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The performativity of sports statistics: towards a research agenda

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ABSTRACT

Statistical analysis has become increasingly integral to contemporary sports. Most existing studies, regardless of whether they endorse or criticise the growing influence of statistical analysis in professional sports, attribute agential capacities exclusively to humans. In this conceptual article, we challenge both what we call ‘instrumentalist’ and ‘romantic’ approaches by applying insights from the expanding literature on the performative effects of statistical models in economic markets to the area of sports. Rather than understanding statistics as mirrors of an objective reality, we conceptualise them as interventions in the analysis and conduct of sports. The use of sophisticated techniques for data collection and analysis by scouts, managers, referees and athletes has profound feedback effects on how these sports professionals come to understand their sport and seek to improve their performance. An interdisciplinary performative understanding of statistics allows for an unpacking of the socio-material mechanisms through which data-heavy analytical technologies shape processes of valuation, commercialisation and regulation in professional sports.

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Introduction

Statistical analysis figures prominently in contemporary sports. At the most visible level, TV punditry revolves around heat maps and ball possession percentages in association football; serve percentages, winners and errors in tennis; or strike rates in cricket. Today’s sports professionals enlist the services of an expanding industry that conducts statistical analysis to enable them to train and prepare better for the multiple physical and psychological challenges of competitions. Companies such as Opta¹ or Prozone² log thousands of data points from elite athletic competitions. Football clubs have contracted dedicated specialists, some with as unconventional a professional background as theoretical physics, to undertake focused match analysis (Lewis 2014; Medeiros 2014). Aided by input culled from this wealth of data, scouts, managers and athletes in various sports perceive their professional assignment as intimately bound up with fine-grained statistical knowledge of athletic performance.

Acknowledging that the influence of statistical analysis in contemporary sports has grown markedly, in this conceptual article we develop a different perspective on the significance of this trend. In line with studies showing how statistics can transform professional practices in areas as diverse as health (Erikson 2012) and fishing (Cardwell 2015, pp. 713–716), we argue that statistics do not simply represent sporting behaviour and condense it into numerical fact. A notable additional capacity of statistics is performative – that is, their use (re)shapes the ways in which sports are understood and conducted. Our disagreement with the widespread conceptualisation of sports statistics as transparent pieces of information builds on performative accounts of science, knowledge and

organisation (e.g. Desrosières [1993] 1998; Law 2009b, 2012; Orlowski 2007). As Law and Urry (2004, p. 403, emphasis in original) put it: ‘... methods are never innocent and ... in some measure they enact whatever it is they describe *into* reality’. The study of the performative dimensions of financial markets is flourishing (e.g. Braun 2016; Clarke 2012; Karl 2013; Langley 2015; Lockwood 2015; Morris 2016; Paudyn 2013). However, the insights of the performativity literature have yet to be harnessed for the study of sports, which could foster interdisciplinary dialogue between sports sciences, sociology and political economy. This move could enrich sports sciences with novel insights into the rise and fall of certain playing cultures, or the growth and decline in market value of certain types of athletes. It could also allow sociologists and political economists to extend the study of sports beyond such topics as globalisation (Andrews & Ritzer 2007; Wright 1999), commercialisation (Gerrard 1999; Magdalinski et al. 2005; Nauright 2004) or development (Hayhurst 2011; Levermore 2010).

The article is divided into three main sections. First, we contrast existing instrumentalist and romantic perspectives on statistics in contemporary sports. Here we show that, despite their competing normative orientations, both approaches ignore the potential impact of statistical analysis itself on professional sporting practices. Second, engaging the multidisciplinary literature on performativity, we move beyond these positions to reconceptualise the place of statistics in sports and render visible their agential qualities. Third, we illustrate our conceptual argument with several examples. Our discussion highlights the considerable influence that statistical analysis exerts across the ‘life-cycle’ of professional sports: from the development of athletic talent to the deployment of in-game tactics to the creation of sporting markets. In the conclusion, we reflect on the directions that future research on the performative effects of sports statistics might take.

Instrumentalist and romantic approaches to statistics in sports

Although most scholars and professionals agree about the increasing significance of statistics in sports, many disagree about whether or not this development should be welcomed. The dividing line runs roughly between sports sciences on the one hand, and sociology and political economy on the other. Sport scientists tend to adopt an *instrumentalist approach*, underpinned by a positivist epistemology. They assume a stable sporting reality that pre-exists our attempts to understand it, so that statistical findings can feed into improved training schemes, tactical styles and even nutritional choices. These interventions are predominantly targeted at practitioners who seek to secure a competitive advantage against their rivals. By contrast, sociologists and political economists tend to adopt a *romantic approach*. They often contrast the meaninglessness of ever more quantified and commodified sports with the authentic beauty of pre-statistical sports. This romantic sensibility surfaces in popular contemporary TV punditry, where former professionals bemoan the infiltration of statistical models and valorise more intangible aspects of sporting success, such as ‘camaraderie’, ‘character’ or ‘courage’. The romantic approach does not map so neatly onto a distinct epistemology. In particular, many of its proponents may be happy to embrace the practical use of statistics even if they do not accept positivist assumptions about their correspondence to social reality (Desrosières 2001, pp. 350–353). We structure our following literature review with reference to these two positions.³

The instrumentalist approach relishes the increased availability of sophisticated data for sports analysis. For example, Kuper and Szymanski (2009) invoke a ‘dashboard’ analogy in their book *Socceronomics* to argue that statistical analysis promises deeper insights into the reasons for success or otherwise in football. In their view, an improved understanding of the game needs to be grounded in reliable numerical evidence: ‘... we distrusted every bit of ancient soccer lore, and tested it against the numbers’ (Kuper and Szymanski 2009, p. 6). Instrumentalist works pitch their contributions in terms of scientific progress and against an implied distinction between ‘premodern’ and ‘modern’ ways of doing professional sports. Two specialist journals that exhibit such a positivist spirit are the *Journal of Sports Economics* and the *Journal of Sports Sciences*, in both of which the typical article sets out to analyse how sporting results can be optimised. Current topics range from difficulties in

talent selection (Faber et al. 2016; Furley & Memmert 2016) and biases in athlete remuneration (Deutscher & Büschemann 2016) to measures for injury prevention (Buckeridge et al. 2016) and sources of success (Lago-Peñas & Sampaio 2015; Pitts 2016).

A number of foundational assumptions place much of the instrumentalist literature firmly in the positivist philosophical tradition (see Hacking 1983). Most instrumentalists see statistical analysis as a key to uncovering previously hidden value in sporting markets. A pertinent example is the book *Moneyball* by Lewis ([2003] 2004), which chronicles the contribution of ‘sabermetric’ modelling to the success of the Oakland Athletics baseball team. The book’s central theme is the weakness of subjective methods used by the baseball establishment to evaluate players, whose actual qualities data can bring to light. Billy Beane’s embrace of a statistical view of the sport helps to correct the systematic undervaluation of certain player attributes, such as on-base percentage. As Beane explains: ‘The idea that I trust my eyes more than the stats, I don’t buy that, because I’ve seen magicians pull rabbits out of hats and I just know that the rabbit’s not in there’ (quoted in Leslie 2015). The subsequent replication of these sophisticated analytical techniques by other teams resulted in heightened demand for players matching particular statistical profiles. While making a general case for the practical benefits of statistical thinking in sports, the book cautiously points to the agency of statistical devices in determining the context in which social practices of valuation occur (see Helgesson & Kjellberg 2013; see the discussion of the subsequent movie by Helgesson & Muniesa 2013, pp. 2–3).

Instrumentalists are interested in how data analytics contributes to improved athletic performance through the revelation of new preparation methods or playing strategies. But the instrumentalist position is based on the flawed assumption that statistics affect only the reality of sporting performances ‘out there’, thus obscuring how statistics help to constitute the wider context in which professional athletic performances are understood and evaluated. All of the above-cited articles from the *Journal of Sports Economics* and the *Journal of Sports Sciences* fit into this mould. Moreover, contemporary sports science textbooks, which provide key teaching materials for new generations of students, continue to locate statistical models outside of the reality that they represent (e.g. O’Donoghue & Holmes 2015; Severini 2014). For instrumentalists, Bennett’s (1998, p. xiiv) words still aptly describe the field: ‘Sports are statistics. ... sports have a foundation built upon scoring systems – put simply, numbers. Virtually, all sports contests are unplayable without the generation of numbers.’ Although Bennett (1998, p. xiiv) acknowledges the function of ‘numbers as expressions of subjective judgements’ in some competitions, these accounts tend to describe humans as handling data and data as reflecting given patterns in the sporting world.

A corollary of this double assumption is the silent imagining of a reflexive human agent, who consciously utilises new insights. From this perspective, statistical research thus serves to generate enhanced knowledge about sporting performance and to transmit ever more accurate information from the pitch to the sports professional. In *Data Analysis and Sport*, O’Donoghue and Holmes (2015, p. xvi) target a readership concerned with using statistics strategically: ‘Being able to communicate quickly and efficiently to your players, coaches and other personnel the information you have collected is vital.’ This focus on the accessibility and utility of better ‘evidence’ fails to account for the unintentional and unpredictable effects that simplified models may have on sporting outcomes (examples of which we offer below). To paraphrase Latour (2005, p. 40), the instrumentalist view conceptualises statistics as ‘intermediaries’ rather than ‘mediators’: they relay information about sporting performance without transforming or distorting it. Overall, despite focusing on how statistics can be used *in* sports, its proponents typically do not study the impact that the growing use of statistics has *on* sports.

The romantic approach to sports statistics rejects the optimism proffered by the instrumentalists. In the romantic view, statistics are not a boon but a curse. Writing in 1993, when computer-driven statistical analysis was not nearly as powerful as today, Gibson (1993, p. 1) already lamented:

Today much of sports exists under a value system that recognizes the objectivity of the scoreboard as the only true assessment of worth, and denies the value of the subjective, experiential, and personal dimensions of sport.

Romantic accounts such as Gibson's speak to a broader critique of modernity that can be traced back to the work of social theorists in the late nineteenth century. Weber ([1904–05] 1965, p. 181), for example, warned that the 'disenchantment' of modern life, which accompanies capitalist modes of authority, could leave individuals trapped in a cold 'iron cage' of bureaucratic rationality. These concerns were echoed by Frankfurt School philosopher Benjamin ([1936] 1999, p. 222), for whom the shooting of films in particular exemplified the corrosive effects of mass production on the 'aura' of artworks: 'The camera that presents the performance of the film actor to the public need not respect the performance as an integral whole.' In a similar vein, Gibson (1993, p. 3) fears that the athlete stops being 'a performing artist' and might instead become 'a subject of quantification and objectification'. Just as Benjamin would have foreseen it, if sporting performances are divorced from the wider cultural context to serve as mere tools for generating monetary value, games lose their authenticity.

Detailed data analytics is thus understood as both a symptom of and a contribution to the increasing commodification and professionalisation of sports. This problem seems to be acutely felt in contemporary football. Proponents of the romantic approach denounce a number of unwelcome changes, such as club takeovers by rich oligarchs or the abstraction of performance into statistical format, as corrupting the 'culture' or tarnishing the 'tradition' of a particular sport. They claim that, as a result, the sport becomes more technical and less emotional, as well as more commercial and less authentic. It is perhaps in the realm of popular punditry that this romantic sensibility is most explicitly linked to the pernicious influence of quantification through statistics. On TV shows such as BBC's Match of the Day, former professionals regularly lament that the statistical dissection of athletic achievement undervalues the intangible attributes of players, which are difficult, if not impossible, to measure. Praising the virtues of 'club loyalty', 'dressing room leadership skills' or 'heart', they imply that the sport has become too analytical and sometimes, by implication, more effeminate. This attitude is nicely captured in the provocative comment by former Southampton manager Harry Redknapp to the team's statistician following a defeat: 'I'll tell you what, next week, why don't we get your computer to play against their computer and see who wins?' (quoted in Medeiros 2014). In these romantic accounts, to place emphasis on statistics in sports is either 'greedy' or 'girly'.

Common in both academic and popular treatments, this critique aims to protect traditional community values from the impersonal grip of global markets. Many of these interventions explore attempts among fan communities to deal with commercialisation in an atomised society brought about by neoliberal politics (Dubal 2010; Giulianotti 2005; Kennedy & Kennedy 2012; Numerato 2015). Their opposition has been accompanied by calls for government regulation to rein in the impersonal commercialisation of sports (Hudson 2001), and for supporter groups and associations to oppose this trend (Webber, 2015). In this context, statistics form part of more far-reaching neoliberal efforts to replace qualitative judgements of sporting experiences with quantitative performance targets (for a comparable critique of performance control in academia, see Gill 2014, pp. 22–24).

But despite their diverging normative claims, advocates of the romantic approach occupy common ground with their instrumentalist counterparts. Unlike the instrumentalists, they do not aim to help athletes, scouts and managers improve athletic performance by applying lessons from a body of statistical 'facts' about a given sport. Rather, researchers embracing the romantic approach seek to recover a more authentic and meaningful sporting reality from the claws of commodification. But like the instrumentalists, they adopt a stance that insulates the broader context in which valuations are performed from the statistical analyses undertaken. In their view, sports statistics shape the wider sporting world, rather than performances within it, only to the extent that humans employ them for particular, often self-interested purposes, such as financial gain. Thus, this position also overlooks how socio-material devices, once put to use, attain a certain level of ontological independence from the ideas and actions of their human creators and users.

In sum, both approaches suffer from the same epistemological reductionism, which holds that statistics merely capture meaningful patterns and anomalies of sporting behaviour. This position, which much sports scholarship at least implicitly endorses, if not explicitly promotes, relegates

materiality, such as statistical artefacts, to ‘a blank slate, surface, or site passively awaiting signification’ (Barad 2003, p. 821). Correcting this one-sided position opens up new ways of thinking about the interdependence between sports and statistics. In the next section, we reconceptualise the significance of sports statistics through a performativity lens.

The performativity of sports statistics

To overcome the impasse between the instrumentalist and romantic approaches, we develop an alternative view of sports statistics that challenges the common separation between the material and the social. Foregrounding the agential potential of sports statistics to effect change in the sporting world, we insist on the ontological possibility of what Orlikowski (2007) calls ‘constitutive entanglement’. In the following discussion, we mobilise the concept of ‘performativity’, a term which has gained traction across the social sciences. This concept has grown out of two major philosophical traditions. The first is rooted in the pragmatic linguistics of JL Austin, whose speech act theory was later applied by gender theorists, most notably Butler. The second is rooted in science and technology studies (STS), and the anthropology and sociology of science; ideas from these fields subsequently informed works by economic sociologists, such as Callon and MacKenzie, to advance the social study of economic markets. To clarify the value that the notion of performativity brings to the analysis of data analytics in sports, we review the philosophical origins of these two strands.

Relating to the first, Austin argues that utterances do not simply represent an external reality, but that they bring certain realities into existence. To understand the social world, studying the meaning of words as an internal truth-bearing system is insufficient because speech acts create phenomena, rather than signifying pre-existing ones (Austin 1962). Austin expands on major themes of the nineteenth-century pragmatist philosophical movement, which was concerned with signification as an act. In this view, ‘... descriptions add to the world ... They may refer to something that is already there but they definitely add to reality, too’ (Muniesa 2014, p. 18). Sports statistics may be seen as performative in the Austinian sense – as ontologically independent utterances, which establish their own referent, not as more or less accurate descriptions of a reality ‘out there’ for us to grasp.

Performative concepts, especially ‘material semiotics’ and the ‘actor-network’ (Law 2009a), also occupy a prominent place in STS and the anthropology of science. In this respect, the work of Latour is foundational. It extends constructivist epistemology, developed initially by Kuhn, to consider not only the social context in which scientific discovery takes place, but also the agency of non-human objects in constructing ‘facts’ (Latour & Woolgar [1979] 1986; Latour 1987, 1992). Ontological categories, even seemingly immutable ‘natural facts’ (see, for example, Martin 1991), are viewed not as foundational features of reality, but as situated achievements assembled through diverse knowledge practices and solidified with instruments, devices and legal-institutional arrangements (Callon & Muniesa 2005). This general idea has inspired analyses of how specific calculative devices, which render possible certain forms of markets and the diverse forms of calculations needed to stabilise them, configure and structure economic life. Some scholars have investigated the self-referential dynamics of the social sciences themselves. The works by Osborne and Rose (1999) on opinion polling, as well as by Law (2009b) on sample surveys, demonstrate the potential performative effects of using particular social scientific methods.

Applied specifically to the study of economic markets, performativity has two major variants: the ‘Austinian’ variant associated with the work of MacKenzie and the ‘generic’ variant developed by Callon (Clarke 2012; Kjellberg & Helgesson 2006). These two approaches to performativity in economic markets assign different relative weight to the illocutionary and perlocutionary aspects of utterances (Butler 2010, pp. 147–148). Illocution occurs when an utterance directly alters reality, such as the pronouncement of a legal verdict by a judge (Austin 1962, pp. 98–131). Illocution in the context of markets is concerned with the ways in which the economic theories, models, and statements yield performative effects, aligning the world with the behavioural assumptions embedded in them. For example, MacKenzie (2003) analyses how the predictive power of the influential Black Scholes

formula, developed as a means to price stock options in the 1970s, increased over time as traders internalised its assumptions and based their evaluations of prices on the model's results. Regulators also came to accept the mathematical simplifications on which the model relied as normative standards for 'free' and 'efficient' derivatives markets. Thus, like 'an engine, not a camera' (MacKenzie [2006] 2008), a piece of economic modelling brought the very world that it predicted into being.

By contrast, the generic variant of the performativity hypothesis focuses on the perlocutionary aspects of utterances. Perlocution occurs when a speech act alone fails to enact meaning. Under these conditions, performative effects depend on conducive conditions that '... produce certain consequential effects upon the feelings, thoughts, or actions of the audience, or of the speaker, or of other persons', with 'misfires' and breakdowns remaining a distinct possibility (Austin 1962, pp. 101, 16–18). Callon (1998), for example, stresses that the categories which structure economic relations are iteratively performed through myriad social interactions informed by the theories and language of economists 'in the wild', such as marketing professionals, consultants or advertising executives. This perspective draws on the work of Butler (1990), which highlights how sex and gender categories are not pre-given biological facts but contingent on the context of iterative performances (see also du Gay 2010). In short, while illocution refers to the direct shaping of the world through speech acts, perlocution indicates the more indirect effects of theory, models and ideas in constituting socio-material practices.

These crucial insights from the performativity literature could spur a more systematic study of the use of analytic technology in sports, which has rapidly proliferated over the past decades. In the area of statistics, where the potential performative effects are hidden behind unambiguously 'true' numbers, perlocution seems particularly important. For Desrosières ([1993] 1998, p. 3), science combines 'description and decision – "there is" and "we must"'. The key operation to attain numerical evidence worthy of the gratifying stamp of reliability is 'objectification', as a result of which prescriptions become socially acceptable: 'It is because the moment of objectification can be made autonomous that the moment of action can be based on firmly established objects' (Desrosières [1993] 1998, p. 9). Yet statistics lack the definitive force of a judge's verdict. They do not speak for themselves but require a series of interrelated acts of interpretation to be produced and infused with social meaning.

Sports statistics, especially in professional sports, objectify value, whether monetary or not, lending more credibility to some registers of value than others. This phenomenon is by no means limited to professional practices in sports. For example, statistical modelling has, as Lockwood (2015, pp. 745–746) notes, delegitimised other forms of knowledge about financial risk that are more difficult to generalise from. Similarly, statistics allow sports professionals to reduce their reliance on intuition and first-hand experiences. In this sense, sports statistics represent a more objectified type of knowledge than what coaches and scouts bring to the table from their often long-standing personal involvement in a sport. While hunches and notepads still support sports analysis, their relative importance has diminished with the rise of computerised statistical modelling, which casts the net wider and deeper (Leslie 2015). With the availability of such comprehensive and detailed data sets, less objectifiable sources of evidence gradually cease to be seen as the 'firmly established objects' (Desrosières [1993] 1998, p. 9) that endow contemporary scientific enterprises with intersubjective credibility.

Processes of objectification precede many of the decisions taken by contemporary sports professionals. Managers who seek detailed information about their sports in statistical format derive their decisions about whom to scout, contract and field from objectified evidence. Medical staff who peruse athletes' health parameters prescribe certain procedures against evidence previously established by colleagues or themselves in series of trials. Athletes who adapt their training, regeneration and regimens to statistically corroborated patterns of evidence follow particular 'dos and 'don'ts'. Bookies who offer betting odds on numerous sporting events could not run their businesses in the same way without the availability of granular data. In all of these instances, professionals trust the evidence at hand as it comes in the form of what they deem to be sufficiently coherent and reliable data. While metrological work typically helps to narrow the scope of disagreement, the

Table 1. Instrumentalist, romantic and performative approaches to sports statistics.

	Instrumentalist	Romantic	Performative
<i>View of sports statistics</i>	Positive: better sports	Negative: less meaningful sports	Contingent: different conduct of sports
<i>Argumentative thrust</i>	Optimal performance	Lost authenticity	Agential qualities of statistics
<i>Concept of value</i>	Uncovered by statistics	Undermined by statistics	Enacted by statistics
<i>Examples</i>	Improving training and regeneration; Adjusting tactical preparation	Objectifying sporting performance; Commodifying competitions and events	Refashioning performance parameters; Redirecting valuation practices

Source: Authors.

effects of measuring and objectifying phenomena remain contingent (Barry 2002). In this sense, sports statistics can ‘misfire’, suffocating consensus and fuelling conflicts among professionals.

Table 1 summarises our presentation of the instrumentalist, romantic and performative accounts of the significance of statistics in contemporary sports. Apart from competing ontologies, the three approaches differ fundamentally in their judgements about the impact of sports statistics and their corresponding understanding of ‘value’ in sports. Instrumentalists propose that value relates to the capacity of athletes to perform well, or better, which can be gleaned from large pools of statistical data. Their critics, who subscribe to a romantic view, maintain that value resides in the more general experience of practicing sports (for both those exercising sports and those attending or following sporting events), which statistics are bound to corrupt. The performative stance that we favour transcends this divide to suggest that value has no predetermined meaning but is enacted through statistics (as well as a range of other socio-material arrangements). Accordingly, our position shifts the empirical focus from either exploring effective training methods or exposing the dangers of commodification to studying how exactly statistics shape professional sporting practices.

Statistics in the product ‘lifecycle’ of professional sports

After dividing the existing literature on statistical analysis in sports into two major perspectives, we have suggested an alternative: a performative perspective allows us to see statistics themselves – and not just the humans who design, organise and employ them – as exercising agency to effect socio-material change in professional sports. This argument amounts to a proposal for rethinking issues surrounding the centrality of statistics in contemporary sports. In the remainder of this article, we therefore illustrate the relevance and applicability of our theoretical position. To this end, we draw examples from various professional sports of how statistical agency may influence sporting practices and formulate key empirical questions that can be best addressed with sufficient attention to the performative dimensions of sports statistics. We show how a performative perspective can contribute to a fuller understanding of the significance of sports statistics by discussing their potential impact across three stages of the product ‘lifecycle’ of professional sports.

Developing athletic talent

Scouting elite talent is vital to developing an attractive sporting product. The recurrent debate about the moral and legal limits of contracting underage players in club-based sports attests to the prevalence of the search for new talent. Selecting promising talents, however, involves more than watching athletes in training and competitions. An athlete’s ‘worth’ is increasingly inferred from numerical indicators and judged against certain performance standards. While an element of intuition informs scouting decisions, the reliance on statistical information can change who is chosen and why. Fads have probably always driven the evaluation of athletes, but now such trends can emerge from highly disaggregated data. Take the case of German international Marco Reus, who as a youth player for Borussia Dortmund

was considered too weak for high-level professional football. After stints with two other clubs, Dortmund bought Reus back in 2012 for a large sum (*Spiegel* 2012). The crucial question in this case is whether the initial decision to let the player go or its later reversal was based on shifting understandings of what constitutes a 'valuable' player. As scouts and coaches make bets about the prospects of an athlete, selection processes in professional sports deserve attention from a performativity angle.

Once talents have been identified, statistics continue to shape the development of young athletes. In football, data-based monitoring of players' development is now applied to children as young as nine years old (Lewis 2014). Coaches use statistics to gauge competitive potential and track the speed at which athletes progress across various performance aspects. In team-based sports, such usage may embed the priorities of the first team's management into the training of young athletes. Statistical evidence may then influence decisions about who 'makes the cut' and progresses to the first team. An interesting empirical question concerns the extent to which athletes, aware of the influence of statistics on their careers, consciously cultivate their own statistical profile and develop a particular playing style. Athletes could, for instance, be incentivised to concentrate on improving aspects of their performance which they know show up favourably in the statistical analyses conducted by their parent club. This process could ultimately shape national playing styles. The differences in how sports professionals in different countries conduct statistical analysis might help to enact particular styles; conversely, similarities in these approaches might further convergence in the tactics and style associated with these countries' international teams.

Key questions include:

- (1) How does statistical analysis shape the selection of (young) athletes?
- (2) What performative effects might statistical analysis have on players' decisions about how to mould their game? How do clubs' statistically visible first team priorities influence the development of youth performance?
- (3) How do statistical and analytical systems vary across countries and institutions? How might this variance affect characteristic national playing styles?

Gaining competitive advantage

To succeed in the sporting market, you need to outplay your rivals. Statistical analysis can redirect tactical choices before and after, as well as during, a competition. Professionals with access to detailed information about themselves or their team, as well as their opponent(s), can derive playing strategies from notable statistical patterns. Consider the example of statistics in professional tennis. The Association of Tennis Professionals (ATP), which organises the circuit of male players, runs an entire 'Stats and Analysis' section on its website.⁴ Three thematic groups, called 'Brain Game', 'Match Stats' and 'Beyond the Numbers', combine targeted statistical analysis of specific matches with more aggregated data highlights, including universal 'success formulas' such as winning a high percentage of points on one's second serve. Players and their support teams are likely to obtain such data in much more granular form, which they can use in preparation for matches and even for tactical readjustment during a match. A recent pilot of the Women's Tennis Association (WTA) went a step further by permitting coaches temporarily on court to share with their players live match statistics compiled by technology corporation SAP (Brady 2015). In this case, players could update their match plans to exploit an opponent's weakness or to capitalise on strategies that had been working well so far.

Statistics can also reconfigure transfer and contract renewal decisions, as teams strive to attract and retain top talent. Scouts searching for hidden talent (including in overseas leagues) are instructed by their clubs to identify certain player types, which fit with the tactical vision of the current management. Tactical fashions stem in part from the rise to prominence of certain statistical indicators and scouting databases, such as ProScout7.⁵ For example, the 'tiki-taka' possession football style

associated with FC Barcelona under Pep Guardiola was emulated by other clubs in Spain, Germany, England and beyond in the early 2010s. Around the same time, statistics on such previously arcane categories as ball retention or pass completion ratios began to be compiled habitually. Ball retention became a highly precious attribute in the view of scouts seeking to find the ‘next Xavi’⁶. Liverpool is rumoured to have paid large sums for Stewart Downing and Jordan Henderson in 2011 as a consequence of their exceptional ‘final third regain’ percentages (Lewis 2014). When new management arrives at a club, the favoured playing style may shift and, with it, the focus on particular aspects borne out in statistics. Such a transition could alter decisions about contract renewals and new signings.

Key questions include:

- (1) In sports with a competitive transfer market, how do statistics influence the value of certain types of athletes?
- (2) How are quantified metrics reconciled with other more judgement-based modes of evaluation in the selection of transfer targets?
- (3) How do statistics affect athletes’ tactical choices, training plans and competition schedules? Do new tactical innovations drive the development of tailored statistics, or vice versa?

Creating sporting markets

Statistics also impact upon the institutions set up to create and regulate sporting markets. While state legislation provides the general framework of reference, associations regulate the sociotechnical organisation of a sport. Numerous examples of detailed regulatory frameworks exist, which usually attract most attention when a reform of the rules of the game is debated: bigger balls, slower surfaces and ‘hawk eye’ technology for players to challenge umpire calls in tennis; second yellow cards, ‘golden’ and ‘silver goal’ extra-time deciders, transfer windows, goal line and within-ball gadgets in football; vehicle and engine parameters in car racing; ski and gun weight limits, and penalty prescriptions for missed shots in biathlon; weight classes and scoring guidelines in martial arts. More broadly, the World Anti-Doping Agency (WADA) establishes the basic anti-doping stipulations (in the ‘World Anti-Doping Code’) and defines forbidden – and hence also permissible – performance-enhancing substances (in an annually updated ‘Prohibited List’). Under this expansive transnational anti-doping regime, athletes have to adhere to certain behavioural standards (Park 2005). The compilation and analysis of sport- and athlete-specific statistics could influence how institutional reforms are framed, debated and pursued.

Professional sports have become major entertainment commodities. Those running events see their value primarily in monetary terms, while those attending events appreciate the joy of watching rather on its own terms. This tension frequently leads promoters (normally the very associations that regulate sports) to appeal to their target audiences by advertising regular events within a set series as extraordinary ones. For the avid fan, local club derbies ‘count’ more than other fixtures (even though points awarded for a win are constant), as do matches between the famed ‘Big Four’ in men’s tennis (Djokovic, Federer, Murray, Nadal).⁷ Differentiated prizes in cycling events (for the best overall sprinter, climber and young cyclist, as well as day wins) create secondary competitions within the main competition. Statistics help organisers and media to imbue events with the perception of excellence and sophistication, touting fixtures of ‘the best offence against the best defence’, ‘the best home team against the best away team’ or ‘the best server against the best returner’. Their efforts can lead to such curious statements as, for instance, ‘a team unbeaten on home soil on a Friday night for seven years’, though only a handful of matches during that period may meet such a narrow description. TV pundits also draw on statistical analysis to enhance the attractiveness of the final sporting product. Indeed, the consumption of modern sporting spectacle is unthinkable without statistical insights.

Key questions include:

- (1) What is the value of data in sporting markets? Who gets to provide sports statistics to whom, and in what format?
- (2) How is data generated by sporting events traded to third parties, and what determines the value of such data? How could these factors influence the market value of a sport or a particular event?
- (3) How does statistical analysis affect the regulation of sports? How do players' associations, corporations, health experts and other professional groups mobilise data to induce regulators to change policies?

Conclusion

The importance of statistical analysis in modern sports is evident. In this article, we have classified two dominant approaches according to their normative orientation towards statistics. While instrumentalists enthuse about the prospect of improving sporting performance through targeted statistical analysis, romantics lament the loss of genuine authenticity in already highly commercialised sports through their further objectification. Both views, we have argued, neglect the agency of statistics in constituting sporting practices. To address this deficiency, we have suggested that sports statistics can be thought of as performative of a sporting reality in the same way as economic models have been theorised as performative of economic institutions. Such a line of enquiry could shed light on numerous empirical issues, some of which we have presented.

Our approach to conceptualising the co-constitution of statistical analysis and contemporary sports could be extended in several ways. The methodological challenges of this specific agenda need to be considered. In light of our discussion, the use of established qualitative methods, such as document analysis, ethnography or interviews, seems best suited to understanding the contingent effects of quantified metrics on sporting practices (see Kjellberg et al. 2013, p. 28). Empirically, it remains an open question to what extent statistical analysis stabilises or destabilises societal conventions about categories such as gender, age or ability. Moreover, both the theoretical discussion and the illustrative examples in this article have focused on professional sports. Although we have not explored this possibility, our argument may apply to amateur sports, especially given the growing presence of analytical methods in everyday exercise. For example, individualised fitness tracking devices and exercise apps (such as Strava), which allow amateurs to generate and compare data on their exercise routines, can act as technologies of neoliberal governance for the 'entrepreneurial self' (Till 2014; see also Davies 2015). However, the performative impact of such devices remains under-researched. Addressing these and similar questions is an important step towards greater dialogue between scholarship in sports sciences, sociology and political economy, a link that has hitherto remained underdeveloped despite considerable potential for cross-fertilisation. This situation raises the critical challenge of developing a common conceptual language through which these concerns could be articulated and negotiated. Performative perspectives hold particular promise towards this end.

Notes

1. Available at <<http://www.optasports.com/>>.
2. Available at <<http://prozonesports.stats.com/>>.
3. Tim Lewis (2014) similarly sees a confrontation between 'quantitative analysts' and 'traditionalists'.
4. More information at <<http://www.atpworldtour.com/en/news/news-filter-results/all/stats-and-analysis/by-the-numbers/all/all/>>.
5. Available at <<http://info.scout7.com/en/products/proscout7/>>.
6. 'Xavi' is short for Xavier Hernández Creus, a long-time former Barcelona midfielder who shaped the team's distinct style.
7. It is interesting to note that both the ATP and the WTA used to reward wins against players with a high ranking under a bonus points system. Beating the number one was more valuable (i.e. yielded more bonus points) than

beating any other player on the circuit; beating the number two was more valuable than the number three and so on.

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