Sports, Society, and Technology

Bodies, Practices, and Knowledge Production

Edited by
Jennifer J. Sterling
Mary G. McDonald

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Roslyn Kerr is Senior Lecturer in Sociology of Sport and Dean of the Faculty of Environment, Society and Design at Lincoln University in Christchurch, New Zealand. She is the author of *Sport and Technology: An Actor-Network Theory Perspective* (2016) and has a long-standing interest in the role of non-humans, such as technologies, in the production and performance of sport. While much of her writing has drawn on the work of Bruno Latour and other actor-network theorists, she is broadly interested in a range of French sociologists, having also published sport-focused articles on Michel Foucault and Pierre Bourdieu.

Samantha King is Professor of Kinesiology and Health Studies and Gender Studies at Queen's University. Her work on the embodied dimensions of consumer culture has appeared in *Social Text, Ethnic and Racial Studies*, the *Sociology of Sport Journal*, and the *International Journal of Drug Policy*, among other venues. Her book, *Pink Ribbons, Inc: Breast Cancer and the Politics of Philanthropy* (2006), is the subject of a National Film Board documentary by the same name. She is co-editor of *Messy*

Eating: Conversations on Animals as Food (2019). Her work explores the place of protein in contemporary food and fitness cultures.

Mary G. McDonald is the Homer C. Rice Chair in Sports and Society and Professor in the School of History and Sociology at the Georgia Institute of Technology. Her research focuses on American culture and sport including inequalities as related to gender, race, class, and sexuality. Her publications have appeared in such venues as the *Sociology of Sport Journal*, *Ethnic and Racial Studies*, *Sociological Perspectives*, and the *International Review for the Sociology of Sport*. A past president of the North American Society for the Sociology of Sport, she directs the Sports, Society, and Technology program at Georgia Tech.

Madeleine Pape is Postdoctoral Fellow in the Science and Human Culture program at Northwestern University. She completed a Ph.D. in Sociology from University of Wisconsin-Madison. Her research examines debates over epistemologies of sex and gender and how these are influenced by the actions of governing bodies, with a focus on international sport and biomedicine in the United States and Canada. Prior to her graduate studies, Pape was a track athlete who competed for Australia in the 800 m at the 2008 Olympic Games in Beijing and the 2009 World Championships in Berlin.

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Jennifer J. Sterling is Lecturer in the Department of American Studies at the University of Iowa. She joined the Sport Studies faculty after completing her Ph.D. in Kinesiology (Physical Cultural Studies) at University of Maryland and a postdoctoral fellowship with the Sports, Society, and Technology program at the Georgia Institute of Technology. Her research

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Nicholas Taylor is Associate Professor in the Department of Communication at North Carolina State University. His work applies posthumanist and feminist perspectives to qualitative research on the intersections of media and subjectivity; specific interests include competitive, spectatorial gaming (esports), domesticity and digital play, and the ways adult artists and enthusiasts engage with LEGO. He is lead editor, with Gerald Voorhees, of the first collection on masculinities and digital gaming (*Masculinities in Play* 2018) and lead editor of a forthcoming volume on LEGO makers and craftspeople (*LEGOfied: Building Blocks as Media*).

Matt Ventresca is Postdoctoral Associate in the Faculty of Kinesiology and Integrated Concussion Research Program at University of Calgary. His research is focused around the sociocultural study of media, science and technology, and pain and injury in sport cultures. His project investigates how neuroscientific research, media coverage, and athletes' experiences come together to create complex and sometimes contradictory processes of knowledge production around sport-related brain injuries. He is the co-editor of the forthcoming book, *Sociocultural Examinations of Sports Concussions*, and his work has appeared in journals such as *Sociology of Sport Journal* and *Communication & Sport*.

Gavin Weedon is Senior Lecturer in the Department of Sport Science in the School of Science and Technology at Nottingham Trent University. His current research explores the ecological and biomediated dimensions of embodied practices, spanning studies of telomere biology, genetic testing, and whey protein powder. His sociological research on sport and exercise has appeared in journals such as *Cultural Studies↔ Critical Methodologies*, *Journalism: Theories, Practice, Criticism*, and the *International Review for the Sociology of Sport*.

Carlin Wing is Assistant Professor and Chair of Media Studies at Scripps College. Her work as an artist and scholar connects everyday gestures to global histories in contexts of play, game, and sports. Her current book project, *Bounce: A History of Balls, Walls, and Gaming Bodies*, follows an array of bouncing balls through the histories of electronic and non-electronic games, across the spectrum of play, game, and sport, and into the domains of physics, material science, animation, and computing in order to describe the worldviews and cultural contests that have been embedded in the architectures, instruments, and gestures of games of ball.

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Introduction: Sports, Society, and Technology

Jennifer J. Sterling and Mary G. McDonald

There are a growing number of scholars working at the intersections of Science and Technology Studies (STS) and Sport Studies. This work does not represent a new phenomenon as STS scholarship has previously engaged physical culture while critical Sport Studies scholars have long pointed out how technology and science impact physical activity and human movement including sports. However, the recent growth in interdisciplinary interactions between these two fields, examples of which are represented in *Sports, Society, and Technology: Bodies, Practices, and Knowledge Production*, is noteworthy. The chapters, therefore, help to illustrate that the study of sports, society, and technology is empirically, theoretically, substantively, methodologically, and disciplinarily diverse and important.

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Taken as a whole, *Sports, Society, and Technology* uniquely addresses the complex entanglements of sports, society, and technology. Sport is a particularly well-suited object of this analysis given its connection to popular pleasures and its capacity to act as a site of ideological meaning making. In addition, the rapid development of technologies and their expanding applications in sports further compels the use of critical, and interdisciplinary, analyses to explicate the social, cultural, political, and historical contexts of an expanding technoscientific landscape. A growing convergence between STS and Sport Studies helps to propel established topics in new directions by offering each discipline new ways to address emerging sporting technologies, phenomena, and related issues.

In this introductory chapter, we briefly discuss important themes and approaches within critical Sport Studies and STS that predate and help to inform this collection. We begin by clarifying terms, pointing toward a brief, and shared, epistemological history between the fields. Foregrounding the book's thematic organization, we conclude the chapter with a discussion of these productive collisions before introducing each of the authors' contributions. Far from definitive, this chapter is strategically selective as a way to introduce some past themes and frames to help contextualize the emerging topics, issues, theories, and methodological concerns that inform the interactions between Sport Studies and STS, and are highlighted individually and collectively by the *Sports, Society, and Technology* chapters.

Tracing Technoscientific Sporting Pasts and Futures

As is the case with most scholarly tracings, we acknowledge that characterizing academic areas of study in terms of their objects of study is a daunting, if not impossible task, particularly in an era of increased interdisciplinarity. Any attempt to name and discuss dynamic elements of a field—themes, paradigms, and ways of knowing—inevitably involves exclusions. That is, in a "world of multiplicities, in which naming, defining, and mapping are acts of ontological politics" we recognize our actions

"give or take explanatory power and authority" (Felt et al. 2017a, p. 4). Therefore, any attempt to construct any field of study is best seen as creating what Max Weber (1949) called "ideal types," or abstractions that can help illuminate a phenomenon but are simultaneously dangerous for simplifying and reifying a complex social process. With this caveat in mind, this tracing—partially and suggestively rather than exhaustively—highlights what we see as key themes and movements within the social studies of sports, science, and technology.

Both critical Sport Studies and STS are historically closely aligned with sociology and have been influenced by broader shifts in the academy toward embracing interdisciplinary ways of knowing which draw from, among others, anthropology, communication, critical race, literary, gender, and cultural studies. Scholars of both sport and science and technology have similarly looked at phenomena as socially constructed and contested. Feminist scholars were among the first critics to expand the study of sport—given the historical exclusion of large numbers of women from sports—to include notions of physical activity, recreation, and the (moving) body. In doing so, feminists, joined by other critical scholars, also interrogated the very notion of sport itself. While fans may recognize sports as rule-bound, organized, and highly competitive, feminists have suggested that sport is eminently tied to power relations of gender, race, class, and nation. For example, late nineteenth- and early twentieth-century myths of female physical malady structurally relegated many women to less physical leisure pursuits. Understanding this process opened up new questions such as "what counts as sports" and "who counts within sports" and "why" (Coakley 2017).

Much as with "sport," scholars of technoscience have likewise moved away from common-sense notions of science as a means to discover natural laws grounded in the scientific method, and of technology as the "relative straightforward application of science" (Sismondo 2010, p. 8). As with strands of Sport Studies, many STS scholars draw upon diverse disciplinary perspectives to conceptualize an active process whereby scientists and engineers engage in researching the material world, which exists—much like sport—as the product of cultural, political and economic contexts and discourses. While never unified, scholars in both fields have produced critiques (influenced by sociological perspectives in

the 1960s, 1970s, and 1980s) that challenge logical positivism's emphasis on quantification and tendency to abstract social phenomena. These parallel developments are reflected by sport scholars who have convincingly, and increasingly, exposed the ways in which sports science has reproduced common-sense notions about the body often grounded in dominant ideologies of race, gender, class, and sexuality. And this scholarship, in turn, has spurred critical sport scholarship to embrace more expansive notions of technology—beyond discursively reductive interpretations of Foucauldian technologies of the body (1986) and toward a (re)consideration of how the discursive and material both interact and are enmeshed.

Thus, a robust range of critical studies of sport has explored the place of science and technology in sporting cultures.[1] For example, research has interrogated scientific racism through an examination of the white historical obsession with the black athletic body, a body partially produced by scientific racism. In a similar way, feminist scholars have shown how medical opinion historically helped to construct the female body as anatomically incapable of physical exertion. Aligned with Anne Fausto-Sterling's (2000) work within STS, other feminist scholars have demonstrated the ways binaries of male and female as well as culture and nature are remade in sports science practices including those around gender verification in sport. As contemporary scholarship illustrates, powerful medical discourses continue with flawed attempts to verify the gender of athletes participating in elite women's events. Ideologies of sex, gender, and sexuality continue to influence the International Association of Athletics Federations's quest to verify the gender of female sexed bodies, the most recent iteration of which is in the quest to confirm the alleged hormonal advantage (hyperandrogenism) of muscular and successful women (see the chapter by Pape in this collection). These writings compellingly argue that science and technology, like sport, are far from neutral arbitrators, but are rather embedded in social and political relations.

Sport Studies scholars have additionally undertaken critical examinations of risk and injury in sport, as well as the cultural, ethical, and economic pressures which contribute to doping and the use of performance enhancing substances, topics more commonly approached through scientific methods in exercise science and sports medicine. These "laboratory"

spaces of exercise science and sports medicine have also been interrogated as important, but understudied, sites of knowledge production (see the chapter by Johnson in this collection). A smaller corpus of research has also explored ethically and ontologically confounding statuses—cyborgs, posthumans, transhumans, and bio-others—as products of human-technology interactions. These include internal and external human-made modifications produced by equipment, prosthetics, and pharmaceuticals. Human–more-than-human collisions are further engaged in scholarship investigating broader empirical sites such as athlete and fan interactions with built and natural environments as well as with animals in sports. Research on sporting mega-events such as the Olympic Games and the FIFA World Cup is also increasingly engaging political and ethical questions around the use of security technologies to ensure safety. Finally, though quantification has long been defined as one of the characteristics of modern sport (Guttmann 1978), more recently scholars have responded to a "digital turn" via research on digital media, esports, (exer)gaming, (bio)metrics, and the quantified sporting self.

This scholarship reflects shifting conceptualizations and materialities of science and technology—from time-keeping, equipment, and training, to doping, cyborgs, and sex testing, to the digital era's focus on biometrics. Yet few critical Sport Studies scholars have engaged these issues through the lens or frameworks of STS, such as those marked by close and in-depth attention to the practices of science and technology. Likewise, sport's entanglement with science and technology has infrequently garnered the attention of STS scholars. For example, there is no substantial engagement with sport in any of the chapters that constitute four editions of the *Handbook of Science and Technology Studies* (see, for example, Felt et al. 2017b), which map the breadth of scholarship and epistemological shifts within the field of STS. As such, the absence of sport is noticeable. This state of affairs further points to the continuing need to elevate and interrogate scholarship which productively engages both fields.

In comparing the emerging scholarship of the two disciplines, it could be argued that STS is more likely to approach science and technology from a production or object-oriented perspective or that STS scholars have been quicker to respond to the need for critical studies of big data

and technological quantification, and that Sport Studies scholars are more interested in embodiment. However, growing evidence of crossover between scholars in the two fields suggests that this distinction may instead be most useful in illuminating the increasing and productive influence of each discipline on the other and the potential for their ongoing and future convergence.

Collisions and Contributions

A potential site for continued convergence relates to issues around methodological, epistemological, and ontological sensibilities exemplified through STS approaches such as actor-network theory (ANT) and new materialisms. Far from the only approaches used within STS, we highlight these two as examples of modes of analyses that are also grounded in epistemological and ontological concerns, which allow for a more expansive approach to both new and existing sporting phenomena. Often identified with STS more broadly and with the work of STS scholars Bruno Latour and Michel Callon, and sociologist John Law in particular, actor-network theory or ANT is a "disparate family of material-semiotic tools, sensibilities and methods of analysis that treat everything in the social and natural worlds as a continuously generated effect of the webs of relations within which they are located" (Law 2008, p. 141). Thus, "actants" in networks are conceived of as both human and nonhuman as ANT incorporates the materiality and interests of objects and things into analyses. After all, as Sismondo (2010) explains, science and technology often "works" by "translating material actions and forces from one form to another" (p. 83). Additionally, objects and things are clearly given meaning as they interact with human actors and, as such, both the material and semiotic constitute networks—that is, networks offer a type of material-semiotic analysis.

Rosalyn Kerr's (2016) *Sport and Technology: An Actor-Network Theory Perspective* is illustrative of the productive application of ANT in tracing the influence of things—in this case, technologies within sport—while noting the highly individualized and unstable character of networks and assemblages; human and nonhuman combinations "that have vastly dif-

ferent qualities and capacities from singular parts" (p. 25). Kerr's scholarship on gymnastics has shown, for example, that nonhumans are central in gymnastics networks. This includes the use of cameras and apparatus that help shape bodily activity in the sport while showing that the (often authoritative) coach is not the most, or only, important human or nonhuman actant in this network. Popularized in the 1980s, Kerr (2016) explains how early renditions of ANT were rich in ethnographic thick descriptions, which helped to detail the myriad of actants involved in the production of science and knowledge. ANT has since gone through many iterations and is not without its critics who, for example, point out the problematic symmetry often granted to human and nonhuman actions and interests without an associated concern with relations of power.

STS approaches also overlap with new materialisms, a development that has activated an ontological turn in Sport Studies (see the chapter by Henne in this collection), a turn that works to decenter anthropocentric Enlightenment fantasies of humans as always and everywhere the most important actants. Broadly conceived, (new) materialisms suggest that bodies are not simply material but also ensconced within the material world and processes, thus counteracting scholarship that mainly centers on representation and interpretation. This relational ontology suggests that different bodies—animate and inanimate—are not separate but instead "intra-act" in a dynamic process of becoming (Barad 2007). This framework helps to disrupt notable Western binaries often reproduced in dominant ontologies, including those often guiding Sport Studies scholarship, such as active-passive, material-discursive, masculine-feminine, nature-culture, and subject-object (McDonald and Sterling 2020). As Jane Bennett has written, this focal point additionally "draws human attention sideways, away from the ontologically ranked Great Chain of Being and toward a greater appreciation of the complex entanglements of humans and non humans" (Bennett 2010, p. 112). Actor-network theory and new materialisms are among the many STS-inspired methodological, epistemological, and ontological influences evident throughout the productive collisions represented by each of the *Sports, Society, and Technology* chapters, and applied to a wide-ranging set of emerging themes, issues, debates, and concerns located at the intersection of sports, science, and technology.

Chapter Introductions

Sports, Society, and Technology: Bodies, Practices, and Knowledge Production illustrates contemporary investigations of sports, science, and technology through a myriad of different topics and methods within the ten chapters that follow. Contributing authors include scholars from Sociology, Gender Studies, Legal Studies, Environmental Science, Media Studies, Communications, and Kinesiology, in addition to Sport Studies and STS programs, representing the aforementioned emergent, diverse, and necessary (inter)disciplinary entanglements.

The anthology is organized into two thematic parts—Practices, Productions, and Knowledges and Bodies/Matter. While there is considerable overlap between the focus of each part, the chapters in the Practices, Productions, and Knowledges segment highlight the complex role of human and nonhuman actants as well as the attendant knowledge formations that constitute sport, science, and technology processes. The chapters in this first part often decenter the human body as a primary point of analysis, thereby disrupting anthropocentric accounts that are too often reproduced in contemporary sport scholarship. Chapters in the second part, Bodies/Matter, are grounded in feminist sensibilities which collectively demonstrate ontological understandings of bodies as multiple, material, and ensconced within the material world.

Part 1: Practices, Productions, and Knowledges

In the opening chapter of Practices, Productions, Knowledges, "True Bounce: Stories of Dunlap and the Rise of Vulcanized Play," Carlin Wing offers a historical tracing, locating evolving rubber technologies as essential to modern sport's constitution and the ideological promotion of fair play. By focusing on changes within the Dunlap brand over time, Wing examines material science and manufacturing, arguing that the quest to produce a consistent or "true" bounce in such objects as tennis balls is far from mere play but rather ensconced within technologies of industrial development and imperial power relations.

While the first chapter of this part is "object-oriented"—a common approach within STS that is less frequently applied to sport and fitness settings—the next four chapters additionally explore practices of knowledge production. Andi Johnson's "Manufacturing Invisibility in 'the Field': Distributed Ethics, Wearable Technologies, and the Case of Exercise Physiology" offers a rare ethnography of exercise scientists' networked activities in the laboratory and "field." Discussing the implications of exercise scientists' physiological knowledge production, Johnson in particular notes how the use of miniaturized instruments helps to produce their own invisibility in field settings and subsequent scholarship.

Next, Matt Ventresca critically examines sport's "concussion crises" in "The Tangled Multiplicities of CTE: Scientific Uncertainty and the Infrastructures of Traumatic Brain Injury." In doing so he shows how neuroscience's inability to determine the exact cause and effect mechanisms that produce brain trauma (e.g. chronic traumatic encephalopathy) exposes not only scientific uncertainty but ultimately an inability to capture the brain's material complexity. Rather than continuing to privilege neurological ways of knowing, Ventresca instead argues for the need to embrace critical socio-cultural perspectives that examine, challenge, and seek to change collision sports infrastructures of harm—the values and violent contexts which place athletes' bodies and brains in danger.

While Ventresca analyzes the politics of uncertainty produced in quantitative scientific studies of sports concussions, the next chapter hones in on cultural work performed through seemingly definitive systems of measurement within sports. In "The Agency of Numbers: The Role of Metrics in Influencing the Valuation of Athletes," Roslyn Kerr, Christopher Rosin, and Mark Cooper explore how sporting metrics exist as unique forms of sporting information—so much so that particular evaluative metrics acquire a "life of their own" by reducing player performances to numeric values. Drawing upon Latour's notion of the immutable mobile as well as Deleuze and Guattari's concept of territorialization, the chapter charts how metrics serve as useful sites to explore performative power and to theorize nonhuman agency in sport and beyond.

Finally, Nicholas Taylor's ethnography examines collegiate e-gaming as embodied and digital sites of identity making, technique development, and intense competition. In "The Numbers Game: Collegiate Esports

and the Instrumentation of Movement Performance," Taylor suggests that unlike collegiate and professional sports, these *League of Legend* players merge the roles of athlete and analyst into a single hybridized identity. Taylor concludes the chapter by briefly discussing the problematic but increasing linked network of knowledge production between video games, sports, and the military where embodied performances are digitally transformed into "moving dots." Taylor's investigation is important in documenting the increasingly prominent place of esport within the broader sports landscape, as well as its diversity and hierarchies. As with other chapters in this part, his analysis further uncovers the powerful capacities of linked corporeal and material networks within technoscientific sporting landscapes.

Part 2: Bodies/Matter

The second part, Bodies/Matter, begins with Kathryn Henne's chapter, "Possibilities of Feminist Technoscience Studies of Sport: Beyond the Cyborg Body" which opens a much needed dialogue between feminist Sport Studies and feminist STS frameworks. Engaging with rich histories of feminist thought, she also draws from both sport and technoscientific studies more broadly. In particular the chapter examines how feminist scholars have applied STS concepts such as the cyborg, agential realism, and assemblage to sport, while also considering how feminist Sport Studies's emphasis on embodiment, sport, and physical activity offers important conceptualizations for understandings of science, technology, and society.

Samantha King and Gavin Weedon's chapter flows well from Henne's discussion as the authors deploy an important tenet of feminism via Mol's ontological conceptualizations regarding the ways in which multiple bodies come into being through diverse practices. "Enacting Bodies: The Multiplicity of Whey Protein and the Making of Corporealities" traces a popular protein supplement favored by fitness enthusiasts, from a toxic by-product of dairy (cow) production to its materialization as a seemingly healthy commodity. This exploration is important in troubling individualistic and human-centered notions of embodiment while also

making visible the often-toxic impact of whey on the natural environment, thus further highlighting the importance of human-nonhuman ecological relationships.

In "The (In)Active Body Multiple: An Examination of How Prenatal Exercise 'Matters,'" Shannon Jette and Katelyn Esmonde also use Mol's conceptualization to map the multiple ways that prenatal exercise comes to matter socially, politically, and materially. In particular, they investigate which ontologies are performed in healthcare contexts, and the privileging of "the over-nutrition hypothesis" and a linear model of causality to emphasize the need for mothers to engage in prenatal physical activity to maintain an "appropriate" weight for the health of their future children. Far from innocent practices the authors illustrate how a narrow notion of an idealized maternal body emerges from the multiple possibilities available. In doing so, this chapter rearticulates a history of STS scholarship that exposes the politicized framings of women's reproduction capacities as well as STS and Sport Studies scholarship that takes the materialization of (multiple) bodies seriously.

Madeleine Pape continues a focus on feminist scholarship in her chapter, "Ignorance and the Gender Binary: Resisting Complex Epistemologies of Sex and Testosterone," where she interrogates and reveals how sexed bodies impose binary categories onto a far more complex and indeterminate reality. Drawing on interviews with international track-and-field stakeholders, including athletes, coaches, managers, media personnel, and officials Pape examines how this elite sport community understands organizations' attempts to regulate those women athletes with naturally occurring high testosterone. Informed by a growing body of scholarship around the social construction of ignorance, this chapter explores the institutional process whereby stakeholders resist alternative ways of knowing and protect their epistemic commitments to binary sex.

In the section's and collection's final chapter, "Screening Saviors?: The Politics of Care, College Sports, and Screening Athletes for Sickle Cell Trait," Mary G. McDonald explores how a required health screening of US college athletes for sickle cell trait is embedded in a longer history of racialization and racist science. Designed to identify and monitor individual athletes during intense exercise which might result in ill health, this individualized focus obscures larger structural problems regarding

the National Collegiate Athletic Association's (NCAA's) racialized labor practices and inattention to other matters of athlete health. McDonald's examination further reveals the politics of care as well as the precarious use of health screening within sport spaces and beyond while helping to trouble notions of (dis)ability, health, and risk.

Individually, each of the above chapters makes their own unique contribution related to their objects of analysis, concepts and theories engaged, and methods utilized, illuminating and interrogating complicated relationships between science, technology, and sporting cultures. Collectively, this anthology highlights the benefits of Sport Studies and STS convergences, particularly in this era of increasingly technologized societies and sporting cultures. In assembling this collection of emerging scholarship it is our hope that *Sports, Society, and Technology: Bodies, Practices, and Knowledge Production* additionally propels established topics in new directions and generates further questions, conversations, and analyses.

Note

1. We realize we are providing very general themes (and an incomplete account at that) as our purpose is to provide examples that reveal the diversity of topics covered to date. It would be impossible to fully document the related and substantial body of scholarship that predates and informs this anthology in the limited space of this introduction. However, there are books and anthologies which provide useful introductions, overviews, and analyses. These include but are not limited to Vertinsky's (1994) examination of nineteenth-century medical ideologies and women's physical activity; Young's (2004) edited collection on risk and injury; Tolleneer et al. (2013) on doping and sports and Henne (2015) on doping and sex regulations in sport; Miah's (2004, 2017) interrogation of both gene doping and sports-digital relationships; Magdalinski (2009) and Fouché (2017) on sporting bodies and technology; Lupton's (2016) exploration of the quantified self and self-tracking and Millington's (2017) examination of the datafication of contemporary fitness; and Taylor's (2012) unpacking of esports. For an excellent introduction to the critical Sociology of Sport see Coakley (2017).

References

Barad, K. (2007). *Meeting the universe halfway: Quantum physics and the entanglement of matter and meaning*. Durham, NC: Duke.

Bennett, J. (2010). *Vibrant matters: A political ecology of things*. Durham, NC: Duke.

Coakley, J. (2017). *Sport in society: Issues and controversies*. New York: McGraw-Hill.

Fausto-Sterling, A. (2000). *Sexing the body: Gender politics and the construction of sexuality*. New York: Basic Books.

Felt, U., Fouché, R., Miller, C., & Smith-Doerr, L. S. (2017a). Introduction. In U. Felt, R. Fouché, C. Miller, & L. S. Smith-Doerr (Eds.), *The handbook of science and technology studies* (4th ed., pp. 1–26). Cambridge, MA: MIT Press.

Felt, U., Fouché, R., Miller, C., & Smith-Doerr, L. S. (2017b). *The handbook of science and technology studies* (4th ed.). Cambridge, MA: MIT Press.

Foucault, M. (1986). *The history of sexuality: Vol. 3. The care of self*. New York: Pantheon Books.

Fouché, R. (2017). *Game changer: The technoscientific revolution in sports*. Baltimore, MD: Johns Hopkins University.

Guttmann, A. (1978). *From ritual to record: The nature of modern sport*. New York: Columbia University Press.

Henne, K. (2015). *Testing for athlete citizenship: Regulating doping and sex in sport*. New Brunswick, NJ: Rutgers University.

Kerr, R. (2016). *Sport and technology: An actor-network theory perspective*. Manchester: Manchester University Press.

Law, J. (2008). Actor-network theory and material semiotics. In B. S. Turner (Ed.), *The new Blackwell companion to social theory* (3rd ed.). Oxford: Blackwell.

Lupton, D. (2016). *The quantified self: A sociology of self-tracking*. Cambridge: Polity Press.

Magdalinski, T. (2009). *Sport, technology and the body: The nature of performance*. London: Routledge.

McDonald, M. G., & Sterling, J. (2020). Feminist new materialism and the troubling waters of the 2016 Rio de Janeiro Olympic and Paralympic Games. In J. Newman, H. Thorpe, & D. Andrews (Eds.), *Sport, physical culture and the moving body: Materialisms, technologies, ecologies*. New Brunswick, NJ: Rutgers University.

Miah, A. (2004). *Genetically modified athletes: Biomedical ethics, gene doping and sport*. London: Routledge.

Miah, A. (2017). *Sport 2.0: Transforming sports for a digital world*. Cambridge, MA: MIT Press.

Millington, B. (2017). *Fitness, technology and society: Amusing ourselves to life*. London: Routledge.

Sismondo, S. (2010). *An introduction to Science and Technology Studies*. Malden, MA: Blackwell.

Taylor, T. L. (2012). *Raising the stakes: E-Sports and the professionalization of computing games*. Cambridge, MA: MIT.

Tolleneer, J., Sterckx, S., & Bonte, P. (Eds.). (2013). *Athletic enhancement, human nature and ethics: Threats and opportunities of doping technologies*. New York: Springer.

Vertinsky, P. (1994). *The eternally wounded woman: Women, doctors, and exercise in the late nineteenth century*. Urbana, IL: University of Illinois Press.

Weber, M. (1949). "Objectivity" in social science and social policy. In M. Weber (Ed.), *Essays in the methodology of the social sciences* (pp. 50–112) (E. A. Shils & H. A. Finch, Trans.). New York: The Free Press.

Young, K. (Ed.). (2004). *Sporting bodies, damaged selves: Sociological studies of sports-related injury*. Bingley, UK: Emerald.

Part I

Practices, Productions, and Knowledges

True Bounce: Stories of Dunlop and the Rise of Vulcanized Play

Carlin Wing

Dear Dunlop

In the summer of 2013, Raneem El Welily wrote a "Dear Dunlop" letter. Of sorts. The 24-year-old Egyptian squash champion atted Dunlop Sport, tweeting that they were ruining her life. Their terrible squash balls were "not even round." She attached photographic evidence of the offending objects. The image shows a collection of Dunlop Pro squash balls, some obviously shy of a regular spherical shape. Many had been discarded with the white stamp of the Dunlop brand still fresh. Other players had also noticed the problem. It was not simply that the balls were bouncing too fast or too slow. Their elasticity, shape, and lifespan were all unpredictable. In an interview in the fall of 2013, longtime top American player Latasha Khan said, "It's dramatic. Some just take off. And other ones are so heavy that they just die. You can't warm them up" (L. Kahn, personal communication, Oct 3, 2013). Kahn said this was affecting both the duration of matches and who was winning and losing. Malaysian

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