



UEFA Research Grant Programme

Grants Awarded
Abstracts

This document contains a short summary of the results of all the research projects completed to date with the help of UEFA Research Grant Programme funding. Most of the final reports for the studies listed here can be obtained by sending an email request to universities@uefa.ch. The content of these final reports and of the summaries in this document is the work of the authors alone and does not necessarily represent the views of UEFA opinion.

2010/11 edition

- **Women's football, Europe and professionalisation, 1971–2011**

Jean William, De Montfort University, UK

This research looked at the increasing number of professional women players between 1971 and 2011. From a status of neglect and scorn, women's football has transformed itself in the last 40 years into one of the fastest-growing team sports for women, and the recent FIFA Women's World Cup in Germany in 2011 was supported by politicians, the media, art exhibitions and a growing number of fans. The research therefore included the increased media and commercial profiles of European women's football competitions since 1971 and Women's World Cups since 1991. Extensive player, coach and administrator interviews allowed the author to assess the major changes in the social, national and cultural composition of players participating in the emerging professional women's football leagues.

- **Corporate social responsibility in European football**

Geoff Walters, Birkbeck College, University of London, UK

Organisations face significant pressure to be accountable and to show commitment to society through social and environmental activities. The concerns of transparency and accountability are also relevant to sport, with some suggesting that sports organisations cannot ignore corporate social responsibility (CSR) and that they have to implement it. Although many sports organisations have, over the last few decades, engaged with various CSR imperatives, including philanthropy, community involvement, youth educational activities and youth health initiatives, this research project presents the first comprehensive, comparative survey in the European football industry, drawing on the most up-to-date academic research. It represents a significant step towards greater understanding of CSR in sport and in European football. All 730 top-division football clubs in Europe and UEFA's 53 member associations were surveyed, and a total of 43 national associations and 112 football clubs from 44 European countries responded. The survey examined key managerial aspects of CSR, including implementation, communication, stakeholder engagement and measurement. The analysis demonstrated that the large majority of national associations and football clubs are involved in a number of initiatives with various stakeholders such as local communities, young people and schools, although supporters were deemed the most important stakeholder group for the football clubs. Despite this, a majority of clubs reported that making connections with the community was a significant challenge. Resource constraints and securing funding were also two significant challenges faced by both national associations and football clubs in relation to CSR implementation. Club responses were also analysed by size, revealing that there are a number of significant differences between large clubs and small clubs in relation to the types of CSR activity that they implement. However, the challenges that clubs face when implementing CSR affect all clubs regardless of their size.

- **Le droit au pari des organisateurs de compétitions sportives, instrument de lutte contre la fraude? (Betting rights for the organisers of sports competitions – an instrument in the fight against fraud?)**

Lilia Douihech, Paris Dauphine University, France

Corruption and organised crime are blighting sports betting and constitute a genuine danger for the future of sport and for the ethical values that it embodies. In this context, and on the basis of the model used in some Australian states, French legislature developed an instrument to protect sporting integrity, based on the ownership rights of organisers of sports competitions and called, for linguistic simplicity, the "droit au pari" ("betting rights"). This instrument aims to maintain the

freedoms of the European community, but requires online betting operators to obtain the consent of the organisers of competitions on which they wish to propose odds. This agreement should take the form of a contract that defines the exploitation conditions of the competition as well as the methods of cooperation between betting operators and organisers when it comes to combatting match-fixing. The tool enables the parties to share skills and knowledge, which in turn increases the chances of detecting illegal behaviour. The law requires the revenue gained by organisers by way of betting contributions to be used in part to finance anti-fraud activities. The French betting rights legislation, which is the first of its kind in Europe, is only in its infancy. However, it has already proven to be an innovative instrument in preventing fraud, which could be even more effective if implemented on a broader (European or international) scale and centred on the appeal of legal gambling and a dissuasive crackdown on illegal markets. The fight against sports betting fraud is a public-order necessity: it requires a real desire to cooperate on the part of states, the sports movement and betting operators, and should not be left to the sole initiative of the sports movement, which, although most affected by the threat, is powerless to face up to it alone.

- **Les footballeurs professionnels camerounais en France – une socio-histoire des carrières sportives et trajectoires migratoires transformées (1954–2010) (Cameroonian professional footballers in France – a social history of sporting careers and changing migratory trajectories (1954–2010))**
Stanislas Frenkiel, Claude Bernard University Lyon 1, France

In this research, we tell the stories of four generations of professional Cameroonian footballers in first and second-division French clubs from 1954 to 2010. To write the social history of these players in the French championship (in which 134 played in the period 1954 to 2010), we combine the prosopographic method and the quantitative reconstruction of this sporting population, using written and oral sources. Altogether, 15 interviews ("life stories") were carried out in France and in Cameroon, in particular with Joseph-Antoine Bell, Benjamin Massing, Roger Milla and Zacharie Noah. We investigate the genealogy of Cameroonian sports migrants to France and their circulation in Europe and worldwide. Specifically, by focusing only on those working in France, we analyse the development of their sporting careers and migratory trajectories. Over 50 years, migratory principles have gradually changed: Cameroonian students, often "professional footballers by accident" seizing a sporting opportunity in France, are replaced by footballers for whom professionalism is the only objective and for whom mobility is growing nationally and internationally. Two key ideas are expressed in this investigation: first, beyond the colonial and cultural context, these migrations between Cameroon and France are primarily in the context of a competitive and speculative market and socio-economic perspectives (a hope of upward mobility), and of three main factors – regulatory, sporting and human – which must be reflected in the transformation of emigration conditions for Cameroonian footballers. The second key idea is as follows: since the 1950s, the emigration procedure for African and specifically Cameroonian footballers has evolved more than their status as sporting immigrants in France and Europe. Although players' monthly salaries have increased and they are now better represented by agents, the similarities between the two eras are striking. We put forward the idea of a constant status of African sporting immigrants in Europe.

2011/12 edition

- **Effects of hot and cold temperatures on referees' ability to perform**

John Brewer, University of Bedfordshire, UK

Football match officials enforce the Laws of the Game, and the decisions they make can affect the results. Many competitions take place in varying environmental conditions. Referees are required to keep up with play to judge an infringement correctly, which may cause significant strain on physiological systems. It is suggested that elevated body temperatures may affect referees' decision-making. Goal-line officials judge notably whether the ball has crossed the goal line and spend the entire match performing minimal movements. Therefore exposure to cold conditions may affect their decision-making. The present study aims to elucidate the decision-making of match officials during exposure to both hot and cold temperatures. Fifteen students from the University of Bedfordshire and referees from the local league volunteered for this study. The protocol consisted of 45 minutes of activity, a 15-minute rest period, and a final 45 minutes of activity, and was performed in three conditions: COLD (5C, 40% relative humidity); temperate (CONT – 18C, 40% relative humidity) and HOT (30C, 40% relative humidity). This was interspersed with four computer cognitive tests to measure vigilance and dual-tasking ability. Core and skin temperature, heart rate, ratings of perceived exertion and thermal sensation were also recorded. For the goal-line official study, subjects performed small lateral movements. The active referee study consisted of five movements performed on a treadmill: stand, walk, jog, run and sprint. For the active referee study, false scores for vigilance were 20% higher in the HOT condition than the CONT condition. False scores for dual tasking were 33% higher in the HOT condition than the CONT condition. For the goal-line official study, false scores for vigilance were 86% higher in the COLD condition than the CONT condition, and false scores for dual tasking were 94% higher in the COLD condition than the CONT condition. Extremely hot conditions have a detrimental effect on an active referee's decision-making abilities and extremely cold conditions negatively affect goal-line officials' decision-making abilities.

- **Protect her knee: exploring the role of football-specific fatigue on dynamic knee stability in female youth football players**

Mark De Ste Croix, University of Gloucestershire, UK

It is well recognised that girls and women appear to have a greater relative risk of non-contact anterior cruciate ligament (ACL) injury compared with boys and men when hours of athlete exposure are taken into account. This study examined the effect of simulated football-specific fatigue on muscular and neuromuscular components of dynamic knee stability in elite youth female footballers. Thirty-six elite female footballers (in the Under-13, Under-15 and Under-17 age groups) were recruited from an FA Women's Super League club. Anthropometric variables including maturation and quadriceps angle (Q angle) were determined for each age group. Relative leg stiffness, functional hamstring to quadriceps ratio (FH/Q), and electromechanical delay (EMD) of the hamstrings during eccentric actions were determined before and after an age-appropriate simulated football match (SAFT90). Football-specific fatigue had little influence on the FH/Q, although the ratio was reduced post-fatigue close to full knee extension. Fatigue had a detrimental effect on neuromuscular stability, with significantly longer EMD recorded post-fatigue for all age groups. These negative effects were significantly greater in the U13 age group. Fatigue influenced the U15 group the most, with a reduction in FH/Q and increase in EMD post-fatigue. Neuromuscular functioning was diminished the most in the U13 age group with reduced feedback responses (EMD) and reduced feed-forward responses (leg stiffness). The U17 age group increased the FH/Q ratio and leg stiffness post-fatigue, and this may be a compensatory mechanism for the reduction in neuromuscular feedback mechanisms (EMD) when fatigue is present. Our findings suggest that the following are considered in the development of neuromuscular conditioning programmes for elite female youth footballers: 1) a focus on fatigue resistance and conditioning work undertaken in the middle or at the end of training sessions; 2) the inclusion of and focus on the portion of the movement that is towards full knee extension; 3) the inclusion of fast-velocity movements as well as more controlled slower-velocity movements; 4) age group or maturational stage-specific training; 5) training in younger age groups that focuses on the development and enhancement of neuromuscular feed-forward mechanisms in response to fatigue and includes fundamental movement skill development; 6) training during puberty that is enhanced and individualised to focus on both muscular and neuromuscular qualities.

- **Anti-violence supporter groups in Serbian football: an ethnology case study**

John Hughson, University of Central Lancashire, UK

Despite a decline in football hooliganism in a number of European contexts, some national settings, largely as a result of particular underlying social and political circumstances, remain problematic. Serbia is presently regarded as one of Europe's main trouble spots for football-related violence. Hooligan behaviour among followers of the Serbian national team, some of it clearly captured in media reporting, disrupted a UEFA EURO qualifying match between Italy and Serbia in Genoa in October 2010. This, as well as continuing crowd-related problems at domestic matches in Serbia, resulted in UEFA delivering an ultimatum to the Football Association of Serbia (FSS) that if crowd-related violence and disorder at both international and domestic matches was not curbed, both the Serbian national team and Serbian club teams may face expulsion from the competitions administered by UEFA. An intensive collaborative process was put in place involving UEFA, the FSS and the national government of Serbia. Immediate resolution has been sought via an upgrading of security and policing measures. The present study acknowledges the necessity of these measures in an acute situation, but looks to a longer-term resolution by giving consideration to what may be done to alter the football-supporting culture in Serbia over time. Accordingly, a small-scale survey was undertaken with participants living in Serbia who declared an interest in wanting to see a change in the football-supporting culture – towards non-violence and the eradication of anti-social behaviour. Most participants believed that the problem was entrenched and in need of addressing via an educational process with which football administration in Serbia, including the clubs, must not only be fully cooperative, but also genuinely proactive. The project draws on fieldwork, with interview and more informal participants, relevant media reports and interviews with representatives of key agencies, including the FSS and the Serbian ministry of youth and sport, to make a number of recommendations for progress towards longer-term positive change within Serbia's football-supporting culture.

- **Wie viel Wettbewerb braucht der Fussball? Eine Untersuchung zur Bedeutung der Wettbewerbsintensität aus Sicht der Zuschauer (How much competition does football need? Research into the significance of competition intensity from the audience perspective)**

Tim Pawlowski, German Sport University Cologne, Germany

The uncertainty of outcome hypothesis (UOH) suggests that increasingly imbalanced sports competitions have the potential to negatively influence fan interest and, consequently, stadium attendance and TV viewing figures. Therefore, to maintain a certain degree of competitive balance (CB), specific regulations and income redistribution schemes have become common practice in professional sports leagues. However, match attendance level studies in European professional football seldom find that more tickets are sold when the two teams have fairly equal chances of winning. Furthermore, in the long term, season-aggregate attendances have actually increased in some football leagues (in Germany and England, for example), even as those leagues have become more dominated by a small number of teams over the last decade. Such findings suggest that CB is of minor importance for stadium or TV demand at present, and therefore challenge the relevance of the UOH in professional football. However, previous studies are based on revealed preference approaches such as "classical" attendance or television demand studies, which cannot assess whether (increasingly imbalanced) football competitions might be at risk of moving into territory where consumer demand will fall off in the future, as (also) suggested by the UOH. Therefore, following a stated preference approach, this study provides a subsequent examination of the relationship between perceived balance (in a number of dimensions) and intention to consume based on a survey conducted among football fans in Denmark, Germany and the Netherlands (n=1,689). As indicated by the results, around 70% of fans care about CB. However, measures to improve balance would not necessarily have a significant effect on consumer demand, since some leagues (such as the German Bundesliga) are not close to any tipping point at present.

- **Une première élite du football européen (1904–1956), ou les prémices d'un champ footballistique européen (The first European footballing elite (1904–1956) or The beginnings of a 'European football field')**

Grégory Quin, University of Lausanne, Switzerland

During the first half of the 20th century, throughout the whole of Europe, football was influenced by several processes (political, economic, social, etc.). More than any other sport, football was becoming truly international, politicised and influenced by economics, and was reaching all social classes, according to variable processes across the different countries. Moreover, beyond democratisation dynamics, national football spheres were being consolidated in European countries, notably illustrated by the professionalisation process of elite football and by the establishment of solid institutions (associations, leagues, etc.) involved both in national league and cup competitions and international matches. This period was marked by a growing number of international games – deeply linked with the affirmation of sporting nationalism, which allowed increased opportunities to identify with the players – but more broadly with “values” and “representations” composing “imagined communities” and with sporting values (amateurism, fair play, etc.). At that time, regional areas where football started to become homogeneous (the British Isles, central Europe, Scandinavia, etc.) were built around international competitions, as a kind of consequence of the consolidation of the football spheres of each of the countries in those areas. For instance, in central Europe, the Mitropa Cup for clubs and the International Cup for national teams were structuring international seasons and facilitating footballing relations. Actually, the first half of the 20th century saw the beginnings of the field of European football, the direct consequence of which in the 1950s was the creation of modern European cup competitions (concerning the whole continent) and the establishment of a continental institution: UEFA.

- **How can formerly successful European football teams capitalise on the UEFA Europa League in order to (re-)establish their brands?**

André Richelieu, Laval University, Canada

The purpose of our research was to understand and explain how team managers of formerly successful European football clubs could capitalise on the UEFA Europa League in order to build or rebuild the brand identity of their team. We collected data from 19 teams in 15 countries: AFC Ajax (the Netherlands), RSC Anderlecht (Belgium), Aston Villa FC (England), Athletic Club (Spain), SL Benfica (Portugal), Borussia Dortmund (Germany), Celtic FC (Scotland), GNK Dinamo Zagreb (Croatia), FC Dynamo Kyiv (Ukraine), FC Dinamo Moskva (Russia), Hamburger SV (Germany), IFK Göteborg and FC Malmö (both Sweden), Olympique de Marseille (France), Panathinaikos FC (Greece), FK Partizan and FK Crvena zvezda (Serbia), FC Steaua București (Romania) and SV Werder Bremen (Germany). We followed a case analysis method, engaging in semi-structured interviews with the head coaches of the selected teams. Content analysis was used to give in-depth meaning to the coaches' responses. We extracted the essence of the answers provided in order to reveal the reality. Admittedly, differences between the teams studied do emerge, but there are also some strong similarities. Right now, and based on the way both the UEFA Champions League and the UEFA Europa League are structured from broadcasting, financial and sporting points of view, the disparities between the top four championships (England, Germany, Italy and Spain) and the rest of Europe are widening. Hence, the rebranding of the UEFA Europa League could be followed by a reflection on how the competition can truly make “smaller” clubs and formerly successful European teams part of a more balanced European football ecosystem. And with financial fair play regulations coming into effect, this might be the right time to do so. On the basis of the findings emerging from this research, the report concludes with a series of recommendations for UEFA.

2012/13 Edition

- **Fan relationships and national football associations in Europe: Better understanding for better management**

Guillaume Bodet, University of Loughborough, UK

Although many practitioners and researchers have recognised the importance of fan and consumer loyalty for sports organisations, very few studies have focused on the expectations of fans and consumers. Considering the importance of these relationships and the lack of existing knowledge in the specific context of European football, this study aimed to identify the types of relationship that football fans want to establish with their national football associations and to identify the managerial tools that could be used to enhance and sustain these relationships. Qualitative research was carried out using individual interviews and focus groups, looking at football fans from Armenia, Lithuania and England to capture the diversity of European football. Two focus groups comprised eight casual and eight die-hard Armenian fans respectively; another two focus groups brought together 11 casual and 11 die-hard Lithuanian fans respectively; and 10 semi-structured individual interviews were conducted with six casual and four die-hard English fans. The analysis revealed that there were more differences between types of fan than between countries, allowing comparison of the approaches adopted by the various national associations. Information was found to be the most crucial issue for all three countries' fans, but ways of communicating varied depending on the type of fan. For fans, a lack of information leads to a lack of interest, which results in a lack of awareness. This means that there is no clear perception of the national association's identity, which creates misperceptions regarding its image and, in turn, results in a lack of trust in or commitment to the national association in question. Managing contact between fans and national teams and associations is also a key issue, and both frequency and intensity are important aspects. Fans are also sensitive to governance issues, but transparency seems to matter more to casual fans than to die-hard fans. Lastly, marketing aspects were not found to hold the same importance throughout Europe.

- **The validation and application of an integrated metabolic cost paradigm using high-frequency GPS technology in soccer**

Dominic Doran, Liverpool John Moores University, UK

In this research, high-frequency global positioning system (GPS) technology was used that allows detailed tracking of player movement in conjunction with a new metabolic logarithm to monitor and evaluate the physiological loads of elite footballers during training and matches. In order to fully implement this new approach, a series of experiments were undertaken to update and improve the specificity of current metabolic power logarithms: first, to derive a new energy constant for football-specific movement on grass in elite players; and second, to validate these new integrated GPS metabolic power equations during football-specific movement patterns. Having established the validity of the approach, the metabolic power requirements of elite players during matches was examined. A database containing movement captured on video during match play (around 295 players) and GPS-captured data (108 players) was analysed using the new equations to model the metabolic requirements of elite players and their different positional roles during matches. The present data indicates that average metabolic power during elite competitive match play is estimated at around $11.2 \pm 1.2 \text{ W}\cdot\text{kg}^{-1}$. Metabolic power and associated performance metrics clearly vary by playing position, with a hierarchy of demand: generally central and wide midfielders had the highest metabolic loads, followed by full-backs and forwards, with central defenders presenting the lowest metabolic loads. Consistent with the ability to detect differences in positional roles, data is sensitive to differences in the metabolic power metrics between the first and second halves of matches. It was found that current performance analysis techniques that use speed and distance grossly underestimate the workloads of players during matches and fail to adequately quantify the true physiological cost of match play activity relative to the new metabolic power paradigm implemented. The implications of these findings for player management are such that workloads may be significantly underestimated. Where players have several games in a week or a block of games together, some unnoticed player fatigue could result, potentially affecting match performances.

- **Economic effects of UEFA's financial fair play regulations**

Markus Lang, University of Zurich, Switzerland

This research project examines the economic effects of UEFA's financial fair play (FFP) regulations. The amendment of the

regulations was approved against the backdrop of financial distress, which has been the typical state of affairs in European football for many years. One major effect of the successful implementation of the FFP regulations will be the end – or at least the severe restriction – of monetary injections by benefactors. This study formally demonstrates that monetary injections by benefactors encourage their clubs to implement riskier investment strategies. Hence, successful implementation of the FFP regulations reduces the risk-taking behaviour of clubs. Riskier investment strategies by clubs with benefactors lead, in turn, to contagion, encouraging clubs without benefactors to also pursue riskier strategies. As a result, successful implementation of the FFP regulations can reduce this contagion risk. Furthermore, there is also an issue of clubs being "too big to fail", because, from a welfare perspective, it may be preferable to consistently bail out clubs whose share of the market is sufficiently large. Finally, successful implementation of the FFP regulations always increases social welfare in leagues where a benefactor owns a club with a small share of the market. The same is true in leagues where a benefactor owns a club with a large share of the market, as long as the regulations are not too restrictive.

- **Influence on injurability and injury recovery time of single nucleotide polymorphisms (SNPs) in genes involved in connective tissue repair**

Ricard Pruna, University of Barcelona, Spain

Soft tissue injuries (in muscles, tendons and ligaments) are a key factor in "talent selection" owing to their great importance in high-level sports. In fact, an athlete with a high injurability index may find that the process of natural selection has denied him/her the opportunity to compete. Epidemiological studies based on meticulous data collection are the source of our current knowledge on injurability and have become the most reliable way to obtain objective information on injurability. However, there have been few serious studies looking at the aetiology of injuries, and no scientific evidence has yet conclusively identified potential risk factors related to injurability or differences between individuals in terms of recovery times. Muscle injuries represent 10–55% of all sports-related injuries. While it is possible for slight injuries to heal completely, serious muscle injuries lead to the formation of scar tissue, which weakens the injured muscle even after recovery and is often associated with muscle contractions and chronic pain. Although there are different degrees of injury and different types of treatment in terms of recovery, there is also considerable variation in the speed at which individuals recover from a specific kind of injury. This variation in recovery times may be due to the presence of single nucleotide polymorphisms, which can affect an individual's response to a specific treatment. Moreover, it has recently been suggested that certain individuals are genetically predisposed to certain kinds of injury. Several studies have demonstrated that the presence of certain SNPs in genes involved in the repair of muscle tissue can enhance recovery after injury. This research provides additional knowledge about SNPs in genes involved in the repair and regeneration of connective tissues. Further studies of these SNPs may shed light on the tendency of certain individuals to suffer muscle injuries and may reveal a gene signature that would allow researchers to identify individuals with an enhanced injury repair system.

- **Race/ethnicity, gender and audience receptions of televised football in the Netherlands and England**

Jacco van Sterkenburg, University of Utrecht, Netherlands

At the beginning of the 21st century, football on television has become one of the critical domains in which meanings associated with race/ethnicity and gender manifest themselves. In this research project, the author focused on the significance of televised football in terms of shaping ideas about race, ethnicity and gender among its viewers. The research looked at how Dutch and English viewers from various racial/ethnic and gender-based groupings receive and interpret representations of race/ethnicity and gender based on televised men's football. This question was explored from an internationally comparative perspective by focusing on the experiences of young Dutch and English viewers. In total, 20 focus group interviews were conducted with male and female viewers (15–31 years of age) spread across white and non-white audience groups in England and the Netherlands. The findings showed the dominance of a natural physicality discourse which associates black athletes with natural physical strength and power among both British and Dutch audience members and among both white and non-white audience members. Respondents sometimes combined this natural physicality discourse with a mentality discourse, which has as an underlying assumption the notion that black athletes are mentally more unstable and less intelligent than white players. Such one-sided representations of race and ethnicity in the sporting context can have meaning far beyond the boundaries of the sporting world itself, for instance in framing meanings given to racial/ethnic groups in non-athletic situations, where "brains" are usually more important than "brawn" in achieving a social career. In relation to gender, too, a physicality discourse and a mentality discourse could be identified, although in a different manner: on the one hand, the

perceived poor quality of women's football was often explained with reference to women's physical weakness, compared with men's physical strength. At the same time, women footballers were often seen as less courageous and less aggressive on the pitch than male players. The role the media play in these gender-based views of football can probably not be underestimated. The male-dominated football media have historically used gender stereotypes that trivialise women's footballing performances. Interviewees in this study generally acknowledged this and were quite critical of the football media's role in this regard.

2013/14 edition

- **Does anti-racist activism by fans challenge racism and xenophobia in European football?**

Mark Doidge, University of Brighton, UK

For several decades European football has experienced widespread public expressions of racism and there are no immediate prospects of this problem disappearing. In December 2012 the Landsrona group of fans of Zenit St Petersburg issued a statement calling for the club to sign only players from Slavic or Scandinavian nations. Racist chanting has been heard also in other national leagues, including at Mario Balotelli in Italy and Dani Alves having a banana thrown at him in Spain. The subject of racism was spectacularly exposed later in the same month when Kevin-Prince Boateng, AC Milan's Ghanaian midfielder, walked off the pitch after being targeted by Pro Patria fans. The ways in which fans have sought to combat racism have been different in each country. Following fieldwork and interviews with fan groups at Borussia Dortmund, Legia Warsaw and AS Roma, this research focuses on how these different fan groups seek to combat racism within their own clubs. The research highlights the different strategies that have been undertaken and the problems they have faced. In particular it focuses on the German fan projects and the kibice razem that have been set up in Poland. It also highlights the importance of the club and associations in maintaining consistent support for anti-racism activities. Borussia Dortmund has been a model club in this instance. Football can provide the space to bring people together, and with the hard work of fans, clubs and authorities, we can slowly challenge some of these actions.

- **The effects of mental fatigue on repeated sprint ability and cognitive performance in football players**

Samuele Marcora, University of Kent, UK

Professional football is a game that requires sustained attention and decision-making, coupled with a pressure to succeed and a celebrity lifestyle. It is, therefore, not surprising that coaches and players often blame mental fatigue for poor performance. However, contrary to physical fatigue, the mechanisms and consequences of mental fatigue in football players are poorly understood. The aim of our research programme was to provide a scientific understanding of mental fatigue in football by measuring its effects on both cognitive and physical performance in players of various ability levels, including professionals. Cognitive performance was measured as psychomotor vigilance and soccer-specific tests of passing and shooting ability. Physical performance was measured as running performance during intermittent exercise tests. Results clearly show that mental fatigue significantly reduces intermittent running performance at low to moderate velocities. Preliminary findings show a trend for a negative effect of mental fatigue on repeated sprint ability, although sprint performance may be protected during a game by the reduction in activity at low to moderate velocities. The negative effects of mental fatigue on physical performance in football players seem to be mediated by high perception of effort. Preliminary findings also show a significant reduction in cognitive performance in mentally fatigued football players, with significantly slower reaction times and more mistakes. These negative effects seem to be associated with lower brain oxygenation. Overall, the findings of our research programme suggest that mental fatigue can negatively influence both the physical and cognitive components of football performance. Therefore, the development of effective countermeasures for mental fatigue may improve the performance of professional footballers. Possible countermeasures include management of mentally fatiguing activities before a competition, caffeine supplementation and brain endurance training, a new method of training that combines physical and cognitive exercises.

- **The identification of good practice principles to inform player development and coaching in European youth football**

Julian North, Leeds Metropolitan University, UK

Youth player development is an essential component of professional football. There is a significant amount of sport science research available to practitioners to help them understand and improve their player development activities. At the same time practitioners are continually innovating and evolving best practice. One problem is that the available research is abstracted from practice in specific disciplines and sub-disciplinary areas, for example, in sport physiology and sport psychology. This makes it difficult for researchers and practitioners to see how the different concepts and ideas fit together to inform effective player development systems. This research adopted a multidisciplinary approach to identify good practice principles to inform player development and coaching systems in the performance pathway. A comprehensive literature review of sport and

coaching science was undertaken to identify an emerging set of good practice principles. These were then used as the basis of a discussion guide with 41 leading youth development experts representing national associations and professional clubs (many at UEFA Champions League level) in Belgium, England, France, Germany, Italy, the Netherlands and Spain. The data from the expert developer-coaches confirmed the usefulness of the multidisciplinary approach and the good practice principles. These were separated into three main areas: human development principles; system development principles; and learning environment principles. The three main areas contained a number of lower level principles, including using a long-term age-staged approach, making careful use of selection, constructively aligning practice and competition activities, and ensuring buy-in to the system by all stakeholders. The research also showed how the application of the principles varied by country and club context. Though the principles were the same, their variable and contextualised application warns practitioners about the widespread importation of 'successful' practices from other countries.

- **Soccer as a novel therapeutic approach to pediatric obesity. A randomized controlled trial and its effects on fitness, body composition, cardiometabolic and oxidative markers**
André Seabra, University of Porto, Portugal

Childhood obesity is increasing dramatically and is associated with several cardiometabolic comorbidities. Physical activity is accepted as an effective strategy for childhood obesity prevention, is closely linked to cardiometabolic risk factors as well as to a wide behavioural spectrum. Football is one of the most popular and widely practiced team sports in Europe and has been suggested as an effective physical activity intervention in adults. The purpose of this research was to examine the effects of a six-month intervention of football practice on the body composition, cardiometabolic risk factors and inflammatory markers, cardiorespiratory fitness and perceived psychological status of obese children (8-12 years; body mass index [BMI] > than CDC 95th percentile). Practising football for 60-90 minutes three times a week for six months (average intensity >70-80% heart rate maximum) in a highly motivating environment resulted in a significant reduction in total body fat, intra-abdominal fat, waist/height ratio, total cholesterol, LDL cholesterol, triglycerides and diastolic blood pressure, accompanied by an increase in muscle and bone mass and HDL cholesterol. In addition to the benefits considered, a significant improvement in body image, self-esteem, quality of life, perception of personal success and cardiorespiratory fitness should also be noted. It is important to emphasise the significance and impact of these findings, particularly the suggestion that football as a highly popular, socially and culturally meaningful sport accessible to all social strata is a highly effective medium for the prevention/reduction of childhood obesity and for the enhancement of body composition, cardiometabolic health, cardiorespiratory fitness and associated psychological status of obese young people.

- **Reciprocal effects involving the recipients of social engagement by football associations and clubs**
Stefan Walzel, Deutsche Sporthochschule Köln, Germany

The majority of national football associations in Europe show commitment to society through many social activities. Although many football organisations have heavily invested in corporate social responsibility (CSR) initiatives over the last decade, not much is known about the outcome and effectiveness of CSR activities for respective football organisations themselves. This research project presents the first comprehensive, comparative study in European football drawing on recipients' attitudes towards socially engaged football associations. Therefore, a standardised online survey was conducted in England, Germany and Italy (n>500 per country). The survey examined key managerial aspects of CSR, including the recognition of the social initiatives, the CSR awareness of football associations, the attributed motives for implementing social activities and the CSR reputation of football associations. The analysis demonstrates that the population in all three countries knows relatively little about the social programmes and activities of the respective football associations. Despite this, respondents mainly attributed extrinsic motives to national football association's social engagement – yet, it is intrinsic motives which increase credibility. Further, for none of the examined football associations is a positive CSR reputation confirmed. However, the study provides evidence for a positive relation between CSR awareness and different outcome variables (e.g. identification with the football association). In addition, it shows that this relation is positively moderated by the individual attitude of reciprocity. This study demonstrates that football organisations can benefit from their CSR activities and even more so if the social engagement is well perceived in society. Therefore, appropriate and comprehensive communication of their CSR activities is one of the main challenges for football organisations.

2014/15 edition

- **Intentions to drop out in adolescent female footballers from five European countries: The role of the coach-created motivational climate**

Paul Appleton, University of Birmingham, England

The purpose of this project was to examine the role of motivation-related mechanisms (i.e. basic psychological needs and motivation regulations) in the relationship between the coach-created motivational climate (i.e. empowering and disempowering; Duda, 2013) and intentions to drop out of football in female players. A secondary purpose was to determine whether the hypothesised relationships were invariant (i.e. the same) across players from five European countries (England, France, Greece, Spain and Norway), and between footballers and female athletes participating in other sports. The total sample consisted of 2,669 female footballers (with a mean age of 14.4 years) and 1,090 female athletes (with a mean age of 14.2 years) from other sports in the five countries. Athletes completed valid and reliable questionnaires measuring the targeted variables. Findings revealed that, while the motivational climate was slightly more empowering than disempowering, mean scores for empowering were generally around the mid-point (i.e. 2–2.5). Tests of the hypothesised model using path analysis revealed that the negative relationship between an empowering climate and intentions to drop out was mediated by players' feelings that basic psychological needs were being satisfied. In contrast, the positive relationship between a disempowering climate and intentions to drop out of football was mediated by players' feelings that basic psychological needs were being thwarted. Importantly, these findings were generally consistent across countries and between sports. In sum, the findings of this project confirm that the coach-created motivational climate is a significant predictor of female footballers' intentions to drop out of the sport. Thus, we recommend that in their attempts to ensure girls and women continue to participate in the game, all coaches attend a theory and evidence-based training workshop (e.g. Empowering Coaching; www.empoweringcoaching.co.uk) that equips coaches with knowledge on how to create an empowering motivational climate in training and matches.

- **A comparative perspective on European football – the organisational capacity of European football clubs**

Christoph Breuer, German Sport University, Cologne, Germany

In order to ensure the sustainable development of the European football pyramid, grassroots football clubs need to fulfil their roles, functions and missions. This involves the ability to deploy resources from different capacity dimensions, including human, financial and structural capacities (i.e. infrastructure, planning and development, external relationships and networks). Each of these capacity dimensions can have a different influence on the ability of an organisation to achieve its objectives.

In contrast to previous academic research on European football, which has mainly focused on the professional level, this research project sought to compare organisational capacities at the base of Europe's football pyramid. It assessed differences across countries in terms of organisational capacities and problems, as well as differences in the public welfare effects that football clubs generate. The influence of organisational capacities on organisational problems and public welfare effects was also analysed. The empirical comparison between football clubs in Europe was designed as a cross-sectional study drawing primary data from European football clubs in six countries (n=36,166). Over 5,100 clubs participated in an online survey, indicating that attracting and retaining volunteers and referees and the cost of operations were the three biggest organisational problems. European clubs did not differ substantially in terms of the ranking of 20 different organisational problems and their respective magnitudes. However, this organisational capacity framework pointed to significant variation in the resources of European football clubs. All capacity dimensions have the potential to contribute to an organisation's survival. However, the picture of how specific capacities determine problem levels and public welfare effects is not straightforward, and the effect sometimes varies across countries.

- **Risk versus benefits: The use of creatine by youth football players**

Pascale Kippelen, Brunel University, London, England

Owing to its ergogenic potential, creatine is widely used in football. As an oral supplement, creatine is currently considered safe and ethical. However, no data exists on the safety of creatine in terms of human lung functions. Furthermore, while creatine can undoubtedly increase the physical fitness of football players, the transferability of its effects to competition performance

remains questionable. The aim of this project was to evaluate the risks – in terms of respiratory health – versus the benefits – in terms of field-based, football-specific performance – associated with creatine supplementation in young football players. Fifteen Under-18 and seven Under-21 male academy players completed a double-blind, placebo-controlled, parallel-group trial. The creatine group (n=10) ingested 0.3g/kg/day of creatine monohydrate (CM) for one week and 5g/day for the remaining seven weeks, whereas the placebo group (n=12) received the same dosage of maltodextrin. Airway inflammation (assessed by exhaled nitric oxide), airway responsiveness (to dry air hyperpnoea), physical fitness (body composition and lower body strength) and football-specific performance (GPS tracking during matchplay, Yo-Yo Intermittent Recovery Test 2 and repeated sprint tests) were assessed pre- and post-supplementation. CM had no significant effect on fitness parameters or field-based, football-specific performance. There was a tendency for airway inflammation to increase post-supplementation in the CM group, especially in those players who were sensitive to aero-allergens. Furthermore, the airways of the players supplemented with CM were more responsive to dry air after eight weeks of supplementation relative to the placebo group. During the study, four players (20%) were diagnosed with asthma and/or exercise-induced bronchoconstriction (EIB) for the first time, and one player had active asthma (despite being on medication). Together, these results highlight the high prevalence of undiagnosed asthma/EIB in elite youth football and cast doubt on both the safety and the effectiveness of creatine as an ergogenic aid in football.

- **Player load monitoring: Protecting the elite player from overload using miniature high-frequency triaxial accelerometers**

Mark Robinson, Liverpool John Moores University, England

Low-cost GPS and accelerometer units are used on a daily basis by football clubs to evaluate the metabolic and mechanical loading experienced by players. This project investigated what meaningful information the accelerometers might provide from a player overload or injury perspective.

This project first characterised the acceleration signals of a commercial accelerometer (sampling at 100 samples per second) compared with three research accelerometers on the trunk, pelvis and tibia (sampling at 1,500 samples per second). The commercial accelerometer underestimated the loading rate, and to accurately predict player loads, a computer model was needed to link trunk accelerations to player loading. The model considered multi-body accelerations and forces and was validated against measured ground reaction forces so that the mathematical link to trunk acceleration could be determined. The model was then able to successfully predict whole body player loading using a trunk accelerometer.

An exploratory retrospective case-control study of hamstring injuries at elite English Premier League football clubs was also conducted. Trunk-worn accelerometer data from injured players three weeks prior to their injury was compared with uninjured controls. Analysis of the pre-processed acceleration data showed that the loading rates of the uninjured players were lower than those of the injured players in seven out of nine cases. This could be evidence of modified behaviour in the three weeks leading up to the injury, but further analysis looking at a greater number of injuries is required for this to be tested comprehensively.

In summary, this project provided a novel rigorous way of gaining meaningful information from trunk-worn accelerometers in the future. By establishing the biomechanical context in which trunk accelerations can predict player loading, there is now scope for monitoring internal loads to the musculoskeletal structures and eventually preventing injury using data collected every day in football clubs.

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- **Mental health in Scottish football: Incidence and role for intervention**

Katy Stewart, University of Glasgow, Scotland. Project supported by the Scottish Football Association.

A number of high-profile cases reported in the media have put mental health issues in sport under the spotlight. To date, the majority of sports medicine research in football has focused on the management and outcomes of musculoskeletal injuries, with a stigma persisting regarding non-physical injury or illness. Phase 1 of this study aimed to investigate the incidence of mental health problems in Scottish football and to identify who players would talk to if they were suffering from these problems. Phase 2 aimed to identify players who may have been suffering from such problems and phase 3 aimed to provide the necessary help.

Phase 1: Responses were received from 608 players and the overall results were analysed. A total of 64% of the players said they had had or had known someone with mental health issues, including problems with alcohol, drugs or gambling. The responses indicated that club medical staff were the main people the players would discuss such sensitive issues with, along with coaching staff to a lesser but still significant extent.

Phases 2 and 3: A questionnaire was sent to each of the players who responded in phase 1 and was analysed through Survey Monkey. This included a standardised generalised anxiety disorder questionnaire (GAD-7) and a standardised patient health questionnaire (PHQ-9), as well as questions regarding injury history, particularly head injuries, and adverse behaviours such as alcohol abuse and gambling. Results (n=162) suggest that 25% of players (n=40) require some mental health advice from a trained health professional, with 20% of these (n=8) needing formal ongoing specialist support (counselling, clinical psychology or psychiatry).

These results highlighted the need for a mental health action plan in Scottish football and for this to be led by medical personnel. Additional funding for this has been secured for the 2016/17 season.

- **Optimising player performance and readiness to train: Fatigue and recovery of neuromuscular function following football match-play**

Kevin Thomas, Northumbria University, Newcastle, England. Project supported by The Football Association

Association football places significant metabolic, mechanical and cognitive demand on players, an inevitable consequence of which is fatigue. This manifests as acute impairments to performance and contributes to persistent decrements in physical function that can take days to fully resolve. While these decrements in physical function during and after match-play are well established, their aetiology has not been studied in detail.

This study assessed the fatigue and recovery of neuromuscular function, using electrical and magnetic stimulation of nervous tissue, following simulated football match-play. Additionally, a range of simple functional and perceptual assessments were evaluated concurrently in order to ascertain their utility as monitoring tools for practitioners. Simulated match-play induced significant post-match fatigue, which was both central and peripheral in origin. Decrements in central nervous system (CNS) and muscle function persisted for up to 72 hours after the match. Central fatigue manifested in large reductions in voluntary activation of nerve tissue after exercise. These decrements in CNS function recovered markedly within 24 hours but remained different to baseline values for 48 hours after the match. Supraspinal fatigue, a subset of central fatigue attributable to suboptimal output from motor cortical cells, contributed to the observed decrements in CNS function for up to 24 hours after

the match. A large reduction in the quadriceps potentiated twitch force (a measure of muscle function) was observed after the match, showed no signs of recovery after 24 hours and remained different to baseline values after 72 hours. This marked and persistent decrement suggests that it is changes in skeletal muscle that can primarily explain recovery in the days after match-play. A similar decline and subsequent recovery of jumping performance and perceptual function was also observed, suggesting these might be appropriate tools to indirectly assess the recovery of neuromuscular function following match-play.

These data suggest that full recovery from match-play can take more than 72 hours, and therefore those responsible for managing the training process and scheduling fixtures should consider strategies to reduce the potential maladaptive responses that are concurrent with the prolonged compromised neuromuscular function after match-play.

- **Transfer of skills from futsal to football in youth players**

Luca Oppici, Victoria University, Australia. Project supported by the Royal Spanish Football Federation.

Many elite football coaches and players, including Arsène Wenger, Lionel Messi, Cristiano Ronaldo and Andrés Iniesta, have stated that practising futsal at a young age fast-tracks the development of football-related skills. However, there is a lack of evidence supporting this. The aims of the study were to examine the passing performance of youth football and futsal players and the transfer of passing skills from futsal to football.

A total of 48 elite male youth players (24 football players and 24 futsal players, all between 13 and 15 years old) played six-a-side games lasting five minutes each on scaled-down football and futsal pitches. Decision-making and technical skills associated with passing performance were evaluated. The football-futsal comparison showed higher demands on passing performance in futsal than in football, with futsal players performing quicker passes using more efficient attentional processes. The transfer-of-skills analysis highlighted that the performance of futsal players in small-sided football games was better than that of football players in futsal games. They performed passes that were quicker (by half a second) and more accurate (by 18%), with higher technical game intensity (23% more passes a minute).

In conclusion, the study showed that futsal has higher demands on passing performance than football. Consequently, futsal players developed quicker technical and decision-making abilities to cope with these increased demands. When futsal players played small-sided football games, they were able to transfer the technical intensity of futsal and their quick and accurate passing ability. This study, therefore, suggests that futsal could be an effective training stimulus for developing quicker technical and decision-making skills in youth football players.

- **An unprecedented civilizing process? Social evaluation of “Supporters United” fan project in Poland**

Radoslaw Kossakowski, Gdansk University, Poland. Project supported by the Polish Football Association.

In Poland, for many years football fans have been perceived as having only negative associations (such as violence and racism). However, as many social phenomena have, the fan environment is undergoing a transformation that can be termed ‘a civilizing process’. The Supporters United programme, implemented in Poland, seems to be an excellent example of such a transformation. The social evaluation of this programme was the main purpose of this research project.

Supporters United, unprecedented in the Polish context, combines fan culture with institutional actors, i.e. the Polish Football Association (PZPN), the Polish ministry of sport and tourism and local councils. It is administered by the ministry and the PZPN but coordinated by fans of clubs in 12 cities. The programme is one stage in the natural development of the fan movement. It requires a compromise between all involved, so fans have to adjust their actions. Gaining credibility is crucial for fans as they

strive to gain a positive reputation. The programme lowers the level of antagonism between the parties involved, as it gives way to the will for dialogue and the need for meetings with all parties to improve their collaboration.

The programme's biggest impact is through local activism. The programme's work is extremely diverse: workshops for children, football tournaments, social work with children with difficult backgrounds, charities and fundraising, and academic conferences. Local centres create a space for cultural support, shaping the attitudes of new young fans by organising family picnics or family sectors at stadiums. The programme should not be seen as a great revolution, but rather as encouraging a 'fledgling' or 'gradual' social change. In the case of Supporters United, the famous saying that 'patience is a virtue' could become an important recommendation.

- **Effizienzpotenziale im strategischen Stadionmanagement (Efficiency potential in strategic stadium management)**

Daniel Gruber, University of Bayreuth, Germany. Project supported by the German Football Association

European football has experienced considerable growth over the last two decades in various respects and, as a result, the revenue of football governing bodies has increased significantly. Notably, stadium attendance has grown continuously thanks to a high standard of play and modern venues. Even though matchday income no longer accounts for the majority of revenue from European top-tier football (it now accounts for approximately 18%), attendance demand is the driver for downstream markets.

In this context, new stadiums with modern architecture and technology boost attendance and direct revenues and are also indispensable for indirect income sources, such as sponsorship and TV coverage, which currently generates the lion's share of revenues. However, modern, comfortable stadiums have substantially higher construction and operational costs than traditional stadiums. As a result, the financial burden for stadium stakeholders is also much higher and may cause insolvency when the stadium's home team is not successful.

Hence, how to plan, construct and run a modern stadium has become an important topic in European football. Yet academic literature lags far behind the urgent need for reliable evidence and insights into strategic stadium management. The vast majority of research is quite pragmatic methodologically and is of a rather qualitative and conceptual nature, i.e. it consists predominantly of case studies. Therefore, this analysis is aimed at a more comprehensive and quantitative approach, raising the question of how to generally improve the management efficiency of football stadiums.

First, following a stylised set of facts and figures, the German football stadium market is identified as a European benchmark. Second, a general business model for strategic stadium management is extensively developed and discussed, alongside accessible evidence regarding the German case. Third, three distinct questionnaires for stadium owners, stadium operators and home teams are derived from the model in order to measure key determinants of stadium efficiency for a large selection of German stadiums (n=146 stadiums, with 167 home teams from the top four divisions of men's football and the women's first league).

The evidence clearly shows, among other things, that financially sustainable concepts for football stadiums should primarily avoid having too much or too little capacity. Therefore, market size and the home team's sporting success – the most significant determinants of the best capacity – must be evaluated carefully when planning a new stadium. Thus, the more uncertain the economic and sports environment of the stadium location, the more stadium constructions should be modular to cope with possibly volatile demand. However, this might raise stadium costs. But, according to the theory of life-cycle costs and interview findings, the additional expenditure during the construction phase can be expected to be recouped through the minimisation of operational costs, which are by far the largest cost over the lifetime of a stadium.



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