Longitudinal Match Performance Characteristics of UK and Non-UK Players in the English Premier League

Running Title: UK and Non-UK Match Performance Characteristics

Keywords: Evolution, football, foreign players, sprinting, passing

Word Count: 3212

Abstract

This study investigated the longitudinal match performance characteristics in the English Premier League (EPL), with special reference to player nationality (UK vs. non-UK). Match observations (*n*=14700) were collected using a multi-camera computerised tracking system across seven consecutive EPL seasons (2006-07 to 2012-13). Player nationality referred to their birthplace, with players born in England, Scotland, Wales or Northern Ireland classified as UK players and other nationalities considered non-UK. Non-UK players demonstrated the most pronounced increases in high-intensity running distance across the seven seasons compared to UK players ($p<0.001$, ES: 0.91 vs. 0.73). UK players covered more high-intensity running distance in 2006-07 ($p<0.001$, ES: 0.24 [CI 0.17-0.31]), however by 2012-13 both populations covered nearly identical distances ($p>0.05$, ES: 0.08 [CI 0.01-0.15]). In contrast, non-UK players performed more passes in 2006-07 compared to UK players ($p<0.001$, ES: 0.23 [CI 0.16-0.3]), however by 2012-13, passing performance between UK and non-UK players was equal ($p>0.05$, ES: 0.05 [CI -0.01-0.13]). The data demonstrates that the longitudinal match performance characteristics in the EPL are similar between UK and non-UK populations.

Introduction

Soccer is a complex sport with players randomly transitioning between maximal, or near-maximal, multidirectional high-intensity efforts and longer periods of low-intensity activity (Bangsbo, Mohr, & Krustrup, 2006). Players typically cover 9–14 km in total during a match with high-intensity running accounting for ~10% of that distance (Di Mascio & Bradley, 2013; Mohr, Krustrup, & Bangsbo, 2003). The physical demands of match-play have been quantified in the English Premier League (Bradley et al., 2009; Di Salvo, Gregson, Atkinson, Tordoff, & Drust, 2009), Italian Serie A (Mohr et al., 2003; Vigne, Gaudino, Rogowski, Alloatti, & Hautier, 2010), Spanish La Liga (Castellano, Blanco-Villaseñor, & Alvarez, 2011), French Ligue 1 (Carling, 2010), German Bundesliga (Hoppe, Slomka, Baumgart, Weber, & Freiwald, 2015) in addition to the UEFA European Champions League (Bradley, Dellal, Mohr, Castellano, & Wilkie, 2014; Di Salvo et al., 2010). The research results suggest that the English Premier League (EPL) is one of the most physically intense Leagues in Europe (Bradley et al., 2009; Dellal et al., 2011; Di Salvo et al., 2009). Despite the physicality of modern match-play, players are still expected to be proficient in an array of technical skills and have exceptional tactical awareness in order to be successful, which is more closely related with game outcome (Barnes, Archer, Hogg, Bush, & Bradley, 2014; Bradley et al., 2013; Carmichael, Thomas, & Ward, 2001; Dellal et al., 2011; Lago & Martin, 2007; Rampinini, Impellizzeri, Castagna, Coutts, & Wisløff, 2009). Thus, given the multifaceted nature of the game it is imperative that more research analyses both physical and technical match performance parameters in order to fully appreciate the complexities of the modern game and its determinants.

The EPL has undergone substantial change over the last decade with the distances covered at high-intensity and sprinting increasing by 30-50% and the number of passes rising by 40% (Barnes et al., 2014), with subsequent research identifying these evolutionary trends to be position and tier specific (Bradley et al., 2015; Bush, Barnes, Archer, Hogg, & Bradley, 2015). Despite supporting evidence, a commonly held belief within the game is that the increased migration of non-UK players into the EPL could account for these recent alterations in technical performances (Richardson, Littlewood, Nesti, & Benstead, 2012), although its unclear why such pronounced increases have been observed in physical performances. The increased proportion of non-UK players in the EPL is related to the Bosman ruling which abolished foreign player quotas for clubs, allowing teams to buy non-UK players without restriction (Binder & Findlay, 2012; Littlewood, Mullen, & Richardson, 2011; Richardson et al., 2012). Nevertheless, previous studies have not accounted for the influence of non-UK players on longitudinal match performance and thus the present study investigated the longitudinal impact of UK and non-UK players on match performance characteristics in the EPL.

Methods

Match Analysis and Player Data

Match performance data were collected from seven consecutive EPL seasons (2006-07 to 2012-13) using a computerized multiple-camera tracking system (Prozone Sports Ltd®, Leeds, UK). Players' movements were captured during matches by cameras positioned at roof level and analysed using proprietary software to produce a dataset on each player's physical and technical

performance. The validity and reliability of this tracking system has been quantified to verify the capture process and data accuracy (Di Salvo, Collins, McNeill, & Cardinale, 2006; Di Salvo et al., 2009). Ethical approval was obtained from the appropriate institutional ethics committee with Prozone Sports Ltd® supplying the data and granting permission to publish.

Data were derived from Prozone's Trend Software and consisted of 1036 individual players across 22846 player observations. Original data files were de-sensitized but included 33 different teams overall with 20 teams evaluated in each season. Individual match data were only included for outfield players that had completed the entire 90 min (Carling & Dupont, 2011). Matches were excluded if a player dismissal occurred. The total number of observations were substantially different across season (2006-07 to 2012-13), phase of season (Aug-Nov, Dec-Feb, Mar-May), position (attackers, central defenders, central midfielders, full backs, wide midfielders), location (Home and Away) and team standard based on final league ranking. The original data were re-sampled in order to balance the number of samples in each of these categories thus minimising errors when applying statistical tests. Table 1 shows a detailed breakdown of the resampled data. The re-sampling was achieved using the stratified function in the R package "devtools" (R Development Core Team) using the procedures of Wickham & Chang (2013) with 14700 player observations included for further analysis.

Classification of Player Nationality

Classifying a players' nationality is a complex process, thus a systematic approach was taken to enable the longitudinal match performance trends of players with different nationalities to be explored. The national team a player was eligible to

play for dictated the nationality selected for that individual. Players with an English, Scottish, Welsh or Northern Irish nationality were considered UK players, with all other nationalities considered non-UK, including players of Republic of Ireland nationalities due to historical political and social issues (McGovern, 2002). Nationality data were aggregated into continents based on the official FIFA classifications regarding the location of the countries national governing bodies (FIFA, 2014). Due to number of player observations in some continents, data comparisons were only made between UK and non-UK populations.

Match Performance Parameters

Activities were coded into the following: standing (0-0.6 $km \cdot h^{-1}$), walking (0.7-7.1 $km \cdot h^{-1}$), jogging (7.2-14.3 $km \cdot h^{-1}$), running (14.4-19.7 $km \cdot h^{-1}$), high-speed running (19.8-25.1 $km \cdot h^{-1}$) and sprinting (>25.1 $km \cdot h^{-1}$) (Bradley et al., 2009). High-intensity running consisted of the combined distance in high-speed running and sprinting (≥19.8 $km \cdot h^{-1}$) and was separated into three subsets based on the teams' possession status: with or without ball possession and when the ball was out of play (WP, WOP, BOP, respectively). An explosive sprint is where a player enters a sprint immediately after a low-to-moderate speed activity (<19.8 $km \cdot h^{-1}$) in the previous 0.5 s period, without entering a high-speed run. A leading sprint is where a player enters a sprint from a high-speed run in the previous 0.5 s period (Di Salvo et al., 2010). Match analysis included the coding of technical parameters according to playing position based on the criteria defined by Prozone and included the number of passes, received passes and successful passes (Di

Salvo et al., 2007). Pass distance referred to the overall length of the pass and was split into short (≤10 m), medium (11-24 m) and long (≥25m).

Statistical Analysis

Factorial analysis of variance tests with sphericity assumed were used to compare UK and non-UK populations from each season. Dunnet's *post hoc* tests used to verify localised differences relative to 2006-07 for each subsequent season with significance set at $p<0.05$. Normality was assessed visually, since even minor deviations from normality can result in data being classified as not normally distributed with such a large dataset. The effect size (ES) was calculated to determine the meaningfulness of the difference, corrected for bias using Hedges formula and presented with 90% Confidence Intervals (CI). Calculations of absolute change per season for selected indicators were assessed based on the 90% CI of the coefficient of the slope (linear regression). The ES magnitudes were classified as trivial (<0.2), small (>0.2-0.6), moderate (>0.6-1.2) and large (>1.2; Batterham & Hopkins, 2006). All analyses were conducted using statistical software (R Development Core Team) and data visualisation was carried out using the ggplot2 package accessed via the Deducer Interface for the R statistical programming language.

Results

Physical Parameters

UK players covered greater distances at high-intensities compared to non-UK players in 2006-07 (929±310 vs. 858±286m, $p<0.001$, ES: 0.24 [CI 0.17-0.31]). However non-UK players recorded greater increases over the seven seasons

(p<0.001, ES: 0.91 [CI 0.83-0.97] vs. 0.73 [CI 0.65-0.80]), resulting in comparable high-intensity running distance being covered by 2012-13 (UK: 1167±344 vs. non-UK: 1139±331m, ES: 0.08 [CI 0.01-0.15]). These increases were equivalent to 31 (CI 27-34) and 40 (CI 37-43) $m \cdot season^{-1}$ for UK and non-UK players respectively (Figure 1A). Similarly, trivial differences were observed with high-intensity running distance WP, where UK players recorded greater distances in 2006-07 (391±240 vs. 358±235m, p<0.05, ES: 0.14 [CI 0.07-0.21]), but was identical (UK: 478±260 vs. non-UK: 478±261m, ES: 0.0 [CI -0.07-0.07]) in 2012-13 and equivalent to 9 (CI 7-12) and 19 (CI 17-21) $m \cdot season^{-1}$ for UK and non-UK players respectively. Trivial differences were observed for high-intensity running distance WOP, where UK players covered greater distances in 2006-07 compared to non-UK players (468±164 vs. 437±159m, p<0.001. ES: 0.19 [CI 0.12-0.26]), but these differences were non-significant in 2012-13 (599±192 vs. 581±202m, p>0.05, ES: 0.09 [CI 0.02-0.16]), being equivalent to 18 (CI 17-20) and 19 (CI 17-20) $m \cdot season^{-1}$ for UK and non-UK players respectively.

Similar trivial patterns were observed for sprinting with UK players covering greater sprint distances in 2006-07 compared to non-UK players (243±117 vs. 222±110m, p<0.001, ES: 0.19 [CI 0.11-0.26]), but the same distance in 2012-13 (UK: 355±147 vs. non-UK: 346±133m, ES: 0.06 [CI -0.01-0.14]). Sprint distance increased by 15 (CI 14-17) and 18 (CI 17-19) $m \cdot season^{-1}$ for UK and non-UK players respectively (Figure 1B). No differences were observed between UK and non-UK players, respectively, for both the number of sprints performed (2006-07: 32±15 vs. 30±14; 2012-13: 57±21 vs. 56±20, p>0.05, ES: <0.15 [CI -0.02-0.21]) and the average distance per sprint (2006-07: 6.9±1.3 vs. 6.9±1.4m; 2012-13: 5.9±0.9 vs. 5.9±0.8m, p>0.05, ES: 0.0 [CI -0.07-0.07]), with

similar changes across the seasons. The number of sprints performed increased by 3.5 (CI 3.4-3.7) and 4.0 (CI 3.8-4.1) per season in UK and non-UK players respectively, whereas the average distance covered per sprint decreased annually by 0.2 (CI 0.1-0.2) $m \cdot season^{-1}$ in both groups. In addition the number of leading (2006-07: 21±10 vs. 20±9, p>0.05, ES: 0.11 [CI 0.03-0.18]; 2012-13: 31±13 vs. 30±12, p>0.05, ES: 0.08 [CI 0.01-0.15]) and explosive sprints (2006-07: 11±7 vs. 10±6, p>0.05, ES: 0.15 [CI 0.08-0.23]; 2012-13: 27±11 vs. 26±10, p>0.05, ES: 0.1 [CI 0.02-0.17]) were identical between UK and non-UK in both seasons, these having increased annually by a similar magnitude for leading (1.2 [CI 1.1-1.4] and 1.5 [CI 1.4-1.6]) and explosive sprints (2.3 [CI 2.2-2.4] and 2.5 [CI 2.4-2.5]), respectively.

Technical Parameters

Technical data revealed trivial to small differences between UK and non-UK players. Non-UK players performed three more passes per match in 2006-07 (27±14) compared to UK players (24±12, ES: 0.23 [CI 0.16-0.3]), however by 2012-13 this small difference had reduced to a single pass (non-UK 36±17 vs. UK: 35±17, p>0.05, ES: 0.05 [CI -0.01-0.13]). This was equivalent to an increase of 1.8 (CI 1.6-1.9) and 1.7 (CI 1.6-1.9) $passes \cdot season^{-1}$ made by UK and non-UK players respectively (Table 2). When broken down, the number of short passes increased from 6±4 in 2006-07 to 9±5 (ES: 0.61 [CI 0.53-0.68]) for UK players and from 7±5 to 10±6 (ES: 0.54 [CI 0.47-0.61]) for non-UK players, annual changes of 0.5 (CI 0.5-0.6) $passes \cdot season^{-1}$. Over the same time period the number of medium passes for both UK (12±8 to 19±11, ES: 0.73 [CI 0.65-0.80]) and non-UK players (14±9 to 20±12, ES: 0.56 [CI 0.49-0.63]), increasing annually to a

similar degree (1.1 [CI 1.0-1.2] passes·season^{-1}). Non-UK players recorded a trivially greater pass success rate in 2006-07 (UK: 75±13 vs. non-UK: 77±12%, ES: 0.16 [CI 0.09-0.23]); nevertheless by 2012-13 both UK and non-UK players had similar pass success rates (UK: 83±10 vs. non-UK: 84±10%, ES: 0.10 [CI 0.03-0.17]). Pass success rate increased seasonally by 1.3 (CI 1.2-1.4) and 1.1% (CI 1.0-1.2) for UK and non-UK players, respectively (Figure 2). The percentage of occurrences of UK players with a passing success rate of <70% decreased from 29% in 2006-07 to 9% in 2012-13, whereas it decreased from 24% to 10% for non-UK players over the same time period. The number of passes received was greater for non-UK compared to UK players in 2006-07 (20±13 vs. 18±11, ES: 0.17 [CI 0.09-0.24]), though were the same in 2012-13 (UK: 29±15 vs. non-UK: 30±15, ES: 0.07 [CI -0.01-0.14]), increasing by 1.8 (CI 1.7-1.9) passes·season^{-1}.

Discussion

The aim of this study was to investigate the longitudinal match performance characteristics of UK and non-UK players in the EPL. Research to date on the involvement of UK and non-UK players in the EPL has focussed on migration patterns (Maguire & Pearton, 2000; Richardson et al., 2012), the legal aspects of player movement (Gardiner & Welch, 2011) and the impact of migration on national teams (Binder & Findlay, 2012; Maguire & Pearton, 2000). To our knowledge, although some research has analysed the differences between different leagues (Dellal et al., 2011; James, Mellalieu, & Hollely, 2002) no research has examined the longitudinal effect of player nationality on match performance.

The present data suggests that at least by the 2012-13 season, there was little difference between UK and non-UK players' physical and technical performances. Non-UK player's demonstrated greater relative increases for physical parameters in this study compared to UK players (sprint distance: 55% vs. 47%; high-intensity distance: 33% vs. 27%; high-intensity distance WOP: 35% vs. 27%; leading sprints: 52% vs. 46%). It is possible that the UK players were more accustomed to working at higher intensities compared to non-UK players. Players intermittent exercise test performances have been shown to correlate with physical match performance (Bradley, Bendiksen, et al., 2014; Krustrup et al., 2003). There are limited physical capacity differences in Middle Eastern, Asian and African players in comparison to UK players (Chaouachi et al., 2010; Kulkarni, Levin, Peñailillo, Singh, & Singh, 2013; Ueda et al., 2011). Although players are performing lower physical workloads during matches in different national leagues (Barros et al., 2007), this is probably due to the requirements of the respective leagues rather than the players' individual capacities. In support of this, researchers have observed changes in physical performance when performing at different playing levels without changes in the physiological profile of players (Andersson, Randers, Heiner-Møller, Krustrup, & Mohr, 2010; Bradley et al., 2013). This suggests that player work rates are dictated by the situational and tactical factors, independent of their physical capacities. Alternatively, and more probable, are improvements in the recruitment process permitting clubs to employ non-UK players with greater capacity to work at higher intensities. Although it important to point out that the effect sizes for these UK and non-UK comparisons were trivial and thus this differences are not practically meaningful.

There is limited research assessing the technical performance from different world leagues, though it would suggest limited differences exist within European countries (James et al., 2002; Janković, Leontijević, Jelušić, & Pašić, 2011; Tenga, Ronglan, & Bahr, 2010). In the present study, UK players demonstrated greater percentage increases for passing variables compared to non-UK players (passes: 48% vs. 34%; passes received: 63% vs. 50%; short passes: 67% vs. 47%; medium passes: 56% vs. 38%). In support of this, the percentage of player occurrences with a passing success rate of <70%, identified as a minimum requirement in elite soccer (Dellal et al., 2011), was lower in UK players compared to non-UK players in 2006-07 (29% vs. 24%), whereas by 2012-13, these differences were trivial (UK: 9% vs. non-UK: 10%). Overall, these data could suggest that non-UK players were initially accustomed to more technically based playing styles before employment in the UK and may therefore have contributed to the development of possession based playing strategies in the EPL. Alternatively these changes in technical performance in both UK and non-UK players could be due to the influx of foreign managers employing this style of play within their coaching philosophy and recruiting players that can integrate into the playing style (Barnes et al., 2014; Bush et al., 2015).

The physical demands (both the total distance and distances at high-intensity and sprinting) in the EPL across the seven seasons analysed in this study are consistently higher than those measured in other leagues in both Europe and Worldwide (Barros et al., 2007; Dellal et al., 2011). As a result non-UK players transitioning into the EPL may be required to perform greater physical workloads during matches, whilst replicating the technical ability they were recruited for. The present study accounted for player nationality, and whilst the results

displayed fewer obvious trends, a convergence over time was evident for both physical and technical performance between UK and non-UK players. It is possible that UK players have encouraged the evolution in non-UK players' physical performance whilst non-UK players' technical performance has aided UK players technical performance. Due to the number of non-UK players in the EPL, as well as the growing arguments associated with the reducing numbers of UK players and the wider effects on the UK national teams, the FA has proposed to increase the minimum number of 'home-grown' (affiliated to a UK based football association for 3 years before the age of 21) players in the EPL from 8 to 12 per squad (The FA, 2015), with a short term view of increasing the playing opportunities for UK players and a long term view of improving the success of the national teams. Nevertheless, it is important to note that these are currently proposals and have not been implemented.

The results of the present study are presented over a limited number of seasons. Thus, in order to gain a greater understanding of the influx of non-UK players and their effects on the EPL a more historic comparison would be required. Nevertheless, this would be challenging, as this would predate the introduction of semi-automated tracking systems. In addition, some of the physical and technical developments may be driven by altered tactics or playing styles, for example, playing formation can influence some physical and technical performance metrics during a match (Bradley et al., 2011). Due to the nature of the dataset and the fluidity of these factors, it was not factored into the analysis. Moreover, due to the nature of the desensitised data, it was impossible to discriminate between non-UK players who had played in the EPL for consecutive seasons and those in their first season (repeated measures design needed), with

this information it could be assessed whether non-UK players bring greater performance to the EPL or whether non-UK players adapt after playing a number of seasons in the EPL. Neither could we identify players who had transferred between teams in the EPL, which may have influenced performance. It must also be noted that player nationality was classified by the players eligibility for a national side, however this does not acknowledge the fact a player can be eligible for a national side but can play their entire domestic career in a different country, nor does this acknowledge a players true place of birth, as players can be play for a national side dependent upon their relatives registered birth country.

In conclusion, it is possible that increasing numbers of non-UK players performing in the EPL has helped evolve the technical capabilities of UK players. However, the results of this study suggest that non-UK players have to adapt and increase their physical performance to match their UK counterparts. Therefore, contrary to popular opinion, the evolution of performance in the EPL cannot clearly be attributed to the recruitment of non-UK players. These changes may also be partly due to altered playing styles, tactics or player recruitment policies adopted by EPL teams over this period. However, due to the nature of team based sports (UK and non-UK players are mixed within a team), the similarity between UK and non-UK based populations could be related to the fact that players within a team are influenced by each other and the opposition players which may have a dilution effect on the trends observed.

Acknowledgments

The authors would like to thank Paul Neilson and Will Jones from Prozone Sports for providing access to the data used in this study.

References

Andersson, H., Randers, M. B., Heiner-Møller, A., Krustrup, P., & Mohr, M. (2010). Elite Female Soccer Players Perform More High-Intensity Running When Playing in International Games Compared With Domestic League Games. *Journal of Strength and Conditioning Research*, *24*(4), 912–919.

Bangsbo, J., Mohr, M., & Krustrup, P. (2006). Physical and metabolic demands of training and match-play in the elite football player. *Journal of Sports Sciences*, *24*(7), 665–674.

Barnes, C., Archer, D., Hogg, B., Bush, M., & Bradley, P. S. (2014). The Evolution of Physical and Technical Performance Parameters in the English Premier League. *International Journal of Sports Medicine*, *35*(13), 1095–1100.

Barros, R., Misuta, M., Menezes, R., Figueroa, P., Moura, F., Cunha, S., … Leite, N. (2007). Analysis of the distances covered by first division Brazilian soccer players obtained with an automatic tracking method. *Journal of Sports Science and Medicine*, *6*, 233–242.

Batterham, A. M., & Hopkins, W. G. (2006). Making meaningful inferences about magnitudes. *International Journal of Sports Physiology and Performance*, *1*(1), 50–57.

BBC. (2013). State of the Game Premier League now less than one third English. Retrieved from http://www.bbc.co.uk/sport/0/football/24467371

Binder, J., & Findlay, M. (2012). The Effects of the Bosman Ruling on National and Club Teams in Europe. *Journal of Sports Economics*, *12*(2), 107–129.

Bradley, P. S., Archer, D. T., Hogg, B., Schuth, G., Bush, M., Carling, C., & Barnes, C. (2015). Tier-specific evolution of match performance characteristics in the English Premier League: it's getting tougher at the top. *Journal of Sports Sciences*, *0414*(October), 1–8.

Bradley, P. S., Bendiksen, M., Dellal, A., Mohr, M., Wilkie, A., Datson, N., … Krustrup, P. (2014). The Application of the Yo-Yo Intermittent Endurance Level 2 Test to Elite Female Soccer Populations. *Scandinavian Journal of Medicine and Science in Sports*, *24*(1), 43–54.

Bradley, P. S., Carling, C., Archer, D., Roberts, J., Dodds, A., Di Mascio, M., … Krustrup, P. (2011). The effect of playing formation on high-intensity running and technical profiles in English FA Premier League soccer matches. *Journal of Sports Sciences*, *29*(8), 821–830.

Bradley, P. S., Carling, C., Diaz, A. G., Hood, P., Barnes, C., Ade, J., … Mohr, M. (2013). Match performance and physical capacity of players in the top three competitive standards of English professional soccer. *Human Movement Science*, *32*(4), 808–821.

Bradley, P. S., Dellal, A., Mohr, M., Castellano, J., & Wilkie, A. (2014). Gender differences in match performance characteristics of soccer players competing in the UEFA Champions League. *Human Movement Science*, *33*, 159–71.

Bradley, P. S., Sheldon, W., Wooster, B., Olsen, P., Boanas, P., & Krustrup, P. (2009). High-intensity running in English FA Premier League soccer matches.

Journal of Sports Sciences, *27*(2), 159–168.

Bush, M., Barnes, C., Archer, D., Hogg, B., & Bradley, P. S. (2015). Evolution of Match Performance Parameters for Various Playing Positions in the English Premier League. *Human Movement Science*, *39*, 1–11.

Carling, C. (2010). Analysis of physical activity profiles when running with the ball in a professional soccer team. *Journal of Sports Sciences*, *28*(3), 319–326.

Carling, C., & Dupont, G. (2011). Are declines in physical performance associated with a reduction in skill-related performance during professional soccer match-play? *Journal of Sports Sciences*, *29*(1), 63–71.

Carmichael, F., Thomas, D., & Ward, R. (2001). Production and Efficiency in association football. *Journal of Sports Economics*, *2*(3), 228–243.

Castellano, J., Blanco-Villaseñor, A., & Alvarez, D. (2011). Contextual variables and time-motion analysis in soccer. *International Journal of Sports Medicine*, *32*(6), 415–421.

Chaouachi, A., Manzi, V., Wong, D. P., Chaalali, A., Laurencelle, L., Chamari, K., & Castagna, C. (2010). Intermittent endurance and repeated sprint ability in soccer players. *Journal of Strength and Conditioning Research / National Strength & Conditioning Association*, *24*(10), 2663–2669.

Dellal, A., Chamari, K., Wong, D. P., Ahmaidi, S., Keller, D., Barros, R., … Carling, C. (2011). Comparison of physical and technical performance in European soccer match-play: FA Premier League and La Liga. *European Journal of Sport Science*, *11*(1), 51–59.

Di Mascio, M., & Bradley, P. S. (2013). Evaluation of the most intense high-intensity running periods in English FA Premier League soccer matches. *Journal of Strength and Conditioning Research*, *27*(4), 909–915.

Di Salvo, V., Baron, R., González-Haro, C., Gormasz, C., Pigozzi, F., & Bachl, N. (2010). Sprinting analysis of elite soccer players during European Champions League and UEFA Cup matches. *Journal of Sports Sciences*, *28*(14), 1489–1494.

Di Salvo, V., Baron, R., Tschan, H., Calderon Montero, F. J., Bachl, N., & Pigozzi, F. (2007). Performance characteristics according to playing position in elite soccer. *International Journal of Sports Medicine*, *28*(3), 222–227.

Di Salvo, V., Collins, A., McNeill, B., & Cardinale, M. (2006). Validation of Prozone: A new video-based performance analysis system. *International Journal of Performance Analysis in Sport*, *6*, 108–119.

Di Salvo, V., Gregson, W., Atkinson, G., Tordoff, P., & Drust, B. (2009). Analysis of High Intensity Activity in Premier League Soccer. *International Journal of Sports Medicine*, *30*(03), 205–212.

FIFA. (2014). FIFA Associations and Confederations. Retrieved 28 September 2014, from http://www.fifa.com/associations/index.html

Gardiner, S., & Welch, R. (2011). Nationality and protectionism in football: why are FIFA's '6+5 rule' and UEFA's 'home-grown player rule' on the agenda? *Soccer & Society*, *12*(6), 774–787.

Hoppe, M. W., Slomka, M., Baumgart, C., Weber, H., & Freiwald, J. (2015). Match Running Performance and Success Across a Season in German Bundesliga Soccer Teams. *International Journal of Sports Medicine*, *36*(7), 563–6.

James, N., Mellalieu, S. D., & Hollely, C. (2002). Analysis of strategies in soccer as a function of European and domestic competition. *International Journal of Performance Analysis in Sport*, *2*(1), 85–103.

Janković, A., Leontijević, B., Jelušić, V., & Pašić, M. (2011). Analysis of passes of Serbian football (soccer) team in qualifying for the World Cup 2010. *Anthropological Aspects of Sports, Physical Education and Recreation*, *2*(1), 235–244.

Krustrup, P., Mohr, M., Amstrup, T., Rysgaard, T., Johansen, J., Steensberg, A., … Bangsbo, J. (2003). The yo-yo intermittent recovery test: physiological response, reliability and validity. *Medicine and Science in Sports and Exercise*, *35*(4), 697–705.

Kulkarni, K., Levin, G., Peñailillo, L., Singh, A., & Singh, S. J. (2013). Physical and Physiological Characteristics of Elite Indian National Football Players. *Journal of Athletic Enhancement*, *2*(6).

Lago, C., & Martin, R. (2007). Determinants of possession of the ball in soccer. *Journal of Sports Sciences*, *25*(9), 969–974.

Littlewood, M., Mullen, C., & Richardson, D. (2011). Football labour migration: an examination of the player recruitment strategies of the 'big five' European football leagues 2004–5 to 2008–9. *Soccer & Society*, *12*(6), 788–805.

Maguire, J., & Pearton, R. (2000). The impact of elite labour migration on the identification, selection and development of European soccer players. *Journal of Sports Sciences*, *18*(9), 759–769.

McGovern, P. (2002). Globalization or Internationalization? Foreign Footballers in the English League, 1946-95. *Sociology*, *36*(1), 23–42.

Mohr, M., Krustrup, P., & Bangsbo, J. (2003). Match performance of high-standard soccer players with special reference to development of fatigue. *Journal of Sports Sciences*, *21*(7), 519–528.

Rampinini, E., Impellizzeri, F., Castagna, C., Coutts, A., & Wisløff, U. (2009). Technical performance during soccer matches of the Italian Serie A league: Effect of fatigue and competitive level. *Journal of Science and Medicine in Sport*, *12*(1), 227–233.

Richardson, D., Littlewood, M., Nesti, M., & Benstead, L. (2012). An examination of the migratory transition of elite young European soccer players to the English Premier League An examination of the migratory transition of elite young European soccer players to the English Premier League, *30*(15), 37–41.

Tenga, A., Ronglan, L. T., & Bahr, R. (2010). Measuring the effectiveness of offensive match-play in professional soccer. *European Journal of Sport Science*, *10*(4), 269–277.

The FA. (2015). FA Chairman's update on England Commission. Retrieved 10 May 2015, from http://www.thefa.com/news/thefa/2015/mar/greg-dyke-england-

commission-homegrown-players-work-permits-march-2015

Transfermarkt. (2014). Premier League Statistics. Retrieved 10 September 2014, from http://www.transfermarkt.co.uk/premier-league/gastarbeiter/wettbewerb/GB1#subnavi

Ueda, S., Yamanaka, A., Yoshikawa, T., Katsura, Y., Usui, T., Orita, K., & Fujimoto, S. (2011). Differences in Physiological Characterization between Yo-Yo Intermittent Recovery Test Level 1 and Level 2 in Japanese College Soccer Players. *International Journal of Sport and Health Science*, *9*, 33–38.

Vigne, G., Gaudino, C., Rogowski, I., Alloatti, G., & Hautier, C. (2010). Activity profile in elite Italian soccer team. *International Journal of Sports Medicine*, *31*(5), 304–310.

Wickham, H., & Chang, W. (2013). Tools to make developing R code easier.

Table Legend

Table 1: Detailed breakdown of the sample data following the re-sampling process

Table 2: The number of observations by continent and playing position across seven EPL seasons.

Table 3: Changes in the number of passes and passing distance between UK and non-UK players.

Table 1:

Season	**2006-07**	**2007-08**	**2008-09**	**2009-10**	**2010-2011**	**2011-12**	**2012-13**	**Total**
Month								
Aug-Nov	700 (33)	700 (33)	700 (33)	700 (33)	700 (33)	700 (33)	700 (33)	**4900 (33)**
Dec-Feb	700 (33)	700 (33)	700 (33)	700 (33)	700 (33)	700 (33)	700 (33)	**4900 (33)**
Mar-May	700 (33)	700 (33)	700 (33)	700 (33)	700 (33)	700 (33)	700 (33)	**4900 (33)**
Location								
Home	1083 (52)	1078 (51)	1050 (50)	1069 (51)	1051 (50)	1049 (50)	1019 (49)	**7399 (50)**
Away	1017 (48)	1022 (49)	1050 (50)	1031 (49)	1049 (50)	1051 (50)	1081 (51)	**7301 (50)**
Position								
AT	315 (15)	310 (15)	309 (15)	308 (15)	306 (15)	306 (15)	298 (14)	**2152 (15)**
CB	534 (25)	527 (25)	523 (25)	539 (26)	554 (26)	546 (26)	569 (27)	**3792 (26)**
CM	459 (22)	463 (22)	465 (22)	464 (22)	454 (22)	452 (22)	443 (21)	**3200 (22)**
FB	475 (23)	489 (23)	493 (23)	487 (23)	491 (23)	487 (23)	498 (24)	**3420 (23)**
WM	317 (15)	311 (15)	310 (15)	302 (14)	295 (14)	309 (15)	292 (14)	**2136 (15)**
Standard								
A (1^{st}-4^{th})	319 (15)	245 (12)	339 (16)	360 (17)	424 (20)	446 (21)	386 (18)	**2519 (17)**
B (5^{th}-8^{th})	509 (24)	436 (21)	407 (19)	385 (18)	459 (22)	347 (17)	422 (20)	**2965 (20)**
C (9^{th}-14^{th})	486 (23)	719 (34)	656 (31)	713 (34)	587 (28)	636 (30)	651 (31)	**4448 (30)**
D (15^{th}-20^{th})	786 (37)	700 (33)	698 (33)	642 (31)	630 (30)	671 (32)	641 (31)	**4768 (32)**
Nationality								
UK	968 (46)	979 (47)	972 (46)	1006 (48)	975 (46)	1049 (50)	931 (44)	**6880 (47)**
Non-UK	1132 (54)	1121 (53)	1128 (54)	1094 (52)	1125 (54)	1051 (50)	1169 (56)	**7820 (53)**
Overall	**2100**	**2100**	**2100**	**2100**	**2100**	**2100**	**2100**	**14700**

Table 2:

	Short Pass		Medium Pass		Long Pass		Total Pass		Pass Completion (%)	
	UK	**Non-UK**	**UK**	**Non-UK**	**UK**	**Non-UK**	**UK**	**Non-UK**	**UK**	**Non-UK**
2006-07	5.7±3.9	6.6±4.5	12.3±7.9	14.3±9.3	5.9±4.0	5.6±4.0	23.8±12.4	26.5±14.2	75.3±13.4	77.2±12.1
2007-08	6.7±4.4	7.3±5.0	13.8±8.3	14.7±9.2	6.1±4.1	5.4±3.8	26.6±13.1	27.4±14.2	77.0±12.3	78.9±11.9
2008-09	7.2±4.8	8.5±5.7	15.9±9.7	17.5±10.8	6.6±4.5	5.9±4.5	29.7±15.0	31.8±16.8	79.8±11.4	81.4±10.5
2009-10	7.0±4.8	8.1±5.4	14.7±9.3	16.3±9.4	6.2±4.5	5.7±4.0	27.9±14.7	30.0±14.4	77.1±12.5	79.2±11.2
2010-11	7.6±4.8	8.8±5.4	17.3±10.2	18.0±9.9	6.8±4.4	5.7±4.0	31.7±15.7	32.5±14.6	80.4±11.0	81.8±9.9
2011-12	8.8±5.9	10.3±6.8	18.8±12.0	20.6±11.6	6.3±4.5	6.2±4.7	33.9±18.2	37.1±18.1	83.6±9.9	84.5±9.3
2012-13	9.1±5.7	9.6±6.2	19.3±11.1	20.2±11.5	6.2±4.6	6.2±4.4	34.7±16.8	36.9±17.3	83.0±10.0	83.5±10.2

Figure Legends:

Figure 1: (A) high-intensity running and (B) sprinting distances covered by UK and Non-UK players across the seven seasons of the EPL. Data represents means and standard deviations.

Figure 2: Two-dimensional kernel density plots representing the number of passes and the pass success rate of UK and Non-UK players across seven seasons. The plot displays an increasing number of passes for both UK and non-UK (plot width), while UK players show a greater change in pass completion rate over the seven seasons (plot length).

Figure 1A:

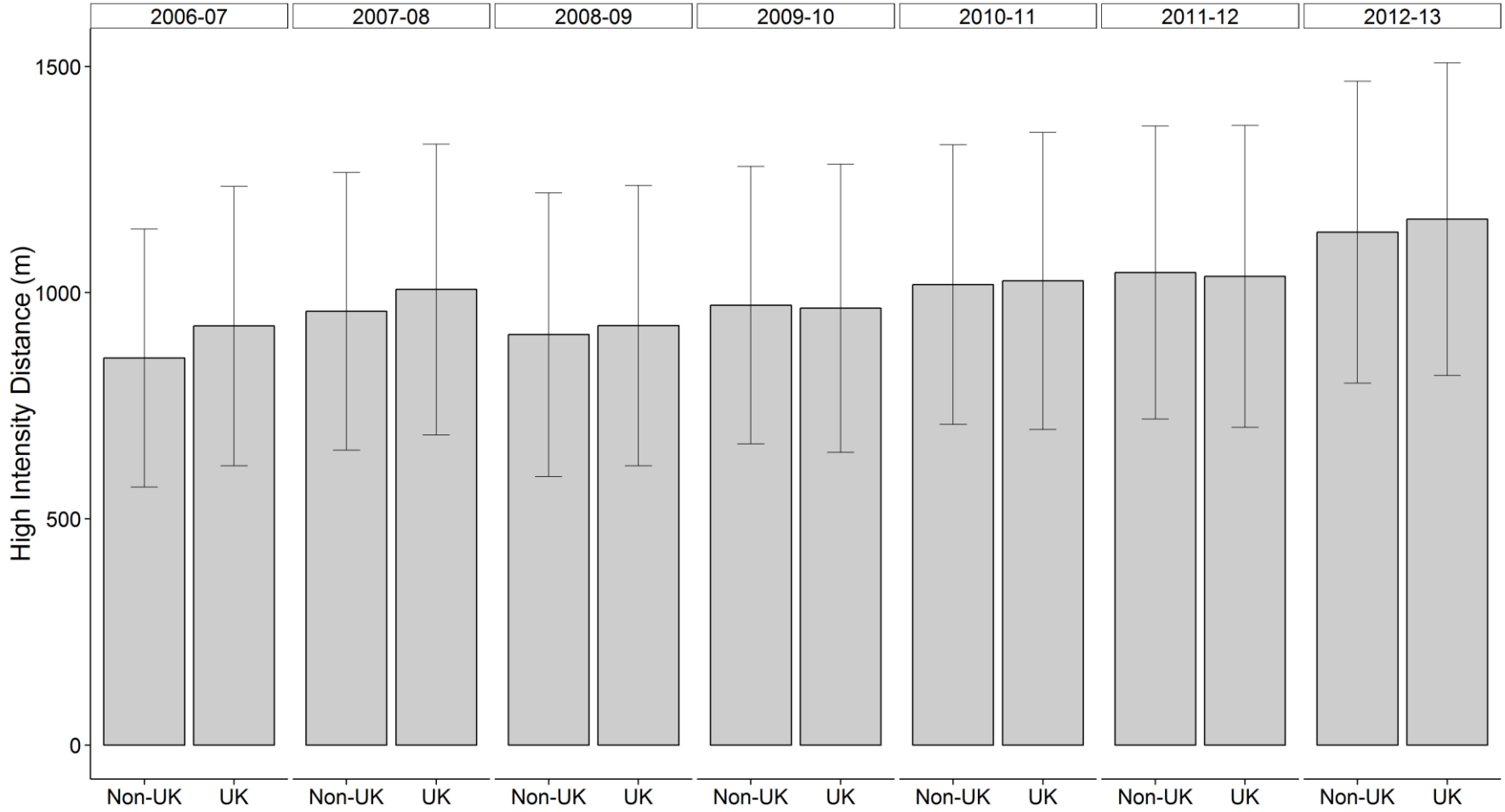

2006-07
2007-08
2008-09
2009-10
2010-11
2011-12
2012-13
High Intensity Distance (m)
1500
1000
500
0
Non-UK
UK

Figure 1B:

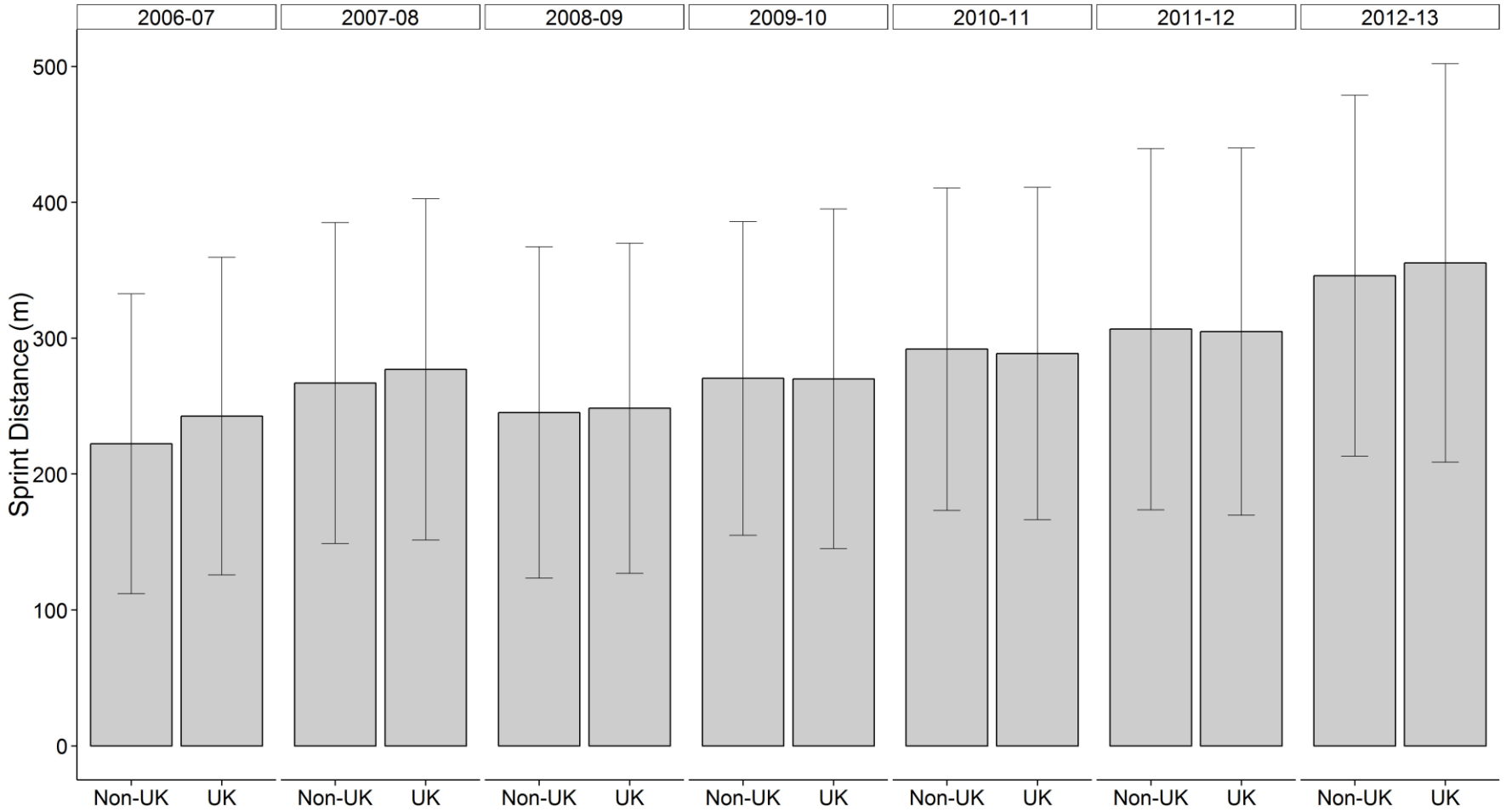
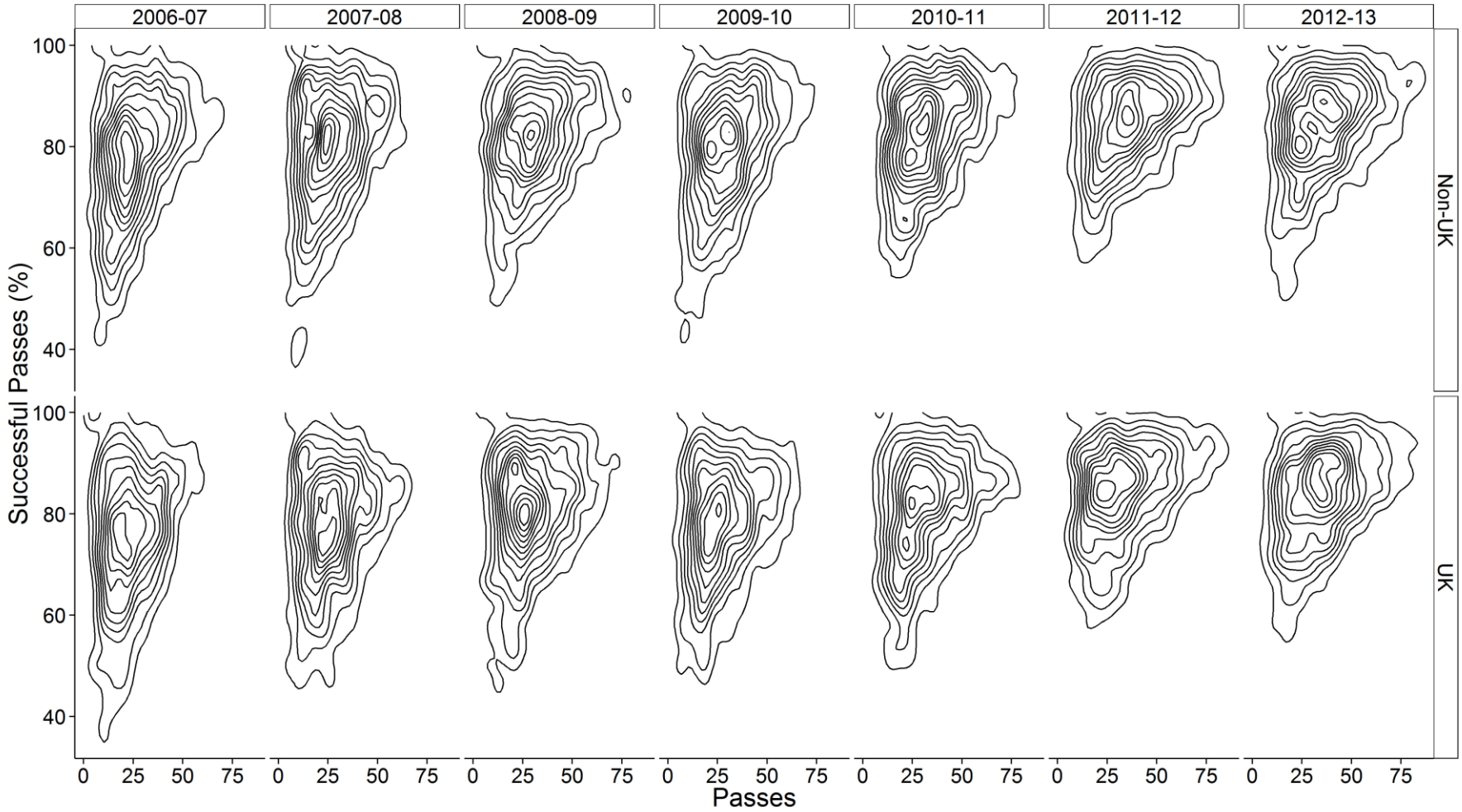

2006-07
2007-08
2008-09
2009-10
2010-11
2011-12
2012-13
Sprint Distance (m)
500
400
300
200
100
0
Non-UK
UK

Figure 2:


2006-07
2007-08
2008-09
2009-10
2010-11
2011-12
2012-13
Non-UK
UK
Successful Passes (%)
100
80
60
40
0
25
50
75
Passes