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The Home Field Advantage in Athletics: A Meta-Analysis[1]

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This meta-analysis examined the home-field advantage in athletics, with an emphasis on potential moderators. The goal of this research was to quantify the probability of a home victory, thus only studies that included win–loss data were included in the meta-analysis. A significant advantage for home teams was observed across all conditions ($M_\pi = .604$); and time era, season length, game type, and sport moderated the effect. Furthermore, it was found that season length mediated the effect of sport such that differences between sports could be attributed to some sports having longer seasons than other sports. This research has implications for athletes, fans, and the media alike.

"Baseball? It's just a game. As simple as a ball and a bat, yet as complex as the American spirit it symbolizes. It's a sport, a business, and sometimes even a religion." This quote by sportscaster Ernie Harwell shows just how important sports are in our society. Large numbers of fans attend sporting events every year. For instance, in 2007 alone, 78.5 million spectators attended Major League Baseball (MLB) games. These fans attending games often reside in areas near the stadium, thus spectators generally support the home team. Therefore, it is not surprising that competitors prefer playing games in their home venue in front of home crowds. This preference is not misguided, as athletes tend to experience a *home-field advantage*, which is "the consistent finding that home teams in sport competitions win over 50% of games played under a balanced home and away schedule" (Courneya & Carron, 1992, p. 14). Thus, simply playing at home increases the chances of winning.

The current research aims to provide the most comprehensive description of the home-field advantage to date, while also identifying factors that impact the magnitude of this effect. Previous research on the home-field advantage generally has not cast a wide net on this phenomenon. Rather, research has focused on particular sports at particular times, whereas other studies have

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been concerned with identifying potential causes of the effect. Additionally, review articles (e.g., Carron, Loughhead, & Bray, 2005; Courneya & Carron, 1992) that have examined the home-field advantage across sports have focused on developing conceptual models to account for why the home-field advantage exists.

Not surprisingly, previous reviews on this topic have found that the home team consistently wins a greater proportion of games played at home (e.g., Carron et al., 2005; Courneya & Carron, 1992). Carron et al. noted that "the home advantage appears to be universal across all types of sports" (p. 405). These reviews, however, have not employed meta-analytic methods, which allow an estimate of the effect, as well as an assessment of factors that moderate the effect; nor have they suggested when one might observe changes in the home-advantage effect. For instance, it is not clear whether the home-field advantage is stronger (e.g., Schlenker, Phillips, Bonieki, & Schlenker, 1995) or weaker (e.g., Baumeister & Steinhilber, 1984) in championship games. The current research compares the effect size of the home-field advantage of championship games against that of regular-season games, as well as the effects of a number of other moderators; that is, sport type, level of competition, time era, season length, and sport. However, before these topics can be explored, it is necessary to examine prior work first to understand what questions need to be answered.

The home advantage in athletics has been studied by researchers across a variety of areas, and the most ambitious attempt to quantify this effect was the conceptual model proposed by Courneya and Carron (1992; see also Carron et al., 2005). This model is a feed-forward model with five major components: game location, game location factors, critical psychological states, critical behavioral states, and performance outcome. According to Carron et al., game location factors "represent four major conditions that differentially impact on teams competing at their own versus an opponent's venue" (p. 395). These factors include crowd, familiarity, travel, and rule factors. Crowd factors represent the differential support from spectators received by the home team versus the away team, which impacts the magnitude of the home-field advantage. For example, larger crowds (e.g., Nevill, Newell, & Gale, 1996) and more dense crowds (e.g., Agnew & Carron, 1994; Schwartz & Barskey, 1977) produce greater advantages for the home team.

Other crowd factors include the behavior of the spectators. For instance, when crowds boo home teams to voice their displeasure with the team's play, the home team responds by playing better and exhibits an advantage over away teams after booing (Greer, 1983). Also, crowd noise has been shown to influence referees' judgments, as fewer fouls were assessed to home teams when audible noise was present than when noise was not present (Nevill, Balmer, & Williams, 2002). Furthermore, fans themselves believe that crowd noise is the primary cause of the home-field advantage in athletics (Smith, 2005). Thus, crowd factors contribute to the home-field advantage, but are likely not the only causal factor, as some research has suggested that spectator support is not related to the home-field advantage effect (e.g., Salminen, 1993; Strauss, 2002).

Courneya and Carron (1992) suggested other game location factors, such as familiarity, which includes familiarity with the playing surface itself, as well as familiarity with a venue's facilities. One effective way to examine the effect of facility familiarity is to study a team that has recently moved to a new stadium, which is a common occurrence in the current climate of professional sports. Research has found that relocated teams exhibit a reduced home-field advantage (Pollard, 2002). Thus, when home teams are less familiar with a venue, they do not exhibit quite as large an advantage over away teams as teams that are familiar with their home venue. Also, teams with the smallest and largest playing surfaces in soccer (i.e., surfaces most different from the norm) displayed larger home-field advantages than did teams with average surfaces (Pollard, 1986). Here, home competitors with unique playing surfaces exhibited a greater advantage because they were more familiar with the unique playing surface than were away competitors.

Another factor to consider that is associated with game location is travel. Away teams obviously must travel to get to the site of a competition, which could impact the advantage experienced by the home team. Studies that have examined sheer travel distance have found that the home-field advantage increased as the distance the away team traveled increased (e.g., Pace & Carron, 1992; Pollard, 1986; Snyder & Purdy, 1985). Research has also examined why traveling longer distances could increase the home-field advantage. For instance, studies have shown that jet lag, which is associated with long-distance, east–west travel, impacts game outcomes (Atkinson & Reilly, 1996; Recht, Lew, & Schwartz, 1995; Reilly, Atkinson, & Waterhouse, 1997).

Each of the aforementioned game location factors then feeds into the psychological states of the individuals who are involved in the competition: competitors and judges/referees. Generally, athletes report more positive psychological states when playing at home, as compared to their states when playing away (e.g., Bray, Culos, Gyurcsik, Widmeyer, & Brawley, 1998; Terry, Walrond, & Carron, 1998). These psychological states can have a profound impact on athletes' performance (for a review, see Woodman & Hardy, 2003).

The next factor in Courneya and Carron's (1992) feed-forward model are critical behavioral states. These are the actions of the players and referees that lead to an advantage for home competitors versus visiting competitors.

As mentioned previously, referees can be biased to call fewer fouls on the home team under crowd noise conditions (Nevill et al., 2002). Thus, the psychological state created in the referee ("This crowd will be angry if I call fouls against the home team") by the actions of the fans (cheering/jeering) has a direct impact on the behavior of the referee (fewer fouls).

Game location and psychological state factors can also impact the behavior of the competitors. For instance, research has suggested that athletes' proceduralized behaviors (e.g., a golf putting stroke) are facilitated by increased levels of motivation/arousal, so long as the athletes do not engage in debilitating explicit monitoring (Beilock, Jellison, Rydell, McConnell, & Carr, 2006). Here, the motivation produced by an external source (an evaluator) facilitates the proceduralized behavior the athlete has been trained to execute (the putting stroke).

In sum, Courneya and Carron (1992) concluded that the home-field advantage effect exists and suggested that factors associated with the location of the game feed-forward to produce the effect. However, the home-field advantage is a complex phenomenon, and past reviews have fallen short of sufficiently summarizing the home-field advantage across a wide variety of potential moderator variables. For instance, prior research has not examined how the magnitude of the home-field advantage has changed across time in more than one sport. It may very well be that the home-field advantage has gotten stronger in recent years, with the rise in media coverage, or it may have gotten weaker because of increased player turnover. Also, Courneya and Carron neglected to examine an important critical psychological state: the performance pressure associated with the outcome of the game. The advantage enjoyed by the home team may be accentuated, minimized, or even reversed in high-pressure competitions.

Furthermore, past reviews have not quantitatively compared home-field advantage effects between sports. From these reviews, one cannot determine whether the home-field advantage for hockey teams is the same as the home-court advantage for a tennis player. Finally, past reviews on this topic have not employed meta-analytic techniques when making comparisons across multiple effect sizes. Thus, Courneya and Carron's (1992) conceptual framework helps to identify previous research on the home-field advantage and offers a compelling model that explains how game location produces an advantage for the home team, but this model does not examine potential moderators of the effect. However, it is important for individuals who are interested in sports to know when to expect a larger or smaller home-field advantage. Thus, the goal of the current meta-analysis is to examine the effect of previously unexplored moderators to describe the conditions under which one can expect to observe a relatively weak or strong home-field advantage effect (i.e., When is the effect at its strongest?). This meta-analysis also aims to provide the most comprehensive (to date) description of the home-field advantage in athletic competitions.

The potential moderators tested in the current meta-analysis are sport type, level of competition, time era, season length, game type, and sport. Table 1 presents a summary of the moderator variables examined. All effects

Table 1

Summary of Moderator Variables

Moderator	Level	Number of effect sizes
Sport type	Individual	16
	Group	71
Level of competition	Professional	75
	Collegiate	12
Time era*	Pre-1950	8
	1951–1970	7
	1971–1990	17
	1991–2007	38
Season length*	<50 games	42
	50–100 games	28
	>100 games	13
Game type	Regular season	57
	Playoff/championship	30
Sport	Baseball	14
	Golf	6
	Cricket	2
	Football	12
	Hockey	14
	Boxing	4
	Tennis	6
	Basketball	12
	Rugby/Australian football	3
	Soccer	14

Note. Moderators marked with an asterisk (*) were also analyzed in a regression model.

were analyzed in a random-effects model (see Rosenthal, 1995). Thus, the effects reported in the current meta-analysis can be generalized to future games.

Method

Literature Search Procedure

The studies included in this meta-analysis were found primarily through the search engines of PsycINFO and Google Scholar. Keywords used in this search were *home-field advantage sport*, *home-field sport*, *game location sport*, *home-field advantage*, *home advantage*, *home team*, and *sport location*. Reference sections of studies included in the meta-analysis were searched to identify additional relevant studies, as well as previous reviews on this topic (Carron et al., 2005; Courneya & Carron, 1992; Nevill & Holder, 1999).

As explained later, the present author also compiled data from archival sources, including the National Collegiate Athletic Association's (NCAA) online database (www.ncaa.org); MLB online database (www.mlb.com); Association of Tennis Professionals' (ATP) online database (www.atptennis.com); Professional Golf Association's (PGA) online database (www.pga.com); Entertainment and Sports Programming Network's (ESPN) database (www.espn.com); British Broadcasting Corporation's (BBC) online database (www.bbc.com); *Sports Illustrated*'s database (www.sportsillustrated.com); www.baseballreference.com; and www.hockeyreference.com. Data were also obtained from Wikipedia entries, which were checked for accuracy by cross-referencing Wikipedia with archival information from the sources listed here.

Effect Size

An effect size was computed for each study or aggregation of games. For instance, Acker (1997) examined the home-field advantage in the NFL for the 1988–1994 regular seasons, which consisted of 1,566 individual games (see Appendix). In this meta-analysis, Rosenthal and Rubin's (1989) proportion index (π) was used as the effect size measure. This effect size is appropriate because it represents the proportion of home-team wins on a scale ranging between 0 and 1.00, for which .50 is the null value. The π effect size is often used to describe effects computed from more than two response alternatives on a two-response-alternative scale. However, converting proportions to a two-response-alternative scale was not necessary in the current research because game outcome is already represented on such a scale (i.e., win or lose). For example, a π computed from a sample of 20 games of which the home team won 15 would equal .75 (i.e., 15/20).

The proportion index (π) was calculated using only games played at home to avoid counting the output of the same game twice. Counting both home and away games for each team/player would double the total number of games (*n*) that went into each effect size. For instance, in an NFL football season, Team A and Team B are members of the same division. Thus, one of Team A's away games will also be one of Team B's home games because division members play each team in their division once at home and once away. Therefore, including all games (home and away) played by Teams A and B would count those overlapping games twice. This would inflate the *n* associated with each effect size without adding additional information.

Once π was computed for each sample of games, the effect size was then tested against the null hypothesis that there is no home-field advantage (π = .50). To test for the significance of each π, a series of one-way chi-square tests was conducted. For each test, the expected number of games won by the home team was half the total *n*, as this would indicate that it was equally likely that either the home or the away team would win. The fit of the number of observed games the home team won was then tested against the number of games the home team was expected to win if no advantage exists (see Appendix).

Inclusion Criteria and Determination of Individual Effect Sizes

For the purposes of the current meta-analysis, a *home* game location was operationally defined as the venue where competitors played designated home games, or a venue located in the competitors' home country. The *home country* designation is especially relevant for individual sports (i.e., golf) and intercountry competitions (e.g., World Cup in soccer), which unlike professional and collegiate team sports, do not have designated home locations for each player/team involved in the competition. For instance, the host country for the World Cup changes each time the tournament is played. Thus, the home venue and team change with each tournament.

Each study consisted of a pool of games and was included in the meta-analysis if the study met the following criteria:

1. It examined the outcomes of competitions played by "expert" athletes. High school and non-professional adult competitions (excluding the Olympics) were not included, as these contests are not played by *expert athletes*, which are defined as collegiate, Olympic, or professional athletes. These athletes are considered experts because they have demonstrated sufficient mastery of their sport to

be singled out as successful athletes by experts in their particular field (e.g., coaches, general managers).

2. Each study or aggregate of effect sizes had to provide the information necessary to determine the proportion of contests won by the home team. Because the focus of this meta-analysis is on identifying the probability that the home team will win any given sporting contest, research that examined dependent variables other than win/lose (e.g., point differentials, scoring averages, competitor behavior) were not included in the meta-analysis.
3. The games that went into each study had to be independent of all other games in all other studies to ensure that any one game or group of games was not overrepresented. For example, the 7th game of the 2004 American League Championship Series (ALCS) could not have contributed to the effect size computation for all 2004 MLB playoff games (which includes the ALCS) and to the effect size for all ALCS games from 1995 to 2007. If studies included overlapping games, then that subset of games was excluded from one study. However, if it was not possible to exclude just the overlapping games (because the data were not provided), then the study that examined a greater number of games (i.e., the one with the larger *n*) was included in the meta-analysis instead of the study that covered the smaller number of games. An exception to this rule would be if the smaller study included an additional moderator variable or variables not covered by the larger one. For instance, if one study was made up of all NFL regular-season games from 1995 to 2000 and another examined playoff and regular-season NFL games but only for the 1995 season, then the latter study would be included because it examined the game type (championship vs. regular season) moderator variable, whereas the larger one did not.
4. In individual sports (e.g., golf, tennis), only the outcomes of matches between "home" and "away" players were counted. Matches in which two members from the host country were competing against one another were excluded because the home player would win 100% of the matches under those conditions.
5. When computing effect sizes for tennis, any match that included a wild-card player was not included in the analysis. These wild-card entries are awarded at the discretion of the tournament organizers and are often given to young players, or older "comeback" players from the host countries of the four major tournaments (i.e., U.S. Open, French Open, Australian Open, Wimbledon). Because these players are more likely to be of inferior quality, including these

matches in the analysis would introduce a bias against the host country.

6. All effect sizes for golf were computed based on results of the Accenture Match Play Championship, the Ryder Cup, and the President's Cup because these three tournaments are the only major professional golf events with a win–loss outcome.
7. Following the method of Courneya and Carron (1992), games that concluded in draws were excluded from the effect-size calculations.

The literature search identified 30 published research articles that were included in the meta-analysis, although there was much more research that examined the home-field advantage in athletics that could not be included in the meta-analysis because it measured a dependent variable other than win–loss or was redundant with other research included in the meta-analysis. More than one moderator variable was able to be coded from some of the included research articles. Thus, 8 research articles contributed more than one study to the meta-analysis. These 8 articles yielded 34 individual studies with accompanying effect sizes. For example, an article may have examined the home-field advantage in soccer and baseball. If so, then separate effect sizes could be computed for the soccer games and the baseball games, which would produce two effect sizes extracted from the same research article. When combined with the 24 articles that yielded 1 study each, a total of 56 effect sizes computed from independent games were extracted from previously published research (see Appendix).

An additional 31 independent effect sizes were computed by the author directly from archival sources, rather than from published studies. These studies were obtained by examining the aforementioned archival data sources that consisted of records of game outcomes (win–loss). Taken together, the use of this methodology produced 87 effect sizes to be used in the analyses of the home-field advantage in sports contests. For a summary of each effect size, refer to the Appendix.

Data Preparation

Prior to beginning the analysis, it was necessary to examine the effect of the data-collection methods and sample size on π. To ensure that the archivally retrieved effect sizes did not differ from those obtained from previously published research, an independent-sample t test was conducted between the archivally retrieved effect sizes and those extracted from published studies. In this analysis, archival effect sizes for sports such as golf and tennis that were not available in the published literature were not included because this would confound sport with the source of the effect size (archival vs. published). This analysis showed that the archival effect sizes (M_π = .593, *SD* = .056) did not differ from those extracted from published studies (M_π = .610, *SD* = .069), $t(68) = 0.86$, $p = .39$, $d = .20$. Additionally, including the archival effect sizes from sports that were not represented in the published literature did not impact the results, $t(85) = 1.16$, $p = .25$, $d = .25$. Therefore, archival and published effects will be treated the same in the subsequent analyses.

Furthermore, because each effect size was calculated based on different aggregations of games (range = 9–35,000), it was necessary to determine whether the number of games that went into each effect size impacted π. This is especially important for the game type moderator analysis that examines whether the home-field advantage varies as a function of whether the game is a playoff/championship game or a regular-season game. Since there are fewer playoff games than regular-season games, effect sizes calculated for playoff games will necessarily have smaller *n*s. To determine if game type impacts π, one must ensure that sample size does not impact π. A regression analysis was conducted on regular-season effect sizes. Playoff games were not included in the analysis because, as mentioned previously, game type is confounded with sample size. This analysis of 57 effect sizes demonstrated that sample size (*n*) was not a reliable predictor of π ($\beta = .15$, $p = .25$). Thus, sample size was not examined further as a potential moderating factor in any of the following analyses.

All tests were conducted on raw πs. Since π is an index of proportion, one might argue that the analyses should be conducted on the arcsin transform of π because proportions are not normally distributed. All analyses were conducted on both the raw πs and the π arcsin transformations. In each case, the arcsin-transformed analyses did not differ from the analyses for the raw πs. Thus, for ease of interpretation, only raw πs are reported.

Results

Overall Home-Field Advantage

The first test of the home-field advantage was documenting the overall effect across all potential moderators. To do this, πs were accumulated across studies and a mean unweighted average π was calculated. As expected, the overall effect size (M_π = .604, *SD* = .065) shows that the home team wins significantly more often than do away teams, as the 95% confidence interval (.590–.618) does not include .500. A one-sample *t* test between the mean effect size against $\pi = .500$ also supports the notion that the home team wins a greater proportion of games played at home than away competitors, *t*(86)

= 14.98, $p < .001$, $d = 3.23$. Thus, the home team can be expected to win, on average, approximately 60% of athletic contests.

Sport Type Effects

To test sport type as a potential moderator of the home-field advantage, mean effect sizes were computed for individual sports (i.e., golf, tennis, boxing) and group sports (i.e., baseball, football, hockey, basketball, soccer, cricket, rugby/Australian football). An independent-sample *t* test was then conducted to determine if the average effect sizes differed as a function of sport type. Consistent with previous research (Carron et al., 2005; Courneya & Carron, 1992), the magnitude of the home-field advantage for individual sports ($M_\pi = .596$, $SD = .052$) did not differ from the effect size for group sports ($M_\pi = .606$, $SD = .067$), $t(85) = 0.57$, $p = .570$, $d = .12$. Thus, it does not matter whether the competitor is an individual player competing against another individual or a team playing against another team when assessing home-field advantage.

Level of Competition Effects

In another replication of one of Courneya and Carron's (1992) conclusions, the level of competition was examined as a potential moderator. Based on that research, the current meta-analysis should find that collegiate effect sizes and professional effect sizes do not differ. An independent-sample *t* test was conducted on the mean effect size for each level of competition and, as expected, the home-field advantage for collegiate games ($M_\pi = .608$, $SD = .064$) did not differ from that of professional games ($M_\pi = .604$, $SD = .065$), $t(85) = 0.15$, $p = .880$, $d = .03$.

Time Era Effects

Previous research has suggested that the home-field advantage is not a new phenomenon (e.g., Courneya & Carron, 1992), but research has not made an effort to determine whether the home-field advantage has changed over time. Because many changes have taken place in the larger society over the past 100 years, it is not unreasonable to assume that the home-field advantage effect has also changed. To examine the effect of era, a one-way ANOVA (Era: pre-1950, 1951–1970, 1971–1990, or 1991–2007) was conducted with era as a between-studies factor. Any effect size that spanned more than one time era was not included in the analysis. Time era was analyzed in 20-year blocks post-1950 to best represent overall changes in the sports climate while ensuring that a sufficient number of studies would be included in each era. For instance, free agency was implemented in the 1970s in both MLB and the NBA. Thus, the time span from 1971 to 1990 is a free-agency era for these sports, whereas 1951 to 1970 is pre-free agency. If free agency impacted the magnitude of home-field advantage, one would expect to see differences between these eras.

A significant effect for time era was observed, $F(3, 66) = 2.80$, $p = .046$, $d = .41$. To examine which eras differed significantly from which other eras, Tukey's honestly significant difference (HSD) test was computed (Kirk, 1995). This analysis shows that the home-field advantage was significantly greater for games that took place before 1950 ($M_\pi = .650$, $SD = .110$) than for any of the other three subsequent eras (1951–1970, $M_\pi = .603$, $SD = .044$; 1971–1990, $M_\pi = .581$, $SD = .043$; 1991–2007, $M_\pi = .592$, $SD = .050$; ps < .05), which did not differ from each other (see Table 2). Thus, the home-field advantage was stronger prior to 1950 than it has been since.

Table 2

Home-Field Advantage as a Function of Season Length, Time Era, and Game Type

Moderator	n	M_π	Test statistic	File drawer N
Season length	83		$F(2, 80) = 4.78$	13,906
<50 games	42	.620		
50–100 games	28	.601		
>100 games	13	.559*		
Time era	70		$F(3, 66) = 2.80$	7,173
Pre-1950	8	.650*		
1951–1970	7	.603		
1971–1990	17	.581		
1991–2007	38	.592		
Game type	87		$t(85) = 2.82$	21,066
Regular	57	.590		
Championship	30	.630**		

Note. M_π exceeding .500 indexes a home-field advantage.
*Means differ at $p < .05$ (Tukey's HSD). **Means differ at $p < .001$.

There are many potential factors that may account for this effect that future research could explore. One potential explanation is the degree of familiarity with the facilities where the athletes are competing (e.g., Pollard, 1986). A good example of how familiarity with playing surface has changed over time can be seen in the playing surfaces of the Boston Bruins' old and new arenas. The old Boston Garden, built in 1928, had an ice surface 9 feet shorter and 2 feet narrower (191 ft × 83 ft) than standard ice surfaces (200 ft × 85 ft). Because a smaller ice surface favors more physical play (because of the closer proximity of players), the Bruins tended to recruit bigger, more physical players. Thus, the team gained an advantage when playing at home because their team was selected for smaller ice surfaces. However, the NHL now requires a standardized rink size, which teams must use when building new stadiums. The old Boston Garden was demolished to make way for the new arena, which opened in 1995, and the Bruins (like all other NHL teams) now play on a standardized ice surface. Thus, any advantage that the team may have enjoyed as a result of the smaller playing surface of their old venue was eliminated by the standardization of playing surfaces.

Other research on facility familiarity has demonstrated that the home-field advantage decreases when a team moves to a new stadium (Pollard, 2002). In the current climate of professional sports and large collegiate programs, new, state-of-the-art stadiums are replacing older ones. Thus, as teams move to these new, less familiar venues, the home team may experience an adjustment period during which they are getting acclimated to their new venue and are less familiar with their facilities than a team that has remained in the same venue for a long period of time. Of course, there are exceptions to this rule (e.g., the Boston Red Sox's Fenway Park opened in 1912, and the Red Sox have played there ever since), and it might be interesting for researchers to examine whether the length of a team's tenure at their current stadium is correlated with the strength of the home-field advantage. However, one must be careful in interpreting a result such as this because team quality is also significantly related to home-field advantage, with better teams exhibiting larger home-field advantages (e.g., Bray, 1999; Bray, Law, & Foyle, 2003; Clarke & Norman, 1995). Thus, when speculating on the potential effect of facility familiarity on the time-era effect, it is possible that less successful teams move more often than do more successful teams because they do not have the fan base of the successful teams, which would produce a smaller home-field advantage for the moving/poor teams, as compared to the stable/successful teams.

However, if familiarity fully explained the effect of era on the home-field advantage, one might expect the institution of free agency to have decreased home-field advantages because players would be less familiar with their home venue as a result of switching teams more often. However, when one compares the home-field advantages in baseball and basketball from the 1951–1970 pre-free agency era to the post-free agency era after 1970, one does not see a difference (see Table 2). Thus, familiarity with one's venue/facility may contribute, but likely does not wholly explain the time-era effect.

Another potential factor that may help to account for the time-era effect on the home-field advantage is travel. Although road trips in American professional sports tended to be of shorter distance prior to 1950 than they currently are because there were fewer teams, travel to games took longer, as commercial air travel was not common in the United States until after 1950. Thus, for competitors to get to games, they had to rely on slower modes of transportation (e.g., bus, train), as compared to today's chartered jet travel. Although researchers have examined the effect of jet lag on athletic performance (e.g., Atkinson & Reilly, 1996; Recht et al., 1995; Reilly et al., 1997), research has not compared different modes of travel (i.e., bus, plane, train), controlling for distance, on performance outcomes in athletics.

Season Length Effects

To test for the effect of season length, two separate analyses were conducted. First, each study was coded by sport. Then, the season length for each of those sports/leagues was identified and the effects were grouped into three categories: sports having seasons of fewer than 50 games, between 51 and 100 games, and longer than 100 games. A one-way ANOVA (Season Length: < 50, 51–100, or > 100) was conducted, with season length as a between-studies variable.

This analysis produced a significant effect for season length, $F(2, 80) = 4.78$, $p = .011$. Tukey's HSD test (Kirk, 1995) was then used to determine which effect sizes significantly differed. The home-field advantage for sports with more than 100 games per season was significantly smaller ($M_\pi = .559$, $SD = .052$) than that for sports with 51–100 games per season ($M_\pi = .601$, $SD = .038$; $p < .05$), and for sports with fewer than 50 games per season ($M_\pi = .620$, $SD = .077$; $p < .05$), which did not differ from each other (see Table 2). This effect must be interpreted with caution because one cannot dissociate long seasons from baseball in this analysis because baseball was the only sport examined that plays seasons with more than 100 games. Therefore, it is difficult to determine whether longer seasons lead to a weaker home-field advantage or whether baseball just produces small home-field advantages. This topic will be revisited in the sport moderator section that examines the magnitude of the home-field advantage for 10 distinct sports, including baseball.

The moderating effect of season length was also analyzed in a linear regression model with season length as the predictor and π as the dependent measure. Rather than categorizing effect sizes based on the season length of the associated sport, this analysis examines the exact number of games played per season. However, since many of the effects span more than one season, actual season lengths could not be computed for all studies because sports leagues may change the number of games played per season, and expansion could also influence the balance of the schedule. Thus, the regression included 36 independent effect sizes for which the actual season length could be reliably computed. Replicating the ANOVA analysis, the regression data indicate that as the length of the season increased, the home-field advantage decreased ($\beta = -.371$, $p = .024$).

Other than the possibility that baseball produces smaller effect sizes, a possible explanation for this effect may be that sports with longer seasons generally include series of games at the same location or in the same geographical area. Instead of playing single games on the road, visiting teams play multiple games in a row at a particular venue. This could allow visitors to acclimate to the area and increase familiarity with the playing surface, thus reducing the advantage for the home team. For instance, for the 2006 and 2007 MLB seasons, the Boston Red Sox won the first home game of a series 66% of the time, whereas they won 56% of the concluding games of a series. However, additional research is needed to examine more closely the effect of acclimation on the home-field advantage.

Another reason that longer seasons may generally produce smaller home-field advantages is that as the number of games per season increases, the importance of the outcome of each game decreases. This could impact players' motivation or fans' behavior during games. Research has shown that crowd factors have important consequences for the home-field advantage (e.g., density: Agnew & Carron, 1994, and Schwartz & Barskey, 1977; size: Dowie, 1982; behavior: Greer, 1983). For instance, crowds may be less dense and less vocal during a regular-season baseball game, knowing that the game is just one of 162 total games. However, fans at NFL football games are only able to see 8 home games, instead of 81, each game being only 1 of 16, and the fans' behavior may reflect the relatively increased urgency to win each game. The following section provides a closer look at the effect of game importance.

Game Type Effects

In the literature, there has been some debate as to the effect of increased performance pressure on the home-field advantage. Researchers have argued for a *home-field disadvantage*, whereby teams playing at home are hypothesized to choke and to perform more poorly in high-pressure games (see Baumeister & Steinhilber, 1984; Wallace, Baumeister, & Vohs, 2005). On the other hand, Schlenker et al. (1995) argued that the home-field advantage is not diminished in these games.

The current meta-analysis examines the home-field advantage in high-pressure championship/playoff games and in lower pressure regular-season games to determine whether there is a home-field disadvantage for high-pressure games or whether the home-field advantage is accentuated by increased performance pressure. To test the impact of game importance, an independent-sample *t* test was conducted on the mean effect sizes for playoff/championship games versus regular-season games. This analysis shows that the home-field advantage is stronger for playoff/championship games (M_π = .630, *SD* = .090) than it is for regular-season games (M_π = .590, *SD* = .041), $t(85) = 2.82$, $p = .006$, $d = .61$ (see Table 2). Contrary to the notion that home teams choke in championship games (e.g., Baumeister & Steinhilber, 1984), these data demonstrate that the home-field advantage is actually significantly stronger for high-pressure games than for lower pressure games. Consistent with this finding, the NBA archives show that when playoff series are tied, home teams exhibit the highest winning percentages in Game 7 (i.e., the final and thus the most important game; 80.4%), followed by Game 5 (74.1%) and then Game 3 (55.3%), which are each of declining importance/pressure.

This analysis, however, does not suggest that home teams never choke in high-pressure games; only that, on average, home competitors have an advantage over away competitors and will win approximately 63% of playoff or championship sporting contests. Although the current meta-analysis identifies this effect, it can only speculate on what might mediate it. One area of research that may help account for this effect can be found in the social psychology literature. In fact, popular discourse in the media and among fans suggests that social factors have an important impact on the home-field advantage (Smith, 2005).

Schlenker et al. (1995) suggested that the home choke occurs when athletes experience self-doubts under conditions of increased performance pressure. Thus, the home team will be more likely to choke if they have negative beliefs about their abilities prior to or during an important competition, such as a championship game. This interpretation is consistent with research demonstrating that when athletes are threatened (i.e., have reason for self-doubt), they explicitly monitor their performance, disrupting proceduralization, which then impairs the execution of the proceduralized behaviors that are necessary for optimal performance (e.g., Beilock & Carr, 2001; Beilock et al., 2006).

More specifically, Beilock et al. (2006) found that when skilled male golfers were threatened by being told that female golfers were better putters than are males, these males performed more poorly than did other males who were not threatened. The researchers determined that this impairment under threat arose from participants' explicit monitoring of their putting strokes, which is normally a proceduralized behavior. The explicit monitoring broke down proceduralization, impairing execution. Participants also performed the putting task under threat in a dual-task condition in which they were asked to perform an auditory monitoring task, which occupied executive resources. In this dual-task condition, threatened participants outperformed their no-threat counterparts because they were no longer able to monitor their performance explicitly (Beilock et al., 2006), and the arousal produced by the threat facilitated execution of their proceduralized putting stroke.

The explicit monitoring account of Beilock and colleagues (Beilock & Carr, 2001; Beilock et al., 2006) provides a framework that may help to explain why the home-field advantage is greater in championship games than in regular-season games. As mentioned previously, various crowd factors including density (Agnew & Carron, 1994; Schwartz & Barskey, 1977), size (Dowie, 1982), crowd behavior (Greer, 1983), and athletes' perceptions of crowd support (Bray & Widmeyer, 2000) all influence the magnitude of the home-field advantage. Generally, playoff games lead to larger and denser crowds, more vocal fans, and increased media coverage. These factors index increased support for home competitors in high-pressure games. Thus, the home team may experience an increase in motivation during championship games, and research has indicated that increased motivation potentiates whatever response is prepotent (i.e., most likely to occur) in a given situation (e.g., Harkins, 2006; Jamieson & Harkins, 2007; McFall, Jamieson, & Harkins, 2009). Since professional and collegiate athletes are highly trained, their prepotent tendencies (e.g., a proceduralized baseball swing, a quarterback's throwing motion) during a game are likely to be correct. Therefore, if these prepotent responses are potentiated, performance will be facilitated for home competitors.

However, the same crowd factors that can be construed as supportive by home competitors could be seen as threatening by away competitors. Having a dense crowd cheer for their failure (or against their success) can be a direct threat to away competitors' identities as competent and successful athletes. As shown by Beilock et al. (2006; see also Beilock & Carr, 2001), when an athlete is threatened, there is an increased tendency to monitor proceduralized skills explicitly to ensure that the behavior is being executed properly, which actually impairs the execution of that behavior. Debilitation of away competitors' performance, combined with facilitation of home competitors' performance may account for the meta-analytic finding that the home-field advantage is more profound for championship games, as compared to regular-season games (e.g., Schlenker et al., 1995).

Sport Effects

Another goal of the current meta-analysis was to examine average home-field advantages for 10 distinct sports (see Table 3). Beyond the obvious rule differences, sports also vary along social dimensions. For instance, during golf competitions, spectators are very close to the competitors, but norms dictate that fans not disturb the players. In contrast, fans at European soccer games often cheer vehemently for the home team and against the visiting team or a specific player on that team.

These differences in competition environments could impact the strength of the home-field advantage. As sports differ in rules, season lengths, and social environments, it is likely that different sports produce different home-field advantages. To analyze the effect of sport on the home-field advantage, a one-way ANOVA (Sport: baseball, football, hockey, basketball, soccer, cricket, Australian rules football/rugby, golf, tennis, or boxing) was conducted, with sport as a between-studies factor.

The analysis found a significant effect for sport, $F(9, 77) = 5.21$, $p < .001$. Again, a Tukey's HSD test was used to determine which sports exhibited different home-field advantages. The average home-field advantage effects

Table 3

Home-Field Advantage as a Function of Sport

	n	M_π	Test statistic	File drawer N
Sport	87		$F(9, 77) = 5.21$	30,073
Baseball	14	$.556_{a}$		
Golf	6	$.568_{ab}$		
Cricket	2	$.570_{ab}$		
Football	12	$.573_{ab}$		
Hockey	14	$.595_{b}$		
Boxing	4	$.608_{bc}$		
Tennis	6	$.615_{bc}$		
Basketball	12	$.629_{c}$		
Rugby/Australian football	3	$.637_{c}$		
Soccer	14	$.674_{d}$		

Note. M_π exceeding .500 indexes a home-field advantage. Means not sharing a subscript are significantly different at $p < .05$ (Tukey's HSD).

for each sport can be seen in Table 3, but of particular note was that the home-field advantage for soccer (M_π = .674, SD = .091) was significantly stronger than that of any other sport (ps < .05), and replicates the effect size value reported by Courneya and Carron (1992; M_π = .690) in their review. On the other hand, baseball exhibited a weaker home-field advantage (M_π = .556, SD = .051) than all sports (ps < .05), with the exception of football (M_π = .573, SD = .021), golf (M_π = .568, SD = .059), and cricket (M_π = .570, SD = .014; ps > .20; see Table 3 for all means and standard deviations). Recall that in the season-length moderator analysis, the length of the season was confounded with sport because baseball was the only coded sport with a season longer than 100 games.

What, then, might account for why baseball has generally weak home-field advantages, while soccer exhibits a large home-field advantage? As highlighted by the season-length and game-type analyses, one factor to consider is game importance when accounting for why baseball produces a smaller home-field advantage than most sports. Each MLB baseball team plays 162 games per year, whereas the next longest seasons are in the NHL and NBA, where teams play 82 games per season. When teams play a large number of games, each individual game is less important, as it contributes less to the team's final winning percentage, thereby possibly reducing home competitors' motivation to perform as well as possible.

One can determine whether longer seasons are producing smaller home-field advantages by conducting a mediation analysis. This analysis would also help to determine if the small effect sizes observed for baseball in the current meta-analysis result from that sport having a long season. To this end, a mediation analysis was conducted to examine whether season length mediated the effect of sport on home-field advantage following the procedures suggested by Kenny, Kashy, and Bolger (1998). Zero-order correlations and regression beta weights are shown for the predicted mediational model in Figure 1. Significant zero-order correlations exist between all three variables. However, when effect size is regressed on season length and sport, only season length remained a reliable predictor. Thus, the effect of sport on the home-field advantage is mediated by season length (Sobel's Z = 2.57, p = .01). Therefore, one can say that differences in the magnitude of the home-field advantage effects between sports result from different sports having seasons of differing length.

Additional support for the notion that season length mediates the sport effect is that season length also impacts crowd factors, such as attendance and spectator behavior. For example, the average MLB stadium has a capacity of 45,097, with an average attendance of 32,717 (for 2007). Thus, at an average MLB regular-season game, approximately 72.6% of the seats are filled. In contrast, English Premiership soccer stadiums have an average

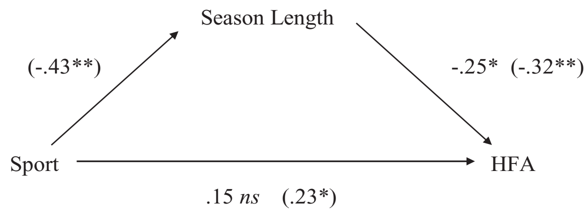

Figure 1. Season length as a mediator of sport effects. Coefficients in parentheses indicate zero-order correlations. Coefficients not in parentheses represent parameter estimates for a recursive path model including both predictors. *Parameter estimates or correlations that differ from 0 at $p < .05$. **Parameter estimates or correlations that differ from 0 at $p < .01$. HFA = home-field advantage.

capacity of 39,035, with an average attendance of 32,462 (2007–2008 season). These figures indicate that 83.2% of the seats are full at an English Premiership soccer game. Thus, crowd density (see Schwartz & Barsky, 1977) could play a role in why baseball exhibits a smaller effect, as compared to more densely attended sports, such as soccer or basketball (89.8%; Smith, Ciacciarelli, Serzan, & Lambert, 2000) or hockey (91.6%; Smith, 2003).

However, game importance and density alone likely do not account for why soccer has large home-field advantages, while baseball has relatively smaller home-field advantages. Football has fewer, and thus more important games (16) per season and more dense crowds (98.6% for 2007) than baseball, but as shown in Table 3, the two sports do not differ in the magnitude of the home-field advantage. Thus, other factors must also play a role in explaining why baseball exhibits a smaller home-field advantage.

In addition to attendance factors, the behavior of fans could contribute to the differences in the home-field advantage between sports. For instance, when one examines the behavior of baseball and soccer crowds, one finds profound differences. Thus, crowd factors are obvious candidates to account for the difference in the home-field advantage between these sports. Soccer is known for having rowdy fans who chant songs and jeers throughout a game, whereas baseball is known for a less intense atmosphere in which fans routinely leave even before the game is over. The high-density, behaviorally active soccer fans likely contribute to soccer's relatively strong home-field advantage, but additional work should be conducted to identify the relative contribution of other game location factors, such as crowd and stadium factors. In addition to these factors, others also likely play a role in accounting for the different home-field advantage effects between sports. For instance, referee judgments could impact the effect, as previous research has demonstrated that the home-field advantage is stronger for judged Olympic sports than for objective sports (Balmer, Nevill, & Williams, 2001).

However, season length (and associated factors) likely are not the only factors that account for why different sports produce different home-field advantage effects because the home-field advantage in football, which has short seasons, does not significantly differ from the home-field advantage in baseball, which has long seasons. Thus, more research is required to examine exactly why specific sports produce different home-field advantage effects. However, the sport mediator analysis shows that season length does mediate this effect. Regardless of why there are differences between sports, it is interesting to note that there is a significant home-field advantage for each sport that was examined in the current meta-analysis. This reaffirms the notion that playing at home is, indeed, an advantage.

General Discussion

The overall home-field advantage produced in the current meta-analysis (M_π = .604) was significantly different from what would be expected from chance (π = .500; 95% confidence interval = .590–.618). Thus, this meta-analysis indicates that the home team will win approximately 60% of all athletic contests.

However, the primary goal of the current meta-analysis was to examine the potential impact of six moderator variables on the home-field advantage in athletics. These moderators included sport type, level of competition, time era, season length, game type, and sport. Consistent with suggestions of previous reviews in this area (Courneya & Carron, 1992), neither sport type (individual vs. group) nor level of competition (collegiate vs. professional) impacted the home-field advantage in athletics. However, time era, season length, game type, and sport all had a significant impact on the home-field advantage.

The time-era effect demonstrated that the advantage for home teams was significantly greater before 1950 than it has been since. One of the more interesting effects produced by the current meta-analysis is the finding that the home-field advantage is stronger for high-pressure championship/playoff games than for lower pressure regular-season games. This finding helps to answer the question as to whether athletes tend to perform better (e.g., Schlenker et al., 1995) or worse (e.g., Baumeister & Steinhilber, 1984) at home in high-pressure games.

Although the current meta-analysis suggests that athletes, generally, do not choke in important games when playing at home, athletes still may choke when they experience threat or self-doubts (e.g., Beilock et al., 2006). This finding also suggests that the home-field advantage should be stronger for intense rivalries versus other games. Because team quality is often confounded with intensity of rivalry, though, the current analysis, which uses win–loss proportions, would not be the optimal measure to examine this effect. However, it is likely that if rivalries increase the subjective importance of games, the home-field advantage will be accentuated.

This meta-analysis also suggests that the season-length and sport effects are intertwined. Separate analyses demonstrated that each of these moderators had a significant impact on the magnitude of the home-field advantage. Increasing the length of season decreased the advantage enjoyed by the home team. As for the sport effects, baseball exhibited a smaller home-field advantage than all other sports, except football, golf, and cricket; whereas soccer produced larger home-field advantages than any other sport. However, the current meta-analysis found that the season-length effect mediated the effect of sport on home-field advantage. Thus, different sports exhibit different home-field advantages because they have seasons of different lengths. This is not surprising, as longer seasons decrease the importance of each game, which could reduce the effect of the home-field advantage.

However, it is not the case that all sports with shorter seasons will exhibit larger effect sizes than sports with longer seasons. As mentioned previously, NFL teams play only 16 games per season, but football produces a mean effect size that is not different from baseball, where the primary professional sports league (MLB) plays 162 games per season. It is possible that the relatively small effect sizes demonstrated in football, as compared to other short-season sports is the result of the short careers of NFL players. In fact, according to the NFL Players Association, NFL careers are only 3.27 years, which is the shortest of the four major professional American sports leagues: MLB (baseball) = 5.60 years; NHL (hockey) = 5.00 years; and NBA (basketball) = 4.50 years. Furthermore, unlike MLB and NBA contracts, players' contracts in the NFL are not guaranteed. Both of these factors could lead to higher rates of player turnover in the NFL, as compared to the other major American professional sports leagues. The more turnover there is, the less familiar players are with a particular system or venue. However, this is just speculation, and additional research is required to examine why football exhibits a relatively small home-field advantage effect.

The current findings also have implications for theoretical models. To date, the most comprehensive model of the home-field advantage in athletics is Courneya and Carron's (1992) feed-forward model (see also Carron et al., 2005). In this model, factors associated with the location of the game feed into the psychological states of the competitors and referees/judges, which then impact the behavior of these individuals, resulting in a home-field advantage. In addition to the factors identified by Courneya and Carron, the current research suggests that game-context factors should be added to the feed-forward model to provide a more comprehensive account of what causes the home-field advantage.

Specifically, the era, season-length, and sport findings demonstrate when a contest occurs (i.e., era) and what attributes are associated with particular contests (i.e., season length, sport) impact the magnitude of the home-field advantage. These contextual variables, however, are not represented in the feed-forward model, and may directly feed into game-location factors. That is, contextual factors shape the likelihood that a sports contest will produce a home advantage (or not) prior to the effects of game location. For instance, two sporting contests that have the exact same game location factors, participants, referees/judges, and fans will not necessarily feed-forward to produce a similar home-field advantage effect if the two contests are being played in different time periods (e.g., 1930 vs. 2000) or if the two contests are examining different sports (e.g., baseball vs. soccer). Thus, theoretical models would benefit from the inclusion of contextual factors.

However, the goal of the current meta-analysis was not to make theoretical claims about why the home-field advantage exists. Instead, the goal was to quantify the home-field advantage in athletic competitions across a variety of potential moderating variables. One additional contribution of the current research is that it highlights topics for future research in this area. Although this meta-analysis shows how some moderating variables impact the home-field advantage in athletics, it cannot take the place of individual studies, which are required to examine how the moderator variables in the present research produce their effect. As more money is invested in athletes' salaries and as ticket prices continue to rise, the importance attached to the outcomes of sporting events increases. Identifying factors that can help to predict when one team will triumph over another has consequences for owners, athletes, fans, and the media alike.

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Appendix

List of Effect Sizes Used in the Meta-Analysis

Study	Sport type	Level of competition	Time era	Season length	Game type	Sport	# of games	π	*Z*
Acker97	Group	Professional	N/A	<50	Regular	Football	1566.00	0.58	6.70
Agnew94	Group	Collegiate	N/A	50–100	Regular	Hockey	90.00	0.62	2.20
Balmer05	Individual	Professional	N/A	N/A	Playoff/Championship	Boxing	788.00	0.67	9.54
Bray99	Group	Professional	N/A	50–100	Regular	Hockey	30000.00	0.60	37.79
Brown02	Group	Professional	N/A	<50	Playoff/Championship	Soccer	1158.00	0.80	20.39
Carmichael05	Group	Professional	1991–2007	<50	Regular	Soccer	285.00	0.65	4.92
Clarke05	Group	Professional	N/A	<50	Regular	Rugby/Aus. football	2299.00	0.60	9.49
Courneya91	Group	Professional	1971–1990	>100	Regular	Baseball	1812.00	0.55	4.34
Dowie82a	Group	Professional	<1950	<50	Playoff/Championship	Soccer	10.00	0.90	2.53
Dowie82b	Group	Professional	N/A	<50	Playoff/Championship	Soccer	41.00	0.78	3.59
Jamieson08a	Group	Professional	1991–2007	>100	Regular	Baseball	12150.00	0.54	9.25
Jamieson08aa	Individual	Professional	1991–2007	50–100	Playoff/Championship	Tennis	971.00	0.60	6.07
Jamieson08b	Group	Professional	1991–2007	>100	Playoff/Championship	Baseball	163.00	0.55	1.18
Jamieson08bb	Individual	Professional	1991–2007	50–100	Regular	Tennis	117.00	0.60	2.13
Jamieson08c	Group	Collegiate	1991–2007	51–100	Regular	Baseball	174.00	0.52	0.61
Jamieson08cc	Individual	Professional	1971–1990	N/A	Playoff/Championship	Boxing	44.00	0.57	0.90
Jamieson08d	Group	Professional	1991–2007	<50	Regular	Football	1280.00	0.58	5.37
Jamieson08dd	Individual	Professional	1991–2007	N/A	Playoff/Championship	Boxing	36.00	0.56	0.67
Jamieson08e	Group	Professional	1991–2007	<50	Playoff/Championship	Football	50.00	0.60	1.41
Jamieson08ee	Individual	Collegiate	N/A	N/A	Playoff/Championship	Boxing	40.00	0.63	1.58
Jamieson08f	Group	Collegiate	1991–2007	<50	Regular	Football	96.00	0.52	0.14
Jamieson08g	Group	Professional	1991–2007	50–100	Regular	Hockey	3447.00	0.56	7.03

Appendix

Continued

Study	Sport type	Level of competition	Time era	Season length	Game type	Sport	# of games	π	Z
Jamieson08h	Group	Professional	1991–2007	50–100	Playoff/Championship	Hockey	252.00	0.56	1.89
Jamieson08i	Group	Collegiate	1991–2007	<50	Regular	Hockey	112.00	0.58	1.70
Jamieson08j	Group	Collegiate	N/A	<50	Playoff/Championship	Hockey	171.00	0.75	6.50
Jamieson08k	Group	Professional	1991–2007	50–100	Regular	Basketball	4879.00	0.60	13.90
Jamieson08l	Group	Professional	1991–2007	50–100	Playoff/Championship	Basketball	334.00	0.65	5.58
Jamieson08m	Group	Collegiate	1991–2007	<50	Regular	Basketball	280.00	0.63	4.30
Jamieson08n	Group	Professional	1991–2007	<50	Regular	Soccer	1140.00	0.63	8.53
Jamieson08o	Group	Professional	1991–2007	<50	Playoff/Championship	Soccer	451.00	0.69	8.15
Jamieson08p	Group	Collegiate	1991–2007	<50	Regular	Soccer	61.00	0.57	1.15
Jamieson08q	Individual	Professional	<1950	<50	Playoff/Championship	Golf	94.00	0.67	2.68
Jamieson08r	Individual	Professional	1951–1970	<50	Playoff/Championship	Golf	205.00	0.59	2.45
Jamieson08s	Individual	Professional	1971–1990	<50	Playoff/Championship	Golf	279.00	0.51	0.30
Jamieson08t	Individual	Professional	1991–2007	<50	Playoff/Championship	Golf	217.00	0.51	0.20
Jamieson08u	Individual	Professional	1991–2007	<50	Playoff/Championship	Golf	225.00	0.56	1.80
Jamieson08v	Individual	Professional	1991–2007	<50	Regular	Golf	99.00	0.57	1.31
Jamieson08w	Individual	Professional	<1950	50–100	Playoff/Championship	Tennis	189.00	0.67	4.58
Jamieson08x	Individual	Professional	1951–1970	50–100	Playoff/Championship	Tennis	98.00	0.66	2.83
Jamieson08y	Individual	Professional	1971–1990	50–100	Playoff/Championship	Tennis	93.00	0.58	1.56
Jamieson08z	Individual	Professional	1991–2007	50–100	Playoff/Championship	Tennis	78.00	0.58	1.36
Jones05	Group	Professional	1991–2007	<50	Regular	Rugby/Aus. football	9.00	0.67	1.00
Leonard98	Group	Professional	1991–2007	>100	Playoff/Championship	Baseball	260.00	0.73	7.44
Madrigal99	Group	Professional	N/A	50–100	Regular	Basketball	1800.00	0.61	9.25

Moore95	Group	Collegiate	1991–2007	<50	Regular	Basketball	90.00	0.64	2.74
Morley05	Group	Professional	1991–2007	<50	Regular	Cricket	224.00	0.58	1.47
Morton06	Group	Professional	1991–2007	<50	Regular	Rugby/Aus. football	345.00	0.64	5.38
Neave03	Group	Professional	1991–2007	<50	Regular	Soccer	760.00	0.66	8.82
Pace92	Group	Professional	1971–1990	50–100	Playoff/Championship	Hockey	82.00	0.57	1.33
Pollard02a	Group	Professional	N/A	>100	Regular	Baseball	567.00	0.55	2.26
Pollard02b	Group	Professional	N/A	50–100	Regular	Hockey	533.00	0.56	2.86
Pollard02c	Group	Professional	N/A	50–100	Regular	Basketball	697.00	0.65	5.70
Pollard05a	Group	Professional	<1950	>100	Regular	Baseball	56765.00	0.55	22.04
Pollard05b	Group	Professional	1951–1970	>100	Regular	Baseball	27268.00	0.54	13.21
Pollard05c	Group	Professional	1991–2007	>100	Regular	Baseball	7281.00	0.54	6.84
Pollard05d	Group	Professional	<1950	<50	Regular	Football	964.00	0.57	4.35
Pollard05e	Group	Professional	1951–1970	<50	Regular	Football	2342.00	0.56	5.81
Pollard05f	Group	Professional	1991–2007	<50	Regular	Football	1960.00	0.59	7.97
Pollard05g	Group	Professional	<1950	50–100	Regular	Hockey	4748.00	0.59	12.40
Pollard05h	Group	Professional	1951–1970	50–100	Regular	Hockey	5262.00	0.60	14.51
Pollard05i	Group	Professional	1991–2007	50–100	Regular	Hockey	3690.00	0.55	6.07
Pollard05j	Group	Professional	<1950	50–100	Regular	Basketball	7603.00	0.64	24.42
Pollard05k	Group	Professional	1951–1970	50–100	Regular	Basketball	8118.00	0.64	25.23
Pollard05l	Group	Professional	1991–2007	50–100	Regular	Basketball	3567.00	0.61	13.14
Pollard05m	Group	Professional	<1950	<50	Regular	Soccer	16112.00	0.61	27.93
Pollard05n	Group	Professional	1951–1970	<50	Regular	Soccer	9240.00	0.63	24.98
Pollard05o	Group	Professional	1971–1990	<50	Regular	Soccer	8952.00	0.63	24.60
Pollard86a	Group	Professional	1971–1990	>100	Regular	Baseball	6316.00	0.54	5.79

Appendix

Continued

Study	Sport type	Level of competition	Time era	Season length	Game type	Sport	# of games	π	Z
Pollard86b	Group	Professional	1971–1990	<50	Regular	Football	571.00	0.55	2.44
Pollard86c	Group	Professional	1971–1990	<50	Regular	Soccer	512.00	0.65	6.60
Pollard86d	Group	Professional	1971–1990	<50	Regular	Cricket	289.00	0.56	2.06
Recht95	Group	Professional	1991–2007	>100	Regular	Baseball	1081.00	0.56	3.86
Schlenker95a	Group	Professional	N/A	>100	Playoff/Championship	Baseball	340.00	0.54	0.81
Schlenker95b	Group	Professional	N/A	50–100	Playoff/Championship	Basketball	340.00	0.64	5.32
Schwartz77a	Group	Professional	1971–1990	>100	Regular	Baseball	1880.00	0.53	2.26
Schwartz77b	Group	Professional	1971–1990	<50	Regular	Football	174.00	0.58	1.97
Schwartz77c	Group	Collegiate	1971–1990	<50	Regular	Football	899.00	0.59	5.50
Schwartz77d	Group	Professional	1971–1990	50–100	Regular	Hockey	449.00	0.64	5.81
Smith00	Group	Professional	1991–2007	50–100	Regular	Hockey	1823.00	0.55	4.36
Smith03a	Group	Professional	1991–2007	>100	Regular	Baseball	4519.00	0.54	5.65
Smith03b	Group	Professional	1991–2007	50–100	Regular	Basketball	2376.00	0.58	8.19
Snyder85	Group	Collegiate	1971–1990	<50	Regular	Basketball	90.00	0.66	3.04
Stefani92a	Group	Collegiate	1971–1990	<50	Regular	Football	1669.00	0.57	6.05
Stefani92b	Group	Professional	1971–1990	<50	Playoff/Championship	Soccer	1079.00	0.60	6.76
Vergin99	Group	Professional	N/A	<50	Playoff/Championship	Football	137.00	0.58	1.79
Wolfson05	Group	Professional	1991–2007	<50	Regular	Soccer	579.00	0.64	6.94
Wright95	Group	Professional	N/A	50–100	Playoff/Championship	Hockey	80.00	0.60	2.03

Note. Jamieson08 refers to the effect sizes calculated by the author for the present study.