. Jurkovac reported on data gathered from collegiate basketball players that indicated they had higher confidence and motivation when playing at home than away. Recent research has complemented Jurkovac's earlier work, having examined players' psychological states using retrospective descriptions, hypothetical scenarios, as well as concurrent psychological assessment in the context of home and away competitions. In concert, these studies have yielded somewhat mixed results.

Two studies by Bray and colleagues examined athletes' retrospective accounts of home advantage. In a study by Bray and Widmeyer (2000), female collegiate basketball players reported that their teams had higher collective efficacy when playing at home than away. Additional results from the same data set (Bray & Widmeyer, 1995) revealed that players believed they were also less anxious, more motivated and better able to concentrate when playing at home than away. In another study, Bray, Culos, Gyurcsik, Widmeyer and Brawley (1998) again found that athletes believed increased self-confidence played an important role in better performance when competing at home. However, several athletes in that sample also indicated that being over-confident when playing at home was a disadvantage for them.

In an interesting study by Bar-Eli, Levy-Kolker, Pie and Tenenbaum (1995), athletes were presented with a variety of home and away competitive scenarios. Athletes then identified events that

occurred during games that caused them to experience what the authors termed a psychological ''crisis''. The results showed that crisis states were significantly less likely to occur when competing at home than away.

Although athletes' retrospective accounts and interpretations of hypothetical events that may occur during competition provide some insights into the potential for psychological states to be affected by variations in game location, they are limited by a number of factors, including demand characteristics, memory distortion and decay, as well as attributional biases. Therefore, conclusions based on these data alone should be drawn conservatively. Nonetheless, they provide a provocative backdrop for seven studies that have investigated competitors' psychological states in the competitive setting itself – before home and away competitions. The results of three studies have been consistent with the retrospective findings indicating more positive psychological states at home compared with away. However, four studies have also found competitors' psychological states *did not differ* before home and away competitions.

The earliest study to examine competitors' psychological states concurrently with competition was that of Kerr and Vanschaik (1995). They found that Dutch rugby players' mood states were no different before playing at home or away. In another study, Duffy and Hinwood (1997) assessed the state anxiety of professional male soccer players before home and away matches. Their findings revealed no differences in a composite anxiety measure (derived from the Competitive State Anxiety Inventory [Martens, 1977]) before home and away matches. A third study by Neave and Wolfson (2003) used a 16-item mood index to assess professional soccer players' psychological states prior to home and away matches. Results showed no differences in any of the mood states before home and away games. Finally, Bray and Martin (2003) also found there were no differences in psychological states when alpine skiers competed at home and away. That is, cognitive anxiety, somatic anxiety and self-confidence assessed by the Competitive State Anxiety Inventory-2 (CSAI-2 [Martens, Burton, Vealey, Bump & Smith, 1990]) were all similar before both home and away races. The researchers suggested that because performances were highly identifiable, athletes in individual sports might experience fewer psychological benefits than team sport athletes when competing at home in front of familiar spectators.

In one of the most comprehensive studies of pre-competition psychological states and home advantage, Terry, Walrond and Carron (1998) had male university and club rugby players ($n$ = 100) complete measures of mood states (Profile of Mood States; [McNair, Lorr, & Droppelman, 1971]), cognitive and somatic state anxiety, and self-confidence (CSAI-2) before a pair of home and away matches. Results showed consistent game location effects across all variables. Specifically, cognitive anxiety (ES = 0.56), somatic anxiety (ES = 0.47), tension (ES = 0.49), depression (ES = 0.25), anger (ES = 0.31), fatigue (ES = 0.63) and confusion (ES = 0.49) were all lower before the home match than before the away match, while self-confidence (ES = 0.80) and vigour (ES = 0.99) were significantly higher before the home match.

Thuot, Kavouras and Kenefick (1998) and Bray, Jones and Owen (2002) offered complementary supportive evidence to Terry and co-workers' positive findings regarding self-confidence and anxiety. Importantly, however, these two studies also examined athletes' pre-competition psychological states over *multiple home and away matches* in order to gain a more general perspective on the game location effect (i.e. the previous five studies all examined only one or two home and one away contests for each athlete). Thuot *et al.* (1998) assessed high school basketball players' psychological states before three home and three away games. Consistent with the findings of Terry *et al.*, somatic anxiety was lower before home games while self-confidence was higher; however, there was no effect for cognitive anxiety. Bray *et al.* (2002) measured state anxiety, self-confidence and self-efficacy for a team of field hockey players before four home and four away matches against evenly - matched opponents. The findings revealed significantly lower cognitive (ES = 0.86) and somatic anxiety (ES = 0.59) before home games and higher self-confidence (ES = 0.37) and self-efficacy (ES = 0.65). One strength of the study of Bray *et al.* was the application of Bandura's (1997) social cognitive theory to justify the examination of self-efficacy. In doing so, Bray and colleagues highlighted the importance of theory; not only to predict changes in psychological states that may be tied to game location, but to help explain variation and to guide possible interventions.

### *Coaches*

Only one study has examined psychological states of coaches in relation to game location. Gayton, Brioda and Elgee (2001) surveyed 144 high school coaches regarding five potential causes of home advantage in their respective sports. Coaches indicated they believed facility familiarity, travel, crowd support, officiating bias and self-fulfilling expectancies all contributed to home advantage for the teams and athletes they coached. Familiarity with the home venue was rated as the most influential factor, while officiating bias was believed to have the weakest

effect. The findings were consistent across different sports and for male and female coaches.

*Officials*

No published research on critical psychological states of officials was uncovered.

*Summary and future directions*

There have been modest advances over the last decade in the study of psychological states associated with the home advantage. However, the gains have mostly been restricted to small-scale examinations of competitors' psychological states before competition. Findings thus far are equivocal, showing more positive psychological states in some studies and no effects in others. Future research should consider the following avenues. First, further examination of anxiety, mood states and self-confidence is needed. Perhaps more importantly, we advocate the use of theory (e.g. social cognitive theory) to help identify a broader array of psychological states (e.g. self-efficacy) that should be impacted by variations in game location and associated factors (e.g. crowd, familiarity). Second, studies should be undertaken that involve larger samples of elite teams, tracked across entire seasons rather than simple comparisons of paired home and away games. Third, investigation of the potential mediating role of psychological states in the game location – game outcome/performance relationship is advocated. For example, effort should be made to investigate how variations in psychological states relate to variations in behaviour and performance outcome home and away. Fourth, because psychological states are by definition transient, researchers should examine psychological states during competition as well as before competition. Fifth, researchers are encouraged to investigate psychological states of coaches in the home and away competition environments.

## Critical behavioural states

*Competitors*

Although it is likely to be one of the most closely linked factors to performance outcome, the behavioural states of competitors has received little empirical attention. In their 1992 review, Courneya and Carron noted that aggressiveness was the behaviour studied most frequently. Research to that point had shown mixed results, with home teams exhibiting more aggression only some of the time. However, Courneya and Carron also pointed out that several studies had mistakenly examined assertive behaviour rather than aggression.

McGuire, Courneya, Widmeyer and Carron (1992) examined aggressive behaviour as a possible mediating mechanism between game location and game outcome in professional ice hockey. Analyses of the frequencies of aggressive penalties (e.g. fighting) from 840 games showed an interesting interaction effect. That is, although there was no overall main effect for game location, home team players were more aggressive during games they won, while visiting players were more aggressive during games they lost. Thus, when higher levels of aggression are present, the outcome seems to favour the home team.

*Coaches*

In 1992, no research had examined coaches' behavioural states. This topic remains relatively unexplored, as there has only been one article published since then. In two studies, Dennis and Carron (1999) examined strategic and tactical decisions made by coaches in ice hockey as a function of game location. In the first study, elite professional (i.e. National Hockey League [NHL]) and development level coaches reported that they purposely implemented more assertive (i.e. forechecking) strategies when playing at home compared with away. In the second study, the actual behaviour of NHL teams was tracked during 62 games. The findings verified coaches' anecdotal reports of using more assertive forechecking tactics when playing at home versus away (ES = 0.29). It should be noted that although the results of the latter study focused on the decisions of the coaches, they also reflect behavioural variations on the part of competitors.

*Officials*

Critical behavioural states of officials had received considerable attention by 1992. At that time, several researchers had documented that increased subjective decisions are made by officials in favour of home teams and players, while visiting players and teams seemed to bear the brunt of unfavourable decisions. However, one confound noted by a few insightful researchers (e.g. Sumner & Mobley, 1981) was that, because home teams generally perform better and visiting teams generally perform worse, what appears to be an officiating bias may simply be a direct reflection of true behaviour on the part of visiting players (e.g. dysfunctional aggression). Furthermore, because home teams may spend more time on offence and have more opportunities to score, they may be the honest recipients of a greater number of officiating decisions that favour them offensively (e.g. penalty shots).

Since 1992, researchers have implemented a variety of strategies to tease out the true effect, if any, of officiating bias with conflicting results. Three studies have found positive support for biased officiating in favour of the home team. In a study of Australian football, Mohr and Larsen (1998) treated the final score differential between teams as a covariate in the analyses of free kicks awarded by instate umpires to either instate or outstate teams. With the score differential controlled, instate teams still received 10% more free kick decisions when they played on home (i.e. instate) grounds than on away (i.e. outstate) grounds, suggesting the presence of a bias in favour of the home team (ES = 0.43). Interestingly, their analyses also showed that favourable decisions occurred most often in the instate teams' defensive zone. These results are consistent with an interpretation that umpiring bias created possession turnovers that kept the outstate opponent from scoring, rather than creating scoring opportunities for the instate team.

As noted above, Balmer *et al.* (2001) examined officiating (i.e. judges') bias in subjectively scored sports (e.g. figure skating) in Winter Olympics events. Their data supported an interpretation of biased officiating in favour of host teams. That is, although host team athletes garnered a greater number of total medals compared with performances at other Olympic Games, the host countries had a proportionately larger home advantage only in the *subjectively judged events* of freestyle skiing and figure skating and not in other events scored objectively (e.g. timed events).

Also, Nevill *et al.* (2002) conducted a laboratory study using experimentally manipulated crowd noise to examine the effect of this factor on officiating decisions in soccer. They had two groups of qualified referees record their officiating decisions of a videotape-recorded match under conditions of either crowd noise or silence. Although the same match was scored by all referees, on average 2.3 fewer fouls were called against the home team by those referees experiencing crowd noise compared to those who called the match with no noise present. The same numbers of fouls were called against the visiting team regardless of noise condition, which helped substantiate a conclusion that referees are more reluctant or uncertain when it comes to calling fouls against the home team. Importantly, from an external validity standpoint, the decisions of referees in the noise condition closely mirrored those of the match referee in the game.

Two studies have also found no evidence of officiating bias. Jones, Bray and Bolton (2001) analysed umpiring decisions from approximately 3000 English club cricket matches. Initially, they discovered that umpires made significantly more subjective decisions in favour of the home team. However, they also recognized that because home teams performed better (i.e. took more wickets) than away teams, the bias might have simply been a reflection of performance. Further analyses that controlled for performance showed that, in fact, there were no differences in umpiring decisions between home and away teams.

An innovative study by Dennis, Carron and Loughead (2002) also found no evidence of officiating bias. In that study, the researchers focused on incorrect decisions made by referees during 42 televised NHL hockey games. They argued that because teams adopt different strategies and tactics when playing at home compared with away, simple analyses of the frequency of penalties assessed by referees might reflect these differences. Thus, a truer reflection of officiating bias in this context would be seen in the number of penalties called in error (i.e. penalty assessed when there was no rule infraction) or penalties missed (i.e. no penalty assessed when a rule infraction did take place) by referees towards the home and visiting teams. The results showed that referees made an equal number of incorrect decisions towards both home and visiting teams.

### *Summary and future directions*

The advances in knowledge regarding critical behavioural states over the past decade can also be characterized as modest. One area where virtually no expansion took place was that of competitors' behaviour. The examination of coaches' behavioural states has begun and clearly shows promise. Perhaps the most significant gains in knowledge have been in the study of officials' judgements. Although the findings have been somewhat mixed, researchers' attention to controlling for confounds associated with home advantage performance effects have shown impressive creativity and should provide sufficient groundwork for future investigations in that area.

Future research might consider the following. First, there is an obvious need to investigate behavioural states of competitors. These factors may ultimately be the most proximal factors associated with the performance statistics and outcomes that represent the home advantage effect. For the most part, what we know about competitors' behavioural states thus far is confined to aggressive and assertive behaviours and there is clearly room for broader scope. For example, although Dennis and Carron's (1999) work focused on the behaviour of coaches, those behaviours generally provide directives that eventually influence the behaviours of their athletes. The strategic and tactical decisions that affect athletes' behaviour may often come from the

bench or sidelines; however, research could also determine the extent to which decisions may be made independently by the athletes themselves.

Second, coaching behaviours should be examined in greater depth and could look to behavioural manifestations that occur both on and off the field. Dennis and Carron (1999) provided evidence that hockey coaches execute different game plans when playing at home versus on the road. This line of research could easily be extended to other sports. For example, anecdotal testimony suggests that because they know that their team will bat first on the road, many baseball managers prepare their teams differently or adjust their batting order.

Third, although the findings are mixed, it is evident that research on officiating bias is progressing. Some of the inconsistencies observed so far may be attributable to generally small effects or moderating variables. While their findings may have limited generalizability, Nevill and co-workers' (2002) approach should be praised by virtue of its attempt to examine mechanisms (i.e. crowd noise) that might lead to biased judgements on the part of referees. Future research should incorporate theory to help uncover root causes that would explain behavioural variations linked to game location and associated game location factors.

## Some final thoughts

Research continues to illustrate the complexity of the home advantage. From an overall perspective, the home advantage appears to be universal across all types of sports. However, it is not universal across all teams in those types of sports; there are a substantial number of teams that do not show a home advantage. Also, from a causal perspective, it is likely that the *why* of the home advantage is equally complex – possibly varying from sport to sport and even team to team. As the summary sections presented above are intended to emphasize, many questions remain unanswered.

What about the conceptual framework of Courneya and Carron? Using it to highlight and organize the major components of the home advantage – as Courneya and Carron intended it to be used – still offers some advantages. All conceptual frameworks provide a vehicle whereby a complex phenomenon can be simplified and explained and directions for future research can be outlined. However, like all conceptual frameworks, the one advanced by Courneya and Carron cannot adequately capture the complexity of the construct. It provides only a static picture of what is likely a dynamic construct, and it suggests the existence of linear relationships when reciprocal relationships make more sense intuitively (Carron & Hausenblas, 1998)

Moreover, it is reasonable to assume that some of the components of their conceptual framework should be deleted or reduced in importance and others be included. To that end, a revised conceptual framework is presented in Figure 2.

One major difference between the models presented in Figures 1 and 2 is the absence of ''officials'' in the revised model. This is not to say that officials are not at least potentially a major contributor to the home advantage. However, unlike competitors and coaches, they do not have a home or visitor status (as Figure 1 explicitly suggests). Specifically, in the model contained in Figure 1, game location (i.e. home versus away) is assumed to be directly related to a series of game location factors (crowd, etc.), which, in turn, are assumed to differentially affect the psychological states, behaviours and, ultimately, performance of coaches, athletes and officials. These proposed linear relationships can be directly tested for coaches and athletes. However, because game location does not vary for them, these relationships cannot be directly tested in the case of officials. Consequently, officials' behaviours may be more appropriately considered as moderating variables or covariates that may impact indirectly on relationships involving competitors and coaches.

A second major difference between the models presented in Figures 1 and 2 is the inclusion of ''physiological states'' in Box 3 of the revised model. The results of a recent study by Neave and Wolfson (2003) showed that soccer players' testosterone was higher before home games than away games. When considered in concert with the jet lag evidence provided by Jehue *et al.* (1993) and Recht *et al.* (1995), there may be good reason to consider physiological variations among competitors that are associated with game location. Although a substantive body of research evidence is lacking at this point, the conceptual model was expanded to encourage future examination of critical physiological factors in competitors and coaches.

We seriously questioned whether the ''rules'' component under game location factors (see Box 3 in Figures 1 and 2) should be retained. First, there are very few sports for which the rules of competition provide the home team with extra or different prerogatives and privileges. Second, in the one study that did directly examine the influence of the rules on the home advantage (Courneya & Carron, 1990), no effect was found. While we question whether the rules factor should be considered a major contributor to the home advantage, it is premature to discount it on the basis of one study.

The past decade has seen an expansion in our knowledge of game location factors as well as critical psychological and behavioural states. A great deal of this research has reflected themes

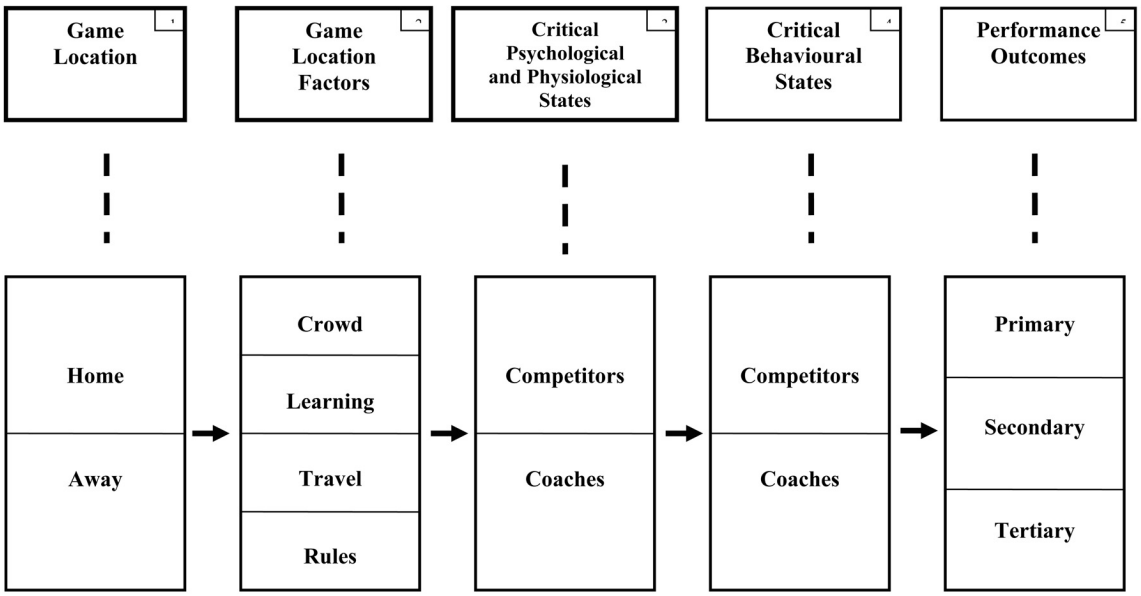


Figure 2.

highlighted by Courneya and Carron (1992). The model of Courneya and Carron offers clear challenges to investigators by virtue of the breadth and complexity of its constituent parts. In addition to a continued focus on the independent effects of its components, researchers are encouraged to embrace the causal flow hypothesized in the model and to examine more complex relationships among variables associated with game location. We hope the model continues to serve as a catalyst for new and exciting avenues of future investigation of the home advantage.

## References


Agnew, G. A., & Carron, A. V. (1994). Crowd effects and the home advantage. *International Journal of Sport Psychology*, *25*, 53–62.

Balmer, N. J., Nevill, A. M., & Williams, M. (2001). Home advantage in the Winter Olympics (1908–1998). *Journal of Sports Sciences*, *19*, 129–139.

Bandura, A. (1997). *Self-efficacy: The exercise of control*. New York: W. H. Freeman.

Bar-Eli, M., Levy-Kolker, N., Pie, J. S., & Tenenbaum, G. (1995). A crisis-related analysis of perceived referees' behavior in competition. *Journal of Applied Sport Psychology*, *7*, 63–80.

Barnett, V., & Hilditch, S. (1993). The effect of an artificial pitch surface on home team performance in football (soccer). *Journal of the Royal Statistical Society*, *156*, 39–50.

Bray, S. R. (1999). The home advantage from an individual team perspective. *Journal of Applied Sport Psychology*, *11*, 116–125.

Bray, S. R., Culos, S. N., Gyurcsik, N. C., Widmeyer, W. N., & Brawley, L. R. (1998). Athletes' causal perspectives on game location and performance: The home advantage? *Journal of Sport and Exercise Psychology*, *20*, S100.

Bray, S. R., Jones, M. V., & Owen, S. (2002). The influence of competition location on athletes' psychological states. *Journal of Sport Behavior*, *25*, 231–242.

Bray, S. R., & Martin, K. A. (2003). The influence of competition location on individual sport athletes' performance and psychological states. *Psychology of Sport and Exercise*, *4*, 117–123.

Bray, S. R., & Widmeyer, W. N. (1995). *Athletes' perceptions of a home advantage in women's basketball*. Paper presented at the meeting of the Association for the Advancement of Applied Sport Psychology, New Orleans, LA, September

Bray, S. R., & Widmeyer, W. N. (2000). Athletes' perceptions of the home advantage: An investigation of perceived causal factors. *Journal of Sport Behavior*, *23*, 1–10.

Brown, T. D., Jr., Van Raalte, J. L., Brewer, B. W., Winter, C. R., & Cornelius, A. E. (2002). World Cup soccer home advantage. *Journal of Sport Behavior*, *25*, 134–144.

Carron, A V., & Hausenblas, H. A. (1998). *Group dynamics in sport* (2nd edn.). Morgantown, WV: Fitness Information Technology.

Clarke, S. R., & Norman, J. M. (1995). Home advantage of individual clubs in English soccer. *The Statistician*, *44*, 509–521.

Courneya, K. S., & Carron, A. V. (1990). Batting first versus last: Implications for the home advantage. *Journal of Sport and Exercise Psychology*, *12*, 312–316.

Courneya, K. S., & Carron, A. V. (1991). Effects of travel and length of home stand/road trip on the home advantage. *Journal of Sport and Exercise Psychology*, *13*, 42–49.

Courneya, K. S., & Carron, A.V. (1992). The home advantage in sport competitions: A literature review. *Journal of Sport and Exercise Psychology*, *14*, 28–39.

Dennis, P. W., & Carron, A. V. (1999). Strategic decisions of ice hockey coaches as a function of game location. *Journal of Sports Sciences*, *17*, 263–268.

Dennis, P. W., Carron, A. V., & Loughead, T. M. (2002). The relationship between game location and decisions by National Hockey League officials. *Avante*, *8*(2), 67–73.

Dowie, J. (1982). Why Spain should win the World Cup. *New Scientist*, *94*, 693–695.

Duffy, L. J., & Hinwood, D. P. (1997). Home field advantage: Does anxiety contribute? *Perceptual and Motor Skills*, *84*, 283–286.

Gayton, W. F., Brioda, J., & Elgee, L. (2001). An investigation of coaches' perceptions of the cause of home advantage. *Perceptual and Motor Skills*, *92*, 933–936.

Gayton, W. F., & Coombs, R. (1995). The home advantage in high school basketball. *Perceptual and Motor Skills*, *81*, 1344–1346.

Greer, D. L. (1983). Spectator booing and the home advantage: A study of social influence in the basketball arena. *Social Psychology Quarterly*, *46*, 252–261.

Jehue, R., Street, D., & Huizenga, R. (1993). Effect of time zone and game time changes on team performance: National Football League. *Medicine and Science in Sports and Exercise*, *25*, 127–131.

Jones, M. V., Bray, S. R., & Bolton, L. (2001). Do cricket umpires favour the home team? Officiating bias in English club cricket. *Perceptual and Motor Skills*, *93*, 359–362.

Jurkovac, T. (1985). *Collegiate basketball players' perceptions of the home advantage*. Unpublished master's thesis, Bowling Green State University, Bowling Green, OH.

Kerr, J. H., & Vanschaik, P. (1995). Effects of game venue and outcome on psychological mood states in rugby. *Personality and Individual Differences*, *19*, 407–410.

Loughead, T. M., Carron, A. V., Bray, S. R., & Kim, A. (2003). Facility familiarity and the home advantage in professional sports. *International Journal of Sport Psychology and Exercise Psychology*, *1*, 264–274.

Martens, R. (1977). *Competitive State Anxiety Test*. Champaign, IL: Human Kinetics.

Martens, R., Burton, D., Vealey, R. S., Bump, L. A., & Smith, D. E. (1990). Development and validation of the Competitive State Anxiety Inventory-2 (CSAI-2). In R. Martens, R. S. Vealey, & D. Burton (Eds.), *Competitive anxiety in sport* (pp. 117–190). Champaign, IL: Human Kinetics.

McGuire, E. J., Courneya, K. S., Widmeyer, W. N., & Carron, A. V. (1992). Relationship between game location and aggression in professional hockey. *Journal of Sport and Exercise Psychology*, *14*, 148–158.

McNair, D. M., Lorr, M., & Droppelman, L. (1971). *Manual for the Profile of Mood States*. San Diego, CA: Educational and Industrial Testing Service.

Mohr, P. B., & Larsen, K. (1998). Ingroup favoritism in umpiring decisions in Australian football. *Journal of Social Psychology*, *138*, 495–504.

Moore, J. C., & Brylinsky, J. A. (1993). Spectator effect on team performance in college basketball. *Journal of Sport Behavior*, *16*, 77–84.

Moore, J. C., & Brylinsky, J. A. (1995). Facility familiarity and the home advantage. *Journal of Sport Behavior*, *18*, 302–311.

Neave, N., & Wolfson, S. (2003). Testosterone, territoriality, and the "home Advantage". *Physiology and Behavior*, *78*, 269–275.

Nevill, A. M., Balmer, N. J., & Williams, A. M. (2002). The influence of crowd noise and experience upon refereeing decisions in football. *Psychology of Sport and Exercise*, *3*, 261–272.

Nevill, A. M., Newell, S. M., & Gale, S. (1996). Factors associated with home advantage in English and Scottish soccer matches. *Journal of Sports Sciences*, *14*, 181–186.

Pace, A., & Carron, A. V. (1992). Travel and the National Hockey League. *Canadian Journal of Sport Sciences*, *17*, 60–64.

Pollard, R. (1986). Home advantage in soccer: A retrospective analysis. *Journal of Sports Sciences*, *4*, 237–248.

Pollard, R. (2002). Evidence of a reduced home advantage when a team moves to a new stadium. *Journal of Sports Sciences*, *20*, 969–973.

Recht, L. D., Lew, R. A., & Schwartz, W. J. (1995). Baseball teams beaten by jet lag. *Nature*, *377*, 583.

Salminen, S. (1993). The effect of the audience on the home advantage. *Perceptual and Motor Skills*, *76*, 1123–1128.

Schwartz, B., & Barsky, S. F. (1977). The home advantage. *Social Forces*, *55*, 641–661.

Smith, D. R., Ciacciarelli, A., Serzan, J., & Lambert, D. (2000). Travel and the home advantage in professional sports. *Sociology of Sport Journal*, *17*, 364–385.

Snyder, E. E., & Purdy, D. A. (1985). The home advantage in collegiate basketball. *Sociology of Sport Journal*, *2*, 352–356.

Strauss, B. (2002). The impact of supportive spectator behavior on performance in team sports. *International Journal of Sport Psychology*, *33*, 372–390.

Sumner, J., & Mobley, M. (1981). Are cricket umpires biased? *New Scientist*, *91*, 29–31.

Terry, P. C., Walrond, N., & Carron, A. V. (1998). The influence of game location on athletes' psychological states. *Journal of Science and Medicine in Sport*, *1*, 29–37.

Thirer, J., & Rampey, M. (1979). Effects of abusive spectator behavior on the performance of home and visiting intercollegiate basketball teams. *Perceptual and Motor Skills*, *48*, 1047–1053.

Thuot, S. M., Kavouras, S. A., & Kenefick, R. W. (1998). Effect of perceived ability, game location, and state anxiety on basketball performance. *Journal of Sport Behavior*, *21*, 311–321.

Ward, R. E., Jr. (1998). Rituals, first impressions, and the opening day home advantage. *Sociology of Sport Journal*, *15*, 279–293.