Home advantage in soccer – A matter of expectations, goal setting and tactical decisions of coaches?

Article *in* Journal of Sports Sciences · March 2015

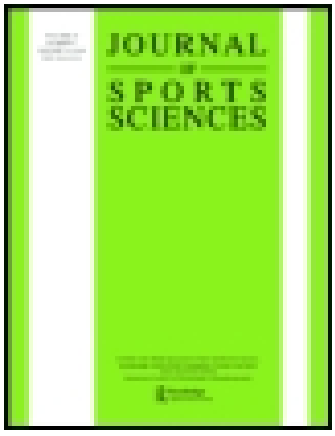
DOI: 10.1080/02640414.2015.1018929 · Source: PubMed

3 authors:

Kathrin Staufenbiel
University of Münster
14 PUBLICATIONS **44** CITATIONS
SEE PROFILE

Babett Lobinger
Deutsche Sporthochschule Köln
39 PUBLICATIONS **98** CITATIONS
SEE PROFILE

Bernd Strauss
University of Münster
150 PUBLICATIONS **933** CITATIONS
SEE PROFILE



Journal of Sports Sciences
Publication details, including instructions for authors and subscription information:
http://www.tandfonline.com/loi/rjsp20

Home advantage in soccer - A matter of expectations, goal setting and tactical decisions of coaches?

Kathrin Staufenbiel[a], Babett Lobinger[b] & Bernd Strauss[a]
[a] University of Muenster, Germany
[b] German Sport University Cologne, Germany

Published online: 06 Mar 2015.

To cite this article: Kathrin Staufenbiel, Babett Lobinger & Bernd Strauss (2015): Home advantage in soccer - A matter of expectations, goal setting and tactical decisions of coaches?, Journal of Sports Sciences, DOI: 10.1080/02640414.2015.1018929

To link to this article: http://dx.doi.org/10.1080/02640414.2015.1018929

Journal of Sports Sciences, 2015
http://dx.doi.org/10.1080/02640414.2015.1018929

Routledge
Taylor & Francis Group

Home advantage in soccer – A matter of expectations, goal setting and tactical decisions of coaches?

KATHRIN STAUFENBIEL[1], BABETT LOBINGER[2] & BERND STRAUSS[1]

[1]*University of Muenster, Germany and* [2]*German Sport University Cologne, Germany*

(*Accepted 10 February 2015*)

Abstract
In soccer, home teams win about 67% of decided games. The causes for this home advantage are still unresolved. There is a shortage of research on the psychological states of actors involved. In this study, we examined soccer coaches' expectations, goal setting and tactical decisions in relation to game location. Soccer coaches (N = 297) with different expertise levels participated in an experimental, online management game and were randomly assigned to one of two groups, "home game (HG)" or "away game." Participants received information on the game for which they were asked to make decisions in multiple points. The only differing information between groups was game location. Regardless of expertise, HG coaches had higher expectations to win, set more challenging goals and decided for more offensive and courageous playing tactics. Possible consequences of these findings concerning home advantage in soccer are discussed.

Keywords: *home advantage, coaches, expectations, goal setting, tactical decisions*

Games played at home (e.g. home stadium) are won more often than games away (e.g. opponent's stadium). This so-called home advantage exists in all team sports, countries and time eras, although with variations in the extent (Jamieson, 2010; Pollard, 2006b; Pollard & Gómez, 2014; Pollard & Pollard, 2005). In a meta-analysis, not only an overall relative home advantage (winning percentage in decided competitions) of 60.4% was found, but also a large variance between sports in terms of relative home advantage from 55.6% in baseball to 67.4% in soccer (Jamieson, 2010). Recently, Pollard and Gómez (2014) found similar results in their worldwide analysis of premier soccer leagues. Soccer is therefore not only the world's most prominent sport but also leading in terms of home advantage. Home advantage is a famous topic discussed among fans and media (Smith, 2005) and extensively researched by the sport sciences community (Carron, Loughhead, & Bray, 2005). In order to organise research regarding the causes of home advantage, Courneya and Carron (1992) proposed a conceptual framework that highlights different factors associated with home games (HGs) and away games (AGs). The framework was updated a decade later to acknowledge research findings (Carron et al., 2005). There are five components in the framework (see Figure 1). The first component is game location, which is either home or away. The second component holds game location factors, which are different for HGs and AGs. The four game location factors (crowd, learning, travel and rules) are supposed to influence the third component of the framework, critical psychological and physiological states of home and away competitors, of athletes and coaches. The physiological states of competitors were included in the revised version of the model because of findings suggesting a higher testosterone level in soccer players before HGs than AGs (Neave & Wolfson, 2003). Eventually, psychological and physiological states influence the behaviour of athletes and coaches, the fourth component, which again leads to performance outcomes, to home advantage. For performance outcomes, the model differentiates between primary outcomes (skill execution), secondary outcomes (e.g. goals or runs) and tertiary outcomes (final outcome of contest). Officials are seen as potential moderators in the revised framework as their decisions might influence the outcome of games.

So far, most research analysed archival data to find correlations between the proposed game location factors of the described framework (e.g. crowd size, distance travelled by away team) and home

Correspondence: Kathrin Staufenbiel, Department of Sport Psychology, Institute of Sport and Exercise Sciences, University of Muenster, Horstmarer Landweg 62b, 48149, Muenster, Germany. E-mail: kstaufenbiel@uni-muenster.de

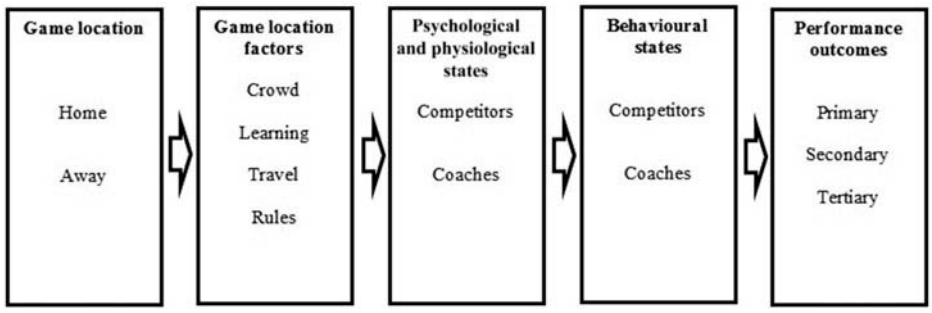


Figure 1. Framework for home advantage research (Carron et al., 2005).

advantage magnitude or to investigate variations in home advantage in different sports, time eras or countries (Allen & Jones, 2014; Aupetit, 2008; Carron et al., 2005; Pollard, 2006a). This approach led to viable insights but could not resolve the underlying causes of home advantage. Factors under investigation explained – if any – only minimal variance in home advantage (Bray, Obara, & Kwan, 2005; Loughead, Carron, Bray, & Kim, 2003; Strauss & Bierschwale, 2008; Van de Ven, 2011; Winter, Hammond, Green, Zhang, & Bliwise, 2009). In recent years, the decisions of referees were examined and a bias in favour of home teams was noticed (Balmer, Nevill, & Williams, 2003; Sutter & Kocher, 2004; Unkelbach & Memmert, 2010). For example, Sutter and Kocher (2004) found soccer referees to give more extra time in cases where the home team is one goal behind at the end of the game. This so-called *injury bias* was confirmed by other studies (e.g. Riedl, Strauss, Heuer, & Rubner, 2015). However, Riedl et al. (2015) show that this bias does not have any effect on the size of home advantage. A causal effect of referees' decisions and home advantage seems at least arguable. Up to now, there are only a few experimental studies in the field of home advantage (Unkelbach & Memmert, 2010). Pollard (2006a) comes to the conclusion: "It is now probably time to focus more on the use of such controlled experiments to eliminate confounding variables with the goal of producing a better understanding of the effects on home advantage of specific factors and their interactions" (p. 187). Also, in a recent review, Allen and Jones (2014) call for experimental research with a more targeted focus on athletes and coaches. There is a shortage of research on the psychological states of the actors of home advantage (Allen & Jones, 2014; Carron et al., 2005), especially of coaches.

Coaches and home advantage

Although coaches have an influence on their athletes, for example, on motivation and expectations (Feltz, Short, & Sullivan, 2008; Lafrenière, Jowett, Vallerand, & Carbonneau, 2011; Mageau & Vallerand, 2003), very little is known of their approach to HGs and AGs. Courneya and Carron (1992) acknowledge the importance of coaches by including coaches in their conceptual framework. Amongst others, the expectations of coaches (confidence and outcome expectations) are listed as critical psychological states (Courneya & Carron, 1992). One rationale behind the inclusion of coaches in the framework is that coaches influence the expectations of their athletes (Vargas-Tonsing, Myers, & Feltz, 2004), for example, through pregame speeches (Vargas-Tonsing & Bartholomew, 2006). Gayton, Broida, and Elgee (2001) asked 144 high school coaches to assess the importance of the possible causes of home advantage and to assign a percentage value between 0 and 100% to five given options and one open option (other reasons). The coaches assigned the highest percentages to site familiarity (29.4%) and to social support (22.9%). However, the explanation of a self-fulfilling prophecy (17.8%), meaning that home teams win more often because they believe to have an advantage, was also considered important (Gayton et al., 2001). It is plausible that coaches pass on their expectations and emphasise having an advantage before HGs to induce confidence. In the field of home advantage, multiple studies suggest home players to have higher confidence and self-efficacy expectations than away players prior to the game (Bray, Jones, & Owen, 2002; Carre, Muir, Belanger, & Putnam, 2006). Self-efficacy is an individual's belief to have the required abilities and talent to accomplish a task successfully and has an internal focus (Bandura, 1997). Research findings suggest that athletes with high self-efficacy expectations achieve better performance than athletes with low self-efficacy expectations (Feltz et al., 2008; Moritz, Feltz, Fahrbach, & Mack, 2000). Stirin, Ganzach, Pazy, and Eden (2012) refer to self-efficacy as internal efficacy to distinguish it from external efficacy, the efficacy expectations deriving from external sources. External efficacy refers to an individual's belief concerning available outside resources (e.g. conditions of a competition) that are perceived as important to be

successful in a given task (Eden, 2001; Stirin et al., 2012). Solely, the expectation to have an advantage – for objectively equal conditions – leads to performance increments (Stirin et al., 2012). Home and away coaches might differ in both types of efficacy beliefs (internal and external efficacy) and pass their beliefs on to their athletes. Differing expectations could also lead coaches to set and communicate different goals for HGs and AGs. In line, home advantage can be seen as a socially accepted phenomenon (Smith, 2005), which could urge home coaches to set higher goals. The importance of goals is widely acknowledged in sport sciences (Latham & Locke, 1985), yet, with regard to HGs and AGs very little is known (Staufenbiel & Strauss, 2013).

Besides influencing their athletes, the expectations and goals of coaches also influence their own decisions before and during competitions. In terms of behavioural states of coaches, Courneya and Carron (1992) name "strategical and tactical decisions (e.g. type of defence, substitutions)" (p. 15). The tactical decisions of coaches have an impact on the success of their teams (Tenga, Holme, Ronglan, & Bahr, 2010). Pollard (2008) proposes that home and away teams approach games with a different tactic. Indeed, some studies highlight differences in the behaviour of home and away competitors that could be based on a different tactical approach to games. Home teams in soccer have more possession of the ball (Lago & Martín, 2007), spend more time in the attacking third (Lago, 2009), cover a greater distance (Lago, Casais, Dominguez, & Sampaio, 2010) and play in a more offensive way (Carmichael & Thomas, 2005). No study was found suggesting different playing systems (starting formations) at home and away. Therefore, it is plausible that not the playing system but the way it is played differs between home and away teams. However, from these archival results, no direct conclusion regarding the causes of a differing playing style at home and away is possible. For example, it could result from the motivation of home players, from tactical decisions of coaches, from both or a totally different explanation. A study by Dennis and Carron (1999) gave a first hint of the importance of coaches in this regard. The authors investigated the strategic decisions of elite ice hockey coaches (n = 40). The coaches filled in a questionnaire and were asked to indicate the degree to which they would implement an active forechecking strategy as a function of game location (home or away), perceived ability of the opponent and game-specific context (either start of the first period or third period defending a lead). Results revealed that coaches play a more active forechecking against teams with lower ability and when playing at home regardless of the period. Therefore, in ice hockey, coaches seem to alter their strategy depending on the game location. The authors point at multiple alternatives as to how the tactical decisions of coaches might affect home advantage and endorse the possibility that "the coaching decision to forecheck less assertively during away games is disadvantegous and, consequently, is one reason why home teams enjoy a better winning percentage" (p. 268). However, it remains unclear whether the findings by Dennis and Carron (1999) can be generalised across sports (e.g. soccer) and across expertise levels. Also, the reasons for the tactical decisions of coaches remain unresolved, for example, do they expect their team to be better in HGs and therefore decide for a more active forechecking?

Aims of the study

One aim of the study was to investigate the tactical decisions of soccer coaches related to game location. Another aim was to investigate expectations and goal setting of soccer coaches to achieve a more complete picture of their approach to HGs and AGs. Further, it was tested whether the degree of coaching expertise had an influence on expectations, goals and tactics home and away. It was hypothesised that coaches had higher internal efficacy expectations, had higher external efficacy expectations and set higher goals in HGs. Further, it was hypothesised that coaches decide different playing tactics at home compared to away (e.g. more offensive playing tactics at home). Also, the playing system used was included as a variable for analysis; however, on the basis of the literature to date, no hypothesis was formulated.

Method

The method of asking coaches to generally report their strategies at HGs and AGs bears some limitations (e.g. social desirability effects or false memories). When coaches are asked about their approach to HGs and AGs prior to a specific game, their answers are influenced not only by game location but also by further factors (e.g. opponent of that specific game). Therefore, in order to investigate coaches' expectations, goal setting and tactical decisions as a function of game location, we used an online, experimental management game (fictive soccer game) to control for other influencing variables. In our study, coaches were randomly assigned to one of two groups – HG or AG – and received information about a game, for which they were asked to make decisions in multiple points. The only differing information between the groups was game location (HG or AG). Coaches filled in information for either a HG or an AG (between-participant design).

Ethical approval for the study protocol was obtained by the ethics committee of the faculty. The online management game was conducted

Table I. Characteristics of the sample.

	High expertise $n = 104$	Low expertise $n = 193$
Age *M* (*s*)	43.27 years (10.45)	32.45 years (10.40)
Gender	100.00% male	94.30% male
Coaching licence	9.62% No licence 75.00% A, B or C-Licence 15.38% UEFA Pro Licence	38.86% No licence 61.14% C-Licence
Experience as coach *M* (*s*)	14.94 years (7.47)	5.75 years (3.46)
Highest league as coach*	40.38% Bundesliga or upper regional leagues (youth) 3.85% Bundesliga or upper regional leagues (women) 25.40% Bundesliga or upper regional leagues (men)	82.38% lower regional or minor leagues (youth) 7.25% lower regional or minor leagues (women) 82.38% lower regional or minor leagues (men)

Note: *The leagues *third league* and *Regionalliga* were defined as upper regional leagues of the German soccer system. The leagues *Oberliga, Verbandsliga* and *Landesliga* are defined as lower regional leagues. The system is not uniform for all of Germany. However, in most regions, there are at least two minor leagues below these lower regional leagues. Coaches answered the question concerning their highest league as coach separately for youth soccer, women soccer and men soccer.

using the online platform Unipark. For all statistical analyses, IBM SPSS 22 was used and for confirmatory factor analyses AMOS 22.

Participants

Participants were asked to take part in an investigation of tactical decisions of soccer coaches. They were unaware of the aim of the study to detect differences between HGs and AGs but were informed at the end of the management game. Soccer coaches were contacted via email (most email addresses from homepages of their soccer clubs) during winter break of the season 2013/2014. All coaches were asked to forward the information on the management game to colleagues.

Altogether, 340 participants completed the online management game. However, $N = 30$ were excluded from analysis because they indicated that they had never been working as coaches. Another $n = 13$ participants were excluded due to multiple other reasons, for example, some participants did not want to be included in the analysis. The remaining $N = 297$ participants represent the sample of this study, although, as some participants did not fill in all the questions, the degrees of freedom varied across analyses. Most of the participants were male (96.29%), average age was 36.24 years ($s = 11.61$) and they had worked as soccer coaches for 8.97 years ($s = 6.82$). The majority of the sample (82.82%) was currently working as soccer coaches, of which $n = 26$ with a (youth) team of a soccer club represented in one of the professional soccer leagues in Germany for men (first, second Bundesliga or third league). Most of the participants (71.39%) held a soccer coaching licence. Moreover, 19.19% ($n = 57$) of the study's sample held one of the top three coaching licences of the German Soccer Association (UEFA Pro Licence, A-Licence or B-Licence). Coaches with a high qualification (UEFA Pro Licence, A-Licence or B-Licence), coaches with at least 15 years of experience and coaches that worked with a soccer team in one of the top leagues in Germany (Bundesliga or upper regional leagues of men, women or youth soccer) are referred to as "coaches with high expertise" in the analyses ($n = 104$). Coaches with less than 15 years of experience only in lower regional and minor leagues and only with a low qualification are considered as "coaches with low expertise" ($n = 193$). Characteristics of the sample subdivided into coaches with high and coaches with low expertise are displayed in Table I.

Measures

Coaches answered questions concerning their internal and external expectations and their goal setting and made tactical decisions in multiple points of the management game.

Expectations. Internal and external efficacy expectations were measured prior to the game. The internal efficacy measure was introduced with the following statement: "As coach you have expectations prior to a game, also regarding the abilities of your team. From everything you know of your team, how certain are you about the abilities of your team in the upcoming (home/away) game?" Following the guidelines by Feltz et al. (2008), two items were constructed to assess internal efficacy, "I am confident my team will have the ability to win the game" and "I am confident my team will have the ability to shoot at the goal more frequently than the opponent" as archival data suggest that the frequency of shots on goal is highly correlated with winning the game (Papahristodoulou, 2008). The 11-point Likert scale anchored from 0% (very unconfident) to 100% (very confident). For external efficacy expectations, the five items used by Stirin et al. (2012) were translated and adapted to sport

competitions. An introduction stated "As coach you have expectations prior to a game, also regarding the conditions of a game. Please rate your agreement regarding the following statements concerning the upcoming (home/away) game". Examples of items are "The venue provides my team with a real advantage in the game" and "The venue of the game gives my team an advantage the opponent cannot catch up." The 11-point Likert scale anchored from 0% (strong disagreement) to 100% (strong agreement).

For efficacy expectations, a theoretical model with two correlating factors, internal efficacy (two items) and external efficacy (five items), was expected. A confirmatory factor analyses with Amos 22 using maximum likelihood as estimation method was performed, and fit indices suggested a satisfactory fit of the model (SRMR = .05, NFI = .94, CFI = .95, RMSEA = .09). There was a substantial correlation among factors, r = 0.36. Cronbach's α for internal efficacy was .72 and for external efficacy .84.

Goal setting. Goal setting was measured retrospectively at half-time and at the end of the game. In both situations, coaches were introduced to the current score of the game and then asked to rate their satisfaction: "How satisfied are you with the score (0:0) in the home/away game?" The response scale was 1 = very unsatisfied to 6 = very satisfied. According to Heath, Larrick, and Wu (1999), the value of an outcome is altered by goals that serve as reference points. Therefore, coaches that were not satisfied with the score set higher goals. As we see goals as reference points, no neutral response option was given.

Tactical decisions. The tactical approach by the soccer coaches was tested in multiple ways. Coaches decided for a playing system, made further tactical decisions and substituted one of the players in the 70th min.

A pre-study was conducted to define items for tactical decisions on how the team should play. Four professional soccer coaches (100% male, M_{AGE} = 53.74 years, s = 16.03) all with coaching experience in professional soccer and with the highest coaching licence of the German Football Association (UEFA Pro Licence) were asked for tactical differences between home and away teams in semi-structured interviews. The coaches were asked to give specific examples for tactical instructions. The interviews were analysed by three independent raters with experience in soccer. All of the coaches stated that if tactical differences were made, likely differences were a more offensive and courageous playing style by the home team.

From these interviews, one item regarding the full-backs was developed: Participants had to decide how offensive or defensive their full-backs should act (four ascending options displayed as pictures, example in Figure 2) prior to the game.

Further, 11 items for tactical instruction on how the entire team should play were developed. In the online management game, these tactical decisions were asked prior to the game and in half-time. The items were introduced by "Please specify tactical instructions for the upcoming (home/away) game". Examples of items are "You can decide how offensive or defensive your team shall play," scale from 0% (very defensive) to 100% (very offensive), and "You can decide how daring or simple the passing of your team shall be," scale from 0% (very simple) to 100% (very daring). To reduce the number of observed variables to a smaller subset of factors, two separate EFAs (for game start and for half-time) using maximum likelihood extraction with oblique rotation (Promax) were used. For items at game start, the Kaiser–Meyer–Olkin (KMO) measure was good, KMO = .89, and for individual items KMO > .85. The correlation among items was sufficiently large for EFA as Bartlett's test

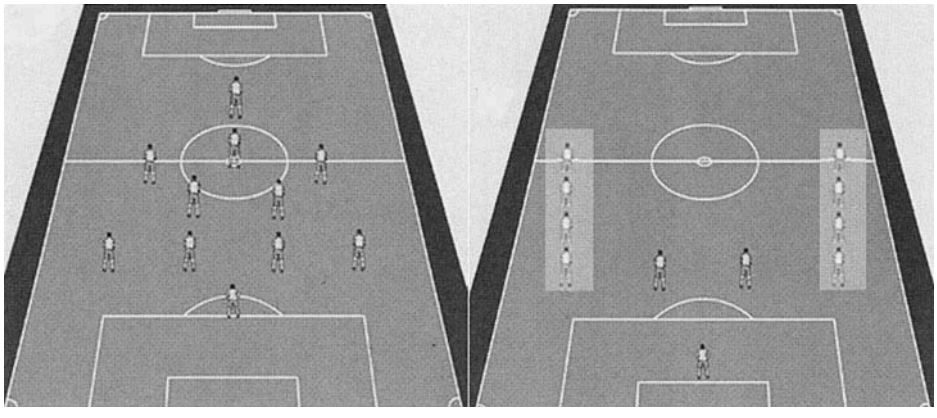


Figure 2. Examples for items of playing system and outside defenders. On the left side, an example of playing system, here 4-2-3-1. On the right, the four options for how outside defenders should play within one picture.

Table II. Factor loadings for EFA with Promax rotation of tactical items.

	Start		Halt-time	
You can decide…	Dominant-offensive	Courageous	Dominant-offensive	Courageous
…how offensive or defensive your team shall play*	**.49**	.32	**.59**	.29
…how aggressive or restrained your team shall play	−.15	**.60**	−.15	**.72**
…how daring or simple the passing of your team shall be	−.17	**.62**	−.09	**.78**
…whether your team shall try to make the game or let the opponent play	**.91**	−.03	**.99**	−.10
…whether your team shall play deep or high pressing	**.58**	.31	**.60**	.32
…how deep or high your defensive line shall be positioned	.17	**.66**	.23	**.54**
…whether your team shall take the risk or play safely	.23	**.54**	.07	**.68**
…in how far your team's tactic is aligned to counter-attacks, or not	**.82**	−.20	**.60**	−.05
…in how far your team's playing style is aligned to ball possession, or not	**.86**	−.21	**.82**	−.19
… in how far your team's playing style has a vast willingness to run or to safe energy	−.11	**.53**	−.06	**.49**

Notes: Factor loadings >.40 are in boldface. *All items ended with "… in the home/away game against club G." The response scale was a 11-point Likert scale, for example scale from 0% (very defensive) to 100% (very offensive).

of sphericity suggested, $\chi^2(45, n = 297) = 1245.97$, $P < .001$. However, one item was excluded from further analyses because of singularity (no substantial correlation with any other variable, $r < 0.30$). Two factors had eigenvalues over Kaiser's criterion of 1 and explained 49.49% of variance. The two factors highly correlate, $r = 0.68$. Items that cluster on the same factor suggest the first factor to represent a dominant and offensive playing style while the second factor represents a courageous playing style. For items measuring tactical decisions at half-time, the KMO measure was again good, KMO = .87, and for individual items KMO > .76. The correlation among items was sufficiently large for EFA indicated by Bartlett's test of sphericity, $\chi^2(45, n = 297) = 1420.53$, $P < .001$. The same factor structure appeared for tactical items at half-time with two factors, dominant-offensive and courageous, explaining 52.21% of variance. Again, there was a high correlation among factors, $r = 0.68$. Crombach's α for dominant-offensive was .86 and .85, for game start and half-time, respectively. Crombach's α for courageous was .72 for game start and .78 for half-time. In Table II, the factor structure is displayed for game start and half-time.

Prior to the game, coaches also decided for a playing system (4-2-3-1, 4-3-3, 4-4-2 flat four and 4-4-2 with diamond midfield displayed as pictures, e.g. in Figure 2).

In the 70th min, coaches had to substitute a player. They were asked how offensive or defensive the substituted player was playing and how the new player should act. The 11-point Likert scale for both items was from 0% (very defensive) to 100% (very offensive).

Procedure

The management game was built up like a questionnaire with some items presented as pictures (e.g. full-backs). It consisted of three main parts. First, there were demographic questions, mainly on the experience as soccer coach. Then, the actual management game was conducted. Finally, the last part asked coaches about their understanding and approach to HGs and AGs. On average, participants needed 20.03 min ($s = 9.59$) to complete the online tool.

For the management game, participants were randomly assigned to one of two groups, HG or AG, and received information about their own team, the opponent and the next game. The information of their own team and the opponent included current ranking, results of the last three games, the result of the last game against each other, goal of the season and the information that both teams do not have to compensate any injured players. The given information was very similar for both teams in order to picture two equally strong teams in the middle realm of the table (e.g. same number of points in current ranking, last game against each other ended 1:1). The teams had only letters as names to avoid any sympathy or association with existing teams. The game was the 15th game of the season as it was also around the 15th game of the German Bundesliga by the time of data acquisition. Coaches were asked to make decisions in four points in the game – prior to the game, at half-time, in the 70th min of the game and at the end of the game. Some pages of the questionnaire were included to describe the progress of the game (e.g. "The game started."). Prior to the game, coaches answered questions regarding their internal and external efficacy expectations and made tactical decisions on the playing system and on how the team should play. The order of blocks varied across participants (random rotation). At half-time, coaches were informed that the game was still a 0:0 tie, coaches' goal setting was assessed and again coaches made tactical decisions on how the team

Table III. Descriptive statistics for main dependent variables.

	Home game		Away game	
	High expertise *M* (*s*)	Low expertise *M* (*s*)	High expertise *M* (*s*)	Low expertise *M* (*s*)
Internal efficacy	8.88 (1.45)	8.64 (1.30)	7.92 (1.80)	8.12 (1.67)
External efficacy	7.09 (1.70)	6.68 (1.61)	5.38 (1.76)	5.26 (1.52)
Dominant-offensive start	8.00 (1.47)	7.66 (1.18)	6.86 (1.76)	6.63 (1.62)
Dominant-offensive half-time	8.23 (1.30)	7.73 (1.27)	6.99 (1.79)	6.97 (1.62)
Courageous start	8.07 (1.22)	7.65 (0.95)	7.39 (1.17)	7.13 (1.21)
Courageous half-time	8.39 (1.23)	7.88 (1.07)	7.61 (1.24)	7.55 (1.24)
Goal half-time	3.56 (0.95)	3.47 (0.97)	4.12 (0.94)	4.09 (1.04)
Goal end of game	2.89 (0.92)	2.98 (1.04)	3.76 (1.06)	3.65 (1.19)

Note: The response scale for goal achievement asked for satisfaction with the current score (1 = very unsatisfied to 6 = very satisfied). For all other measures, responses were obtained on an 11-point Likert scale, for example scale from 0% (very defensive) to 100% (very offensive).

should play (random rotation). In the 70th min, the game was still 0:0, and coaches had to substitute one of the players. The game also ended 0:0 and again the goal setting of coaches was assessed.

To gain further information for future research, coaches were asked multiple questions regarding their approach to HGs and AGs (e.g. coaches were asked what kind of differences they make between HGs and AGs) after the management game. Further, they were asked to estimate the home winning percentage (in decided games) in professional soccer leagues in Germany for men and name the possible causes of home advantage. Also, there were two control questions regarding their satisfaction with the current ranking of their team (or their last if not currently working as coaches) and with their current (or last) home winning percentage as it was assumed of importance that groups of participants were not different in this regard. Finally, the participants were asked to confirm the declaration of agreement to be included in the analyses.

Results

The control items yielded no difference between the groups of the main independent variables (game location and coaching expertise). Coaches with low and high expertise were similar in terms of their own current (or last) ranking, $F(1,282) = 1.45$, $P = .23$, and in terms of satisfaction with their current (or last) home winning percentage, $F(1,291) = 0.42$, $P = .52$. Also, HG and AG coaches did not differ regarding ranking, $F(1,282) = 1.24$, $P = .27$, or satisfaction with home winning percentage, $F(1,291) = 1.75$, $P = .19$. The two control items were not included as covariates in further analyses as they were not considered as confounders.

In the following significant effects at $P < .05$ of the dependent variables expectations, goals and tactical decisions are reported. The dependent variables were analysed separately. In Table III, descriptive statistics for main dependent variables are displayed.

Expectations

Using Pillai's trace, there was a significant effect of the venue on internal efficacy and on external efficacy, $V = .19$, $F(2,291) = 34.63$, $P < .001$. Separate univariate ANOVAs on the outcome variables revealed significant effects on internal efficacy, $F(1,292) = 15.54$, $P < .001$, $\eta_p^2 = .05$, with HG coaches having higher expectations to succeed. HG coaches had also higher external efficacy expectations, $F(1,292) = 64.27$, $P < .001$, $\eta_p^2 = .18$. Regarding the level of expertise, Pillai's trace revealed a non-significant effect on internal and external efficacy, and no interaction was found.

Goal setting

For goal setting, a significant main effect for the game's venue appeared, with HG coaches being less satisfied with the score (0:0) than AG coaches, $F(1,292) = 37.66$, $P < .001$, $\eta_p^2 = .11$. Further, there was a significant main effect of point in game (repeated measure) – at the end of the game coaches were less satisfied with the score than at half-time, $F(1,292) = 66.38$, $P < .001$, $\eta_p^2 = .19$. No main effect for expertise was found and also no interaction.

Tactical decisions

Using Pillai's trace, there was a significant main effect of point in game for courageous (repeated measure) – at half-time coaches decided the playing tactics to be more courageous than in the beginning of the game, $V = .06$, $F(1,291) = 18.43$, $P < .001$. Also, an interaction appeared for point in game and venue – AG coaches' tactics in half-time were more courageous than at the beginning of the game,

V = .03, $F(1,291)$ = 9.40, P < .01. For dominant-offensive, there was also a significant main effect of point in game (repeated measure) – at half-time coaches decided the playing tactics to be dominant and offensive than at the beginning of the game, V = .11, $F(1,291)$ = 35.67, P < .001. Also, there was a main effect of venue, $F(1,291)$ = 35.42, P < .001, η_p^2 = .11 and a main effect of expertise on dominant-offensive and courageous, $F(1,291)$ = 4.58, P < .05, η_p^2 = .02. Separate univariate ANOVAs revealed coaches' playing tactics to be more dominant and offensive, $F(1,293)$ = 35.46, P < .001, η_p^2 = .11 and more courageous, F (1,291) = 18.52, P < .001, η_p^2 = .06 in the HG condition. Further, coaches with high expertise wanted to play more courageously than coaches with low expertise, $F(1,291)$ = 5.46, P < .05, η_p^2 = .02. No significant effect of expertise was found for dominant-offensive and no interaction was found.

The offensive playing of full-backs was significantly affected by venue and expertise of coaches, $H(3)$ = 36.40, P < .001. Separate Mann–Whitney tests were used to follow up this result. It appeared that the way full-backs should play was significantly affected by venues (U = 7568.00, r = 0.29) – full-backs were playing more offensive in HGs. Also, significant differences appeared for expertise as coaches with high expertise indicated a more offensive playing style by full-backs, (U = 7873.00, r = 0.19). No interaction was found.

Also, the substitution of a player is more offensive at home, $F(1,297)$ = 7.35, P < .01, η_p^2 = .02. No significant main effect for expertise and no interaction.

For playing system, no difference between groups was found, $\chi^2(3, n = 297)$ = 0.91, P = .82. The playing system chosen by most of the participants regardless of game location or expertise was 4–2–3–1.

Closing questions

Coaches indicated to approach HGs and AGs differently. Most often, differences are made for pre-game speech (M = 3.06, s = 1.66), tactics (M = 2.96, s = 1.48) and goal setting (M = 2.72, s = 1.53) on a 6-point Likert scale anchoring from 1 (never) to 6 (always). Starting players (M = 2.32, s = 1.37) and playing system (M = 2.28, s = 1.25) are altered less often. Coaches indicated they assumed fans and soccer club to expect a different playing style at home, but not to a very high extent (M = 3.22, s = 1.47) on a 6-point Likert scale anchoring from 1 = not at all to 6 = very much. The only significant difference between coaches of low and high expertise appeared for playing system as coaches with low expertise alter their playing system less often (M = 2.16, s = 1.22) than coaches with high expertise (M = 2.48, s = 1.28), $t(290)$ = 2.05, P < .05. Regarding the extent of home advantage, coaches with low expertise assumed a similar winning percentage of home teams in decided games (M = 66.29, s = 9.95) than coaches with high expertise (M = 65.37, s = 9.03). Causes of home advantage that were named most often were fans of the home team (n = 249), familiarity with the home environment (n = 216) and psychological factors (n = 133) such as higher motivation (n = 42) or self-confidence (n = 16).

Discussion

In home advantage research, there is a shortage of studies on the psychological states of actors involved (Allen & Jones, 2014; Carron et al., 2005), especially of coaches. Above, there is a need for experimental research to disclose the causes of home advantage (Allen & Jones, 2014; Pollard, 2006a). The aims of this study were to investigate tactical decisions, expectations and goals of soccer coaches as a function of game location. Further, it was tested whether the degree of coaching expertise had an influence. To control for other possibly influencing parameters, an experimental online management game was used and coaches were randomly assigned to one of two conditions, HG or AG. Regardless of expertise, HG coaches had higher internal and external efficacy expectations prior to the game. HG coaches also decided for more dominant, offensive and courageous playing tactics at the beginning of the game and at half-time. However, it should be noted that AG coaches did not decide for, for example, defensive playing tactics but to a significantly smaller degree for dominant and offensive playing tactics. HG coaches decided for more offensive full-backs and for a more offensive substitution in the 70th min of the management game. HG coaches were less satisfied with the score (0:0) at half-time and at the end of the game and therefore pursued a more challenging goal. Regarding playing system, no difference between conditions was found. This is in line with an analysis of the first half of season 2013/2014 in the first German Bundesliga (n = 153 games, n = 9 different playing systems), suggesting no distinction between home and away team in terms of playing system, $\chi^2(8, n = 306)$ = 8.82, P = .36. There was no significant difference found for coaches of high and low expertise regarding their approach to HGs and AGs.

This study is in line with the findings of coaching strategies in ice hockey (Dennis & Carron, 1999). Also in soccer, some coaching strategies are altered by game location (e.g. full-backs). Furthermore,

soccer coaches have higher external and internal efficacy expectations and set higher goals, which could lead to different tactical decisions in HGs and AGs. Findings are also in line with archival studies suggesting a more offensive playing style (Carmichael & Thomas, 2005; Lago, 2009) and more possession of the ball of home teams (Lago & Martín, 2007). From the knowledge gained from this study, it is likely that different playing styles in HGs and AGs are a consequence of the tactical decisions of soccer coaches. However, the players might also play differently because home players are known to have higher levels of self-confidence and of testosterone before HGs (Carre et al., 2006; Neave & Wolfson, 2003). It is plausible that the combination of tactical decisions of coaches on the one hand and the psychological and physiological states of players on the other hand lead to a different behaviour. So far, it is not clear which specific aspects of the behavioural states of players lead to a more successful home winning percentage. Yet, goals are a consequence of shots on goals and shots on goals are a consequence of offensive opportunities. Official match-play statistics from the UEFA Champions League suggests that for one goal an average of four shots on the target is required (Papahristodoulou, 2008). Therefore, the more offensive playing style of the home team – and the more defensive playing of the away team – could eventually lead to home advantage. Another explanation could be that the more offensive and dominant playing style of the home team leads to further advantages (e.g. energises the home crowd, influences the referee) that support the home team to be more successful.

The present study provides some support for the validity of the conceptual framework of home advantage provided by Carron et al. (2005) and highlights the importance of coaches in this regard. In the framework, the game location factors are said to influence the psychological and behavioural states of athletes and coaches. However, even in this controlled, experimental study without influences of the game location (e.g. the home crowd) differences were found concerning coaches' approach to HGs and AGs. Therefore, the approach of coaches might be due to their expectations regarding HGs and AGs. Coaches and athletes should be the main focus of investigation in order to gain an understanding of home advantage. The evolvement of varying expectations before HGs and AGs seems to be a fruitful field of research. Even if the crowd had no direct influence on home advantage (Strauss, 2002; Strauss & Bierschwale, 2008; Van de Ven, 2011), they could still lead to the expectation of players and coaches to be advantaged (external efficacy expectations), which again leads to behavioural states (e.g. offensive playing style) that make a home victory more likely. When asked for the main causes of home advantage, coaches of this study named crowd, familiarity and psychological factors, which is in line with the causes athletes rate as important (Anderson, Wolfson, Neave, & Moss, 2012). As athletes play a large role in the ultimate outcome of sporting events, future research is clearly needed to link the expectations of coaches with the expectations of their athletes. First attempts to assess and combine the efficacy beliefs within elite sport dyads have been put forward (Jackson, Knapp, & Beauchamp, 2008). Moreover, in order to broaden our understanding of coaches' approach to games, future research could combine tactical and strategical decisions of coaches and their coaching efficacy expectations, for example, measured with the coaching efficacy scale (Feltz, Chase, Moritz, & Sullivan, 1999). This study offers a methodological approach to study expectations, goals and tactical decisions as a function of game location that controls for other possibly influencing variables (e.g. opponent). More experimental research is needed to lighten the causes of home advantage. From a practical point of view, coaches should reconsider the importance of game location when deciding on playing tactics as it might hinder their performance in AGs.

Acknowledgement

We wish to acknowledge Dennis Bergforth for his contribution to the data collection of this study.

References

Allen, M. S., & Jones, M. V. (2014). The "Home Advantage" in athletic competitions. *Current Directions in Psychological Science*, *23*, 48–53.

Anderson, M., Wolfson, S., Neave, N., & Moss, M. (2012). Perspectives on the home advantage: A comparison of football players, fans and referees. *Psychology of Sport and Exercise*, *13*, 311–316.

Aupetit, S. (2008). Influence du lieu de la rencontre sur la performance sportive (match à domicile ou à l'extérieur): Une analyse critique [Game location and performance (home or away game) as research object: A critical analysis]. *Science & Motricité*, *65*(65), 9–34.

Balmer, N. J., Nevill, A. M., & Williams, A. M. (2003). Modelling home advantage in the Summer Olympic Games. *Journal of Sports Sciences*, *21*, 469–478.

Bandura, A. (1997). *Self-efficacy*. New York, NY: W.H. Freeman.

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

Bray, S. R., Obara, J., & Kwan, M. (2005). Batting last as a home advantage factor in men's NCAA tournament baseball. *Journal of Sports Sciences*, *23*, 681–686.

Carmichael, F., & Thomas, D. (2005). Home-field effect and team performance: Evidence from English Premiership Football. *Journal of Sports Economics*, *6*, 264–281.

Carre, J., Muir, C., Belanger, J., & Putnam, S. (2006). Pre-competition hormonal and psychological levels of elite hockey players: Relationship to the 'home advantage'. *Physiology & Behavior*, *89*, 392–398.

Carron, A. V., Loughhead, T., & Bray, S. R. (2005). The home advantage in sport competitions: Courneya and Carron's (1992) conceptual framework a decade later. *Journal of Sports Sciences*, *23*, 395–407.

Courneya, K. S., & Carron, A. V. (1992). The home advantage in sport competitions: A literature review. *Journal of Sport and Exercise Psychology*, *14*, 13–27.

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.

Eden, D. (2001). Means efficacy: External sources of general and specific subjective efficacy. In M. Erez, U. Kleinbeck, & H. Thierry (Eds.), *Work motivation in the context of a globalizing economy* (pp. 73–85). Mahwah, NJ: Lawrence Erlbaum Associates.

Feltz, D., Short, S., & Sullivan, P. J. (2008). *Self-efficacy in sport*. Leeds: Human Kinetics.

Feltz, D. L., Chase, M. A., Moritz, S. E., & Sullivan, P. J. (1999). A conceptual model of coaching efficacy: Preliminary investigation and instrument development. *Journal of Educational Psychology*, *91*, 765–776.

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

Heath, C., Larrick, R. P., & Wu, G. (1999). Goals as reference points. *Cognitive Psychology*, *38*, 79–109.

Jackson, B., Knapp, P., & Beauchamp, M. R. (2008). Origins and consequences of tripartite efficacy beliefs within elite athlete dyads. *Journal of Sport and Exercise Psychology*, *30*(5), 512–540.

Jamieson, J. P. (2010). The home field advantage in athletics: A meta-analysis. *Journal of Applied Social Psychology*, *40*, 1819–1848.

Lafrenière, M.-A. K., Jowett, S., Vallerand, R. J., & Carbonneau, N. (2011). Passion for coaching and the quality of the coach–athlete relationship: The mediating role of coaching behaviors. *Psychology of Sport & Exercise*, *12*, 144–152.

Lago, C. (2009). The influence of match location, quality of opposition, and match status on possession strategies in professional association football. *Journal of Sports Sciences*, *27*, 1463–1469.

Lago, C., Casais, L., Dominguez, E., & Sampaio, J. (2010). The effects of situational variables on distance covered at various speeds in elite soccer. *European Journal of Sport Science*, *10*, 103–109.

Lago, C., & Martín, R. (2007). Determinants of possession of the ball in soccer. *Journal of Sports Sciences*, *25*, 969–974.

Latham, G. P., & Locke, E. A. (1985). The application of goal setting to sports. *Journal of Sport Psychology*, *7*, 205–222.

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

Mageau, G. A., & Vallerand, R. J. (2003). The coach–athlete relationship: A motivational model. *Journal of Sports Sciences*, *21*, 883–904.

Moritz, S. E., Feltz, D. L., Fahrbach, K. R., & Mack, D. E. (2000). The relation of self-efficacy measures to sport performance: A meta-analytic review. *Research Quarterly for Exercise & Sport*, *71*, 280–294.

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

Papahristodoulou, C. (2008). An analysis of UEFA Champions League match statistics. *International Journal of Applied Sports Sciences*, *20*, 67–93.

Pollard, R. (2006a). Home advantage in soccer: Variations in its magnitude and a literature review of the inter-related factors associated with its existence. *Journal of Sport Behavior*, *29*, 169–189.

Pollard, R. (2006b). Worldwide regional variations in home advantage in association football. *Journal of Sports Sciences*, *24*, 231–240.

Pollard, R. (2008). Home advantage in football: A current review of an unsolved puzzle. *The Open Sports Sciences Journal*, *1*, 12–14.

Pollard, R., & Gómez, M. A. (2014). Components of home advantage in 157 national soccer leagues worldwide. *International Journal of Sport & Exercise Psychology*, *12*, 218–233.

Pollard, R., & Pollard, G. (2005). Long-term trends in home advantage in professional team sports in North America and England (1876–2003). *Journal of Sports Sciences*, *23*, 337–350.

Riedl, D., Strauss, B., Heuer, A., & Rubner, O. (2015). Finale furioso: Referee-biased injury times and their effects on home advantage in football. *Journal of Sports Sciences*, *33*, 327–336.

Smith, D. R. (2005). Disconnects between popular discourse and home advantage research: What can fans and media tell us about the home advantage phenomenon? *Journal of Sports Sciences*, *23*, 351–364.

Staufenbiel, K., & Strauss, B. (2013, September 25–27). *Für ein Auswärtsspiel ok – Mentale Repräsentationen und Ziele zu Heim- und Auswärtsspielen* [For an away it was ok – Mental representations and goals of home and away games]. Paper presented at the 21th conference of the German Society of Sport Science, Konstanz.

Stirin, K., Ganzach, Y., Pazy, A., & Eden, D. (2012). The effect of perceived advantage and disadvantage on performance: The role of external efficacy. *Applied Psychology: An International Review*, *61*, 81–96.

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

Strauss, B., & Bierschwale, J. (2008). Zuschauer und der heimvorteil in der handballbundesliga [Spectators and the home advantage in the German national handball league]. *Zeitschrift Für Sportpsychologie*, *15*, 96–101.

Sutter, M., & Kocher, M. G. (2004). Favoritism of agents - The case of referees' home bias. *Journal of Economic Psychology*, *25*, 461–469.

Tenga, A., Holme, I., Ronglan, L. T., & Bahr, R. (2010). Effect of playing tactics on goal scoring in Norwegian professional soccer. *Journal of Sports Sciences*, *28*, 237–244.

Unkelbach, C., & Memmert, D. (2010). Crowd Noise as a cue in referee decisions contributes to the home advantage. *Journal of Sport & Exercise Psychology*, *32*, 483–498.

Van de Ven, N. (2011). Supporters are not necessary for the home advantage: Evidence from same-stadium derbies and games without an audience. *Journal of Applied Social Psychology*, *41*, 2785–2792.

Vargas-Tonsing, T. M., & Bartholomew, J. B. (2006). An exploratory study of the effects of pregame speeches on team efficacy beliefs. *Journal of Applied Social Psychology*, *36*, 918–933.

Vargas-Tonsing, T. M., Myers, N. D., & Feltz, D. L. (2004). Coaches' and athletes' perceptions of efficacy-enhancing techniques. *Sport Psychologist*, *18*, 397.

Winter, W. C., Hammond, W. R., Green, N. H., Zhang, Z., & Bliwise, D. L. (2009). Measuring circadian advantage in major league baseball: A 10-year retrospective study. *International Journal of Sport Physiology and Performance*, *4*, 394–401.