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The Accountability of Performance in Media Sports – Slow-Motion Replay, the "Phantom Punch," and the Mediated Body[1]

Markus Stauff

English abstract: Research to date has primarily investigated the formation and the ideological construction of the body in sport. In contrast, the pivotal question here is how media technologies address the body in modern sports in order to make performance comparable and verifiable, i.e. accountable. In the first part, a historical review shows how since the 19th century modern competitive sport have increasingly incorporated new technologies in order to make different aspects of athletic performance accessible. In this process, the body is fragmented and abstracted (as in statistics), yet it is also complemented by nonphysical aspects of performance (tactics, mental states, etc.). The second part analyses this assemblage of different forms of knowledge in relation to slow-motion replays. Both the technical development of slow-motion as well as its first spectacular application (as on Mohammed Ali's "phantom punch") demonstrate how, in the endeavour of making sports more transparent via media technology, the body becomes only one of many elements at play.

In the transition from a television-dominated sports culture to one shaped by social media, the presence of athletic bodies in media culture is bound to change as well. Think of the American sports TV channel ESPN's acquisition of the blog *FiveThirtyEight* from *The New York Times*, announced in July 2013. On this blog, statistician Nate Silver – who started as a baseball analyst – mainly publishes political commentary and analysis, famously predicting the outcome of the 2012 US presidential election correctly for all 50 states (Silver 2012). In his new environment at ESPN, Silver applies his data-driven analysis to different sports (as well as to politics, economics, science; see http://fivethirtyeight.com) on a regular basis. This acquisition seems to signal an important shift. In the 20th century, the public image of sports was initially dominated by photographs and later on by the endlessly circulating slow-motion replays of stunning feats and admirable moves. In the online media of the 21st century, the spectacle of the moving body and the larger-than-life emotions have surely not been replaced by abstract, quantified forms of knowledge; yet the spectacle is at the very least augmented by numbers and data visualization. This becomes espe-

1 I'd like to thank my two anonymous peer reviewers and Florian Duijsens for their helpful notes and comments.

cially obvious when looking at the online live scores (tickers) offering play-by-play accounts of competitions. Here, as an example, are the last 20 seconds of the final 2013 NBA championship game as it was presented on ESPN.com:

0:18	Manu Ginobili misses 26-foot three point jumper	88-94
0:16	Dwyane Wade defensive rebound	88-94
0:16	Danny Green personal foul	
	(Dwyane Wade draws the foul)	88-94
0:16	*Dwyane Wade makes free throw 1 of 2*	88-95
0:16	Dwyane Wade misses free throw 2 of 2	88-95
0:14	Shane Battier offensive rebound	88-95
0:00	*End of the 4th Quarter*	
0:00	End of Game[2]	

The athletes' bodies here are only present through their names and fragmented, pre-defined, and numerable actions (a certain type of shot, a certain distance run, a particular foul, etc.).

To a certain extent, this seems to be a resumption of the very early forms of modern competitive sports reporting that was handled through telegraphy, newspapers, and public score boards – all media that were important in establishing sports as we know it today. It is thus also a reminder that modern competitive sports harnessed a broad variety of media to make visible, to evaluate, and to compare performances. The body spectacle, so conspicuous in photography, on film, and especially in television's slow-motion replays, is only one of many decidedly heterogeneous mediating procedures appropriated and generated by sports. In the following I want to argue that a more detailed focus on this heterogeneity allows us to complicate the role of the body in modern mediated sports.

On the one hand, different media technologies address quite different aspects of the body. On the other hand, all of these – including the body spectacle in slow motion – interpolate the body within a more general endeavor to make the course and the result of athletic competition visible, accountable, and communicable. The body is thus not only multiplied in the mediation of sports, it is also related to, and complemented or even replaced by, aspects of athletic performance that stretch the conventional understanding of physical achievements in sports: psychological and biographical insights, strategic reasoning, technological expertise, and probabilistic prediction. Even slow-motion images, which

2 http://scores.espn.go.com/nba/playbyplay?gameId=400467339&period=4 (accessed 1 July 2013, bold in original).

seem to focus completely on the celebration of the body, contribute to forms of knowledge well beyond the physical realm. The body and its visible features become a medium with which to address noncorporeal features of the competition. While the body, without question, contributes decisively to the media culture of sports, the often taken-for-granted assumption that sports is mainly defined by its particular depictions and manipulations of the human body too quickly covers up the complicated role the body plays in all the different mediations characterizing sports. What sports contributes to media culture is much more than body images and body knowledge; it contributes procedures for organizing, understanding, and gauging performance and competition well beyond its physical aspects.

In order to re-envision the role of the body in media sports, I will first examine the historical establishment of sports that suggests that what we understand as modern competitive sports is actually less a particular form of physical activity than a mediated comparison of such physical performances. Second, I will analyze the establishment of slow-motion replays in television sports from a technological perspective (mainly through reports in the engineering journal *SMPTE* from the 1950s and 60s), and also its application in a particular media event (Muhammad Ali's "phantom punch" in 1965). Since slow motion is often considered the technology that most clearly brings the athletic body into focus, it is worth a closer look to see exactly how the body is addressed in the slow-motion replays of television sports – images of the body that are about much more than only the body.

While focusing on this particular historical moment, my argument is meant to be less a historical than a systematic one: The introduction of slow-motion replay here is not researched as a turning point in sports history, or body history for that matter (which could, of course, also be studied). I take slow-motion replay more as an example for the way modern competitive sports was able to adapt and appropriate different media technologies, each with their own particular consequences for body images and body knowledge, throughout its history. Sports harnessed very different media to continuously improve its characteristic comparison of performances and thereby partly relativized the physical specificities – both those of the media itself and of the bodies they made visible.

Sports' Body Culture: Manipulation, Display, Comparison

To understand how media produce different forms of body knowledge in sports, it is helpful to distinguish three different ways of addressing the body: Sports (1) manipulates the body, (2) displays the body, and finally (3) accounts for and compares (physical) performances. After shortly touching on the first two, I will focus mostly on the third, since this is the one in which the most different media get involved and in which the role of the body becomes ambivalent and partly marginalized.

1. The evidence for modern competitive sports' involvement into broader body culture and body politics is most evident in the first aspect – the manipulation of the body, its shape, capability, and orderly behavior: From its beginnings in the 19th century, sports was harnessed to improve the skills, strength, and self-control of the individual (e.g. Blake 1996), but also to distinguish aristocratic or bourgeois bodies from those of the working class (e.g. Bourdieu 1978); sports was deployed to support military training or religious self-determination (e.g. Wildmann 2009); it was supposed to compensate for the ills of civilization but also to prepare the work force for its daily tasks (e.g. Dinçkal 2013); or to curtail the more "dangerous forms of physicality" (Gruneau 1993, 90) of the young and un-educated. In all these endeavors it also figured as "a prime site for the ideological construction of gender difference" (Whannel 1984, 104), while acting out a broad variety of masculinities (e.g. Kreisky and Spitaler 2006), but sometimes allowing for the introduction of new, surprising concepts of the female body (Butler 1998). Sports, hence, cannot be defined by one particular body concept; at most it can be described as a field of struggle for different body ideologies that always are connected to similar struggles in education, medicine, art, and so on (Bourdieu 1978). Not least, sports encompasses so many different body politics because, by seeking recognition (and economic success), the organizers of (different kinds of) sports take up elements of dominant ideologies (amateurism, fitness, health, competition, fairness) to legitimize their project (Gruneau 1993).

2. The way sports manipulates the body, and the technologies and epistemologies applied in that context, are closely intertwined with similar endeavors in physiology, ergonomics, or life-reform movements (Sarasin 2001, 319–336; Möhring 2002). More than most other forms of physical education, however, modern competitive sports combines the manipulation of the body with the public display of the body. Judith Butler reminds us that, of course, the body – its shapes and its borders – always already exists as an incorporation and embodiment of cultural norms and practices. Signification is not something that is added to a

primordial and meaningless corporeal entity; it is the very condition for the body, and each bodily activity has a public character in that it takes up and reenacts established patterns and hierarchies (Butler 1990, 128–141). Yet Butler herself also outlines the heightened relevance of visibility and representation for the athletic body: the athletic activity cannot "proceed without some reference" to an "imaginary body" – even if the constant transformation that characterizes the trained body simultaneously undermines any fixed representation (Butler 1998). Additionally, modern sports systematically organizes an audience for its physical practices. The cultural and political relevance of sports' bodies is therefore not only based in the possibility to shape and improve its capabilities, but also in its potential to act as a model and an embodiment for a mass audience. Athletes are believed to enact gestures and movements that express a collective culture and stimulate imagined communities (e.g. Alkemeyer 1997); they are also said to act as symbols for "desirable bodies, beautiful bodies and of course broken, damaged bodies" (Woodward 2012, 15); and to embody the modern conviction that life can be changed and improved through physical exercise (e.g. Sloterdijk 2011). Though the bodies of the audience members themselves are also disciplined and intensively kept under surveillance, they are allowed (or even expected) to show emotional excesses very much marginalized in everyday life (e.g. Frank and Steets 2010).

3. In modern competitive sports, the public display of the body and the making of the body through incorporations and reenactments are very much entangled in the mediated comparison of performances beyond the event at hand. Contrary to most other physical practices from life-reform movements to ballet or mountaineering, sports involve the body in a distinctive event with a clear outcome (winners and losers, mostly), one that at the same time depends on a series of similar (and even temporally and spatially standardized) performances that determine the actual value and significance of the single event. Sports is therefore based on mediating mechanisms recounting (and accounting for) the individual events, which makes it possible to relate different performances and events to each other through statistics, narratives, images, results, tables, rankings, etc. (Werron 2009). This is not just an addition to the physical practice of sports; it is both what historically enabled modern sports to emerge as a distinctive field of practice and what systematically (and fundamentally) shapes sports' contribution to the broader formation of knowledge.

Research on the manipulation and the display of the body more often than not takes for granted the close connection between sports and the body – even if a growing part of this research deconstructs the body and

conceives of it as an effect of cultural practices. With respect to the comparison of performances, however, it is less clear if (or in which sense) it is the body that is addressed.

Mediated Comparison of Performances and the Emergence of Modern Sports

While sports' genealogy is heterogeneous (and of course related to other physical activities), modern competitive sports got its distinctive, still-dominant form in the second half of the 19th century when local and individual contests were integrated into a much more expanded field of competition, including contests happening in different places and at different times. Various kinds of sports developed alongside each other, all characterized by serially organized competitions based on standardized rules and standardized playgrounds to guarantee comparability and "competitive transparency" (Collins 2013). The establishment of leagues (distinguishing different levels of perfor-mance) and the interest in world records are two quite different examples of this drive for comparison that would not have become stabilized if mediated forms of observing sports (based on telegraphy and the mass press) would not have supplemented the perception of the spectators present at the live event (Werron 2010; Werron 2013). Eventually, competitions as different as boxing, sailing, horse racing, car racing, or figure skating would all be included in the field of modern competitive sports, each of them having developed specific criteria and media constellations to make their performances accountable and comparable. The abstract machinery of standardized rules, serialized competitions, and the comparison of performances allowed for the 'sportification' of quite variegated practices, each with their very own body shapes and displays (Gruneau 1993).

The pure quantitative result of each single contest is the most basic and condensed account of a performance. Through its radical abstraction from the specific course of events and its physical features, the end result guarantees comparability and easy memorability. However, the fascination with the single local live contest combined with the urge to refine its comparison with a series of similar events provoked a dynamic to make as many aspects of the performance accountable as possible. To determine the significance of a single performance in relation to similar other ones, and especially to future competitions, it has to be scrutinized for supposedly decisive and telling characteristics. And this can only be achieved by processes of mediation that allow for identifying and distinguishing different types of action, decomposing each competition into

fragmented features and offering criteria to classify and communicate these features.

On the one hand, this dynamic changes and multiplies the possible ways to address the physical performance: shirt numbers allow us to distinguish individual players; photo finishes allow for a more fine-grained determination of results and records; the display of an athlete's heart rate or of the distance the players cover during a match offers physiological details up to scrutiny. Through mediation, features of the performance that are already visible are systematically recorded and formerly invisible aspects of the athletes' bodies can be added to the ledger, achieving heightened accountability. Sports is paramount in the implementation and popularization of diverse forms of body knowledge, addressing the body as a vessel of individual subjectivity or as a physiological machine.

On the other hand, however, this comparing of performances far exceeds mere physical aspects. Mediating procedures often abstract and marginalize physical specificities. The statistical inquiry of 'assists' or 'shots on goals' and the more general surge of big-data analysis in sports delivers disembodied knowledge about functions in a game instead of information about physical capabilities.[3] Additionally, media forms add layers to the comparison of performances that involve the body only as one element. Visualizing tactics and strategies through diagrams transforms individual athletes into more or less arbitrary embodiments of a coach's 'vision' or of the immaterial 'character' of a team. Close-ups of athletes' faces supplemented by narratives of their personal biographies are used to add psychological aspects to the accounting endeavor (Stauff 2009a; Stauff 2009b). Computer-generated images, which are used to determine if a ball crossed or hit a line, even more radically efface the human body for the sake of precision. The same applies to discussions of the nonhuman, material conditions of sports, such as the quality of skis or bikes, or the turf and weather conditions.

Most of the features listed here can easily be related to the physical realm, with the body either the originator or an effect of the features in question. I would, however, like to go beyond the seemingly natural connection between sports and the body for a moment and to focus on the extent to which the quest for accountability and comparability produces forms of knowledge that at least partially become independent of the body. The most extreme case, perhaps, would be fantasy sports,

3 While in some sports (e.g. baseball or cricket) statistics were already relevant during the second half of the 19th century, others only started to be impacted by statistics at the end of the 20th century. Since then, it also has become a popular phenomenon present in books, films, newspapers, and blogs (e.g. Silver 2012; Lewis 2014).

based on actual sports statistics and simulating an entire season of a league, which dispenses completely with the necessity of training a body or displaying it as a spectacle – while of course being closely related to the commodification of athletes as tradable entities (Oates 2009).

In considering the relevance of the systematic comparison of performances for the constitution and reproduction of sports as a specific social practice, it is consequential that the most diverse aspects of a performance are taken into account. The sheer visibility of the body makes it an important element of rendering performances accountable, but even a predominantly physical competition can be compared (and explained) more intensively by taking into account nonphysical aspects in order to better understand and ascribe differences in performances. Sometimes the body is nothing but yet another medium for making such nonphysical aspects of the performance – psychological, strategic, etc. – accessible.

The history of sports is driven by its public observation, which precipitates inventive explanations for a team's sudden predominance or an athlete's unexpected feats. Of course some of these suggestions will not be taken up at all, some will only be taken up by a certain group of people (e.g., fans of one team spinning conspiracy theories about their opponents), and some will become commonplace and might even be taken up by the athletes, coaches, and sports organizations as they endeavor to refine their performance (Stiehler and Marr 2003). There is no *a priori* difference between aspects of a performance that 'belong' to sports and those that are considered not to; additionally, there is a constant translation – in both directions – between bodily and nonbod-ily features of the performance.

Media of Accountability: Statistics, Narratives, Slow Motion

From the beginnings of modern competitive sports, statistics and narratives have been two of the most relevant – if fundamentally differ-ent – procedures that foster the comparison of performances (Werron 2009, 86–92). Both develop criteria to identify important moments of a performance, and both establish – again, fundamentally different – modes of explanation. Where statistics are based on predefined elements (e.g., passes, assists), working through abstraction and thereby offering decontextualized and quantified evaluation, narratives, while also highly selective and evaluative, tend towards specification and contextualization, offering a more situation-based form of accountability that focuses on cause and effect.

In terms of how these two approach the body, one can see that statistics fragment the performance and make bodily features invisible, whereas narratives contribute to the visibility and plausibility of physical aspects (e.g., pain) by connecting them with more subjective, psychological, and contextual aspects of the performance. Often, statistics and narratives complement each other, but they also compete for the most appropriate and reliable account of a performance – as in the constant debate about whether the value of an athlete can most reliably be detected from statistics or from more qualitative, narrative forms of knowledge about them.

When, in the second half of the 20th century, slow-motion replay became a staple of sports coverage, it transformed the visibility of athletic performances considerably. This had consequences for the definition of which moments were to be considered 'highlights'[4] and also changed the more general concept of the moving body (Whannel 1992, 90–97). Today, slow-motion replay is the dominant reference point when sports is described as (or gets criticized for) being a spectacle of heroic or beautiful bodies (e.g. Caysa 2004). Narrative, statistic, and other media forms, however, remain important and also shape the impact of slow motion and its contribution to the accountability efforts (ibid.).

Slow motion continues and intensifies this tension between display and play as it transforms and decontextualizes (male) bodies into dreamlike images of grace and flow. It turns them into objects to enjoy (or even desire), while also supporting the endeavor to scrutinize the body's movements and find out how the result was actually achieved (Morse 1983, 49). In showing that one and the same media form simultaneously creates desirable and scrutinizable bodies, Morse explicitly counters conservative complaints that the increasing mediatization of sports overestimates display to the detriment of play (e.g. Stone 1971). She thereby also offers a helpful qualification of more recent definitions that locate sports' beauty (and its attractiveness more generally) in its capability to create unexpected and ephemeral moments of intensity (Gumbrecht 1999). Hans Ulrich Gumbrecht, similar to Morse, identifies the analytic and interpretational potential of slow motion, yet he devalues it in favor of sports' presumably essential nonhermeneutic "epiphany of form" (Gumbrecht 2006). He, therefore, does not consider scrutiny, mediated accountability, and the comparison of performances to be contributions to sports' pleasures.

4 On the media history of the 'highlights' approach to sports, see Gamache (2010), who claims the highlight originates with the first boxing films in the late 19th century and became a staple in sports culture through the newsreels of the 1910s.

By analyzing the entanglement of play and display, Morse not only shows that slow motion produces a beautiful body while simultaneously placing the body under scrutiny; she also indicates that slow motion images, like all other media forms in sports, extend and complicate the concept of the body. Often slow motion uses the body image to makes processes visible and accountable that are not bound to the physical or physiological realm.

Precisely because slow motion is a technology with a strong focus on the body (as opposed to statistics, for example), a close analysis of it can show how the body in modern sports is fragmented, scrutinized, abstracted, and quite often marginalized by other layers of accounttability. In the following, I will first analyze the technical and industrial discussion about the advantages of the use of slow motion in sports during the early 1960s. I will then discuss an early example (1965) of the application of slow motion to show how the technical development, the actual application, and even athletes' references to the technology all present slow motion as a media form that goes far beyond the spectacle of the body.

Improved Visibility: The Technological Assets of Slow Motion

In the 1960s, television started to apply slow-motion replay in a regular and conventionalized manner to enhance the accountability and comparability of athletic performances. While I will focus on this era in the following analysis, it is important to keep the longer tradition of slow motion and its close connection with sports in mind. Sports performances (and partly the athletic bodies of humans and animals) have been used to develop and improve slow-motion technologies since these were first developed; at the same time, sports was also the field where the capabilities of slow motion were displayed most often and most conspicuously.[5] The use of slow motion in sports can thus be conceived of as an "operational aesthetic" (Gamache 2010, 19). On the one hand it implies a mode of perception which follows an epistemological function, being used to see better, to see differently, and to generate new explanations

5 Dylan Mulvin even claims that it was the early use of instant replay and slow motion in sports which incited the use of similar technologies in military, judicial, medical, and educational contexts (Mulvin 2012, 11). Focusing on television, Garry Whannel states: "The demands of sport coverage did act as a spur to particular kinds of technical development (e.g. action replay and slow motion, satellite communication, etc.) and major sporting events have been used as showcases for new technological innovation (e.g. the introduction of colour)" (Whannel 1992, 59).

of performances. On the other hand, it directs the attention towards the capability of the technology itself.[6]

Throughout the entire history of slow motion, the entanglement of play and display, of scrutiny and awe, has been in flux, with some media forms clearly tending towards one side and others to the other side. Eadweard Muybridge in the 1870s and 1880s applied his photographic motion studies not only to scrutinize the movement of race horses, but also to record the performances of trained athletes (Solnit 2004). Soon, photographic documentation and the possibility to manipulate its temporality were also used to decide the outcomes of competitions[7] or improve the capabilities of individual athletes and the tactical behavior of teams.[8] On the other end of the continuum, Leni Riefenstahl's two films of the 1936 Olympic Games,[9] especially the diving competition sequence, used slow motion to produce highly stylized images of gracefully moving bodies. Clearly preferring display over play, the result of the competition here is of no importance and the depiction does not help to distinguish between (and evaluate) the performances of indi-vidual athletes at all.

When early television took up and popularized slow motion, it again re-balanced the relationship between play and display. Already in 1947/48, the DuMont network scheduled a series of sports programs combining instruction and entertainment. On August 29, 1948, SWING INTO SPORTS presented two-time US tennis champion Sarah Palfrey Cooke as a special guest.[10] While chatting with the host, Cooke explains and

6 The concept of an "operational aesthetic" is used similarly in the recent discussion on complex narrative in television series: "We watch these shows not just to get swept away in a realistic narrative world (although that certainly can happen) but also to watch the gears at work, marveling at the craft required to pull off such narrative pyrotechnics" (Mittell 2006, 35).

7 On the early connection between gymnastics and chronophotography, cf. Sarasin 2001, 328f. The use of film-supported time-keeping at the 1932 Olympic Games in Los Angeles not only aimed to determine more reliably the winner of the competition at hand, but also to establish new records more precisely: "On this basis national and world records have been established in order to classify the performance of the individual in terms of an invariable quantity such as time, where a contestant may compare his own performance either with that of some one who preceded his athletic activities, possibly by years, or with other contestants in different localities" (Fetter 1933, 332).

8 Experimentation with the use of film to "build up team work as well as individual play" in American football started around 1915 and became more or less systematic in the 1940s (Mulvin 2012, 72f).

9 OLYMPIA. FEST DER SCHÖNHEIT and OLYMPIA. FEST DER VÖLKER, both directed by Leni Riefenstahl, Germany, 1938.

10 SWING INTO SPORTS (USA, DuMont, 1948), accessible at The Paley Center for Media, Los Angeles

shows how best to execute the "overhead smash." As a stand-in for the audience at home, the host takes a racket and gets instructions from Cooke on how to stretch his arm. Soon after, recordings of games played by Cooke and another player are shown. The voice-over commentary on the performance by the host and Cooke herself (e.g., "oh, good shot there") is supported by scenes in slow motion, a technology that is explicitly announced and then used to discern more details: "Here comes a slow motion […] his shoulder goes back."

In these instructional uses of slow motion it is still the body that is of major interest, even if it is less about the beauty of the body or the body as an entity and more about certain fragmented body parts, mostly in connection with a nonhuman object – a racket, a club, a ball, etc. The depiction and the commentary in these uses characteristically focus on the connection between the body part and this object. Following Vivian Sobchack, one could argue that slow motion mainly makes visible the "movement of movement" (Sobchack 2006, 342); in sports this often means that of the human body, but attention can easily be redirected to the racket, to drops of sweat, rain, etc.

When in the late 1950s and early 1960s slow-motion technology had finally developed far enough to fit the requirements of live competitive sports coverage on television, its aim was less to deliver a more spectacular *display* of the body and more to offer insights into otherwise invisible aspects of the *play*. This at least becomes apparent in the engineers' discussions about the different alternative systems for instant replay and slow-motion replay (film-based, video tape-based, video disc-based), which more or less invariably refer to the example of sports,[11] mostly citing the complexity of team sports or the "details of a very rapid action" (Hiwatashi, Mio & Kitagawa 1960, 261) as the main reasons to use slow motion. Additionally, of course, sports offered well-defined, decisive events (goals, knock-outs, etc.) that clearly demanded repeated and careful scrutiny.

When in 1961 ABC introduced a new technology that enabled slow-motion replay (the VTX or video tape expander), the company considered it "an entirely new tool for immediately reviewing rapid occurrences," making it possible for the network on the one hand "to show view-

(http://www.paleycenter.org/collection/item/?q=Swing+into+Sports&f=all&c=all&advanced=1&p=1&item=T85:0153, accessed 10 March 2013).

11 In the leading American journal for engineers in the field of film and television, the *SMPTE Motion Imaging Journal* of the Society of Motion Picture and Television Engineers, on which I base the following analysis, nearly all experiments related to slow motion refer to examples from sports, while high-speed photography is mainly discussed in the context of ballistics, military, and science, and video often with examples from the educational context.

ers a slow motion touchdown run or other standout play immediately after it occurs" and on the other hand to playback highlights during half time (*Variety*, 15 November 1961, 35).

More or less at the same time, CBS experimented with a film-based form of replay and slow motion that was used in football games during the 1962 New Year's weekend: "At the end of the first half during each game, the important plays during the preceding period were reproduced in slow motion with suitable commentary to permit the viewers to see what they may have missed when they blinked their eyes during the original game" (Whittaker 1962, 578). Slow motion is said to enable the viewer "to observe details not readily apparent in normal transmission" (ibid., 578), but it also has to be anchored by commentary that guides the perception. Until today, slow-motion replays are dependent on "multiple framing narratives" (Bouman 2011, 68).

In 1965, a video disc-based system for instant replay also allowed for freezing a single frame of the replay to scrutinize not only movements but also gestures, positions, and tactical constellations. In *SMPTE* this "stop-action effect" was already described as the next step in the continuous enhancement of the perception of sports:

> The past few years in television coverage of sports events have been marked by a number of advances in technique to give the home viewer a better understanding and enjoyment of the action. Football coverage, because of its commanding importance in network sports broadcasting, has been a major focal point for technical innovation. […] In early 1965, the CBS Sports Dept., planning for the National Football League season of that year, wished to introduce a new element into the recorded replay technique to aid the viewer in comprehending the often complex and fast action of a football play. (Ettlinger and Fish 1966, 1086)

Competitor ABC suggested an alternative stop-action technology in "order to 'freeze' the action for analytical scrutiny" (*Variety*, 12 August 1964, 42).

If we follow the rhetoric of the industry and the engineers, slow motion is not (or not yet) considered an embellishment of sports but an essential part of it, since only this technology enables the audience to perceive what is happening on the field or the track – the events other-wise being too fast or too complex for the small screen.[12] This is also accepted as a given in an overview of the technical equipment available for cover-

12 At least in the *SMPTE* journal issues from 1950 to 1970, slow motion and instant replay are very consistently related to the enhancement of perception. The more popular trade magazine *Variety* also ascribes "entertaining" effects to the new technology. The issue from January 15, 1964 describes ABC's technical equipment for covering the 1964 Winter Olympics, and states that "slow motion techniques will dramatize events."

ing the 1966 soccer World Cup in England: "Since it was obvious that many incidents in the World Cup matches would take place at high speed and that it would be of interest to reproduce some of them in slow motion, the BBC Engineering Division set about the task of producing a slow-motion television tape machine" (Putman 1967, 449).

The excessive demands of sports on human perception were considered so severe that in 1964 none other than Roon Arledge (president of ABC sports for 18 years, creator of the seminal sports program MONDAY NIGHT FOOTBALL, and avowed advocate of sports' transformation into show business) announced an "instantaneous (or 'live') slow-motion tape process," which would allow viewers to watch a 100-meter sprint slowed down right from the start. According to Arledge, the event would then take 20 seconds instead of only 10 without losing any of its suspense (*Variety*, 12 August 1964, 42). Here, it is impossible to clearly distinguish the tendency towards spectacle – images unfolding a "pseudo-world apart" (Debord 1995, 12) – from the endeavor for greater accountability of the 'play'.

An important reference for Arledge's thoughts must surely be the 'highlight films' of the National Football League, which began with PRO FOOTBALL'S LONGEST DAY (USA, Ed Sabol/Daniel Endie, 1962) and quickly became a staple of American sports culture (Vogan 2014). Very often in these films – which mostly were watched by people fully aware of the game's ultimate outcome – action on the field was shown in slow motion straight away. Combined with a dramatic score and a sonorous male voice over, the slowed-down physical movements contributed to the enormous popular success of football in the US. It focused on displaying the bodies and creating a mythical image and narrative of the game, yet also making it accessible for perception and follow-up communication. Arledge's suggestion to also use instantaneous slow motion in live television was ultimately not taken up. Besides spoiling the liveness of the transmission, this approach would have ruined slow motion's capacity to condense events into a selection of decisive and contested moments.

The development of slow-motion technology for television was clearly guided by the endeavor to improve the accountability of the play and to unlock additional layers of athletic performance. On the one hand, slow-motion replay is thought to contribute to the condensation of an event by selecting, defining, and repeating decisive moments, while on the other it is supposed to expand these moments and offer them up to additional scrutiny, commentary, and clarification during the ongoing discussions about the game or event. The accountability the engineers looked for in the 1960s is not necessarily related to the body, and espe-

cially the idea of the beautiful body is conspicuously absent in the technological discussion.

Film (and filmic slow motion) is considered to be an example to be imitated (or better, outperformed) by television (e.g. Hiwatashi, Mio, and Kitagawa 1960). The cinematic reference in these discussions, however, is never the Riefenstahlian celebration of the body but rather the more explanatory use of slow motion in films of football games. In large part, the engineers' discussions are structured by the endeavor to enhance the visibility of events that are not defined by specificities of the human body but by the rules of different sports and by the unpredictability of unfolding live events. When slow motion was eventually applied in live television sports, the body surely became more relevant than it had been in the technical journals. As the following case study of an early application shows, however, the body in slow motion still remains part of a much broader endeavor to make performance accountable.

Contentious Visibility: Slow Motion and the "Phantom Punch"

Sports not only presents opportunities to use slow motion but also to display and negotiate the capabilities of this technology. It does so by offering actions and events that, on the one hand, have to be classified as a particular kind of performance (according to the rules of a sport or the established conventions of accountability), while on the other hand also challenging this classification through speed, ambivalence, invisibility, and so on. A very typical instance of such an event occurred on May 25, 1965, during the world heavyweight championship fight between Sonny Liston and Muhammad Ali.

Ali was declared winner at the end of the first round. His opponent, from whom Ali had taken over the championship title in their first fight a year earlier, went down without a clearly visible cause, spawning the narrative of the 'phantom punch'. Rumors of a fix or of intimidation quickly spread.[13] Here I will analyze how contemporary media – sports magazines and live television – took advantage of then-new technologies to decipher the event.

13 Shortly after the first fight, Ali had joined the Nation of Islam and changed his name (from Cassius Clay), a move that was much discussed and criticized by the US public. The rumors about the outcome of the fight were additionally kindled through the somewhat hesitant referee who first allowed the fight to continue and only announced a knock-out after a boxing reporter intervened from outside the ring.

Less than two weeks later, the weekly magazine *Sports Illustrated* published several articles on the fight. In the first, sports writer Tex Maule elaborated in detail what had happened to underline his conviction that it was a straight, convincing knock-down:

> The knockout punch itself was thrown with the amazing speed that differentiates Clay from any other heavyweight. He leaned away from one of Liston's ponderous, pawing left jabs, planted his left foot solidly and whipped his right hand over Liston's left arm and into the side of Liston's jaw. The blow had so much force it lifted Liston's left foot, upon which most of his weight was resting, well off the canvas. It was also powerful enough to drop him instantly – first to his hands and knees and then over on his back. More than 17 seconds elapsed before Liston could flounder to his feet, still only partly conscious. Even some 30 seconds later […] Liston was staggering drunkenly and had to be led to his corner by trainer Willie Reddish (*Sports Illustrated*, 7 June 1965, 22).

This description is clearly not based on the author witnessing the live event; rather it is based on visual media that enable a dissection and slowing down of the crucial moments. Parts of the boxers' bodies become evidence (e.g., Liston's lifted left foot) and calculable quantities (30 seconds) are combined with a hermeneutics of physical movements ("staggering drunkenly") to classify what happened. Ali's general capability in comparison to "any other heavyweight" is taken into account, as are – further down in the article – the statements of expert witnesses, e.g., Liston's coach or the former heavyweight champion Floyd Patterson, who is said to have been "seated at the ringside in the most advantageous position to see the blow" (ibid.).

A second, much shorter article entitled "No Phantom Punch" further back in the same issue is accompanied by a sequence of four black-and-white photographs to which the text refers one by one: "The blow was seen by only a small percentage of those who watched the fight. The impact of it, however, is plainly shown in the action sequence at left" (*Sports Illustrated*, 7 June 1965, 48). The journal also includes some spectacular color photographs, including a fish-eye top shot of the ring and Neil Leifer's ringside photo showing Ali aggressively gesturing above Liston's knocked down body – which since has become one of the most widely circulated photographs in sports history.

The operational aesthetic here is obvious: *Sports Illustrated* combines photographs displaying the athletic body (its aggression, force, masculinity, blackness[14]) with photographs displaying the capabilities of media technology (color, fish-eye) and photographs in which the body is

14 On the contradictions in Ali's public image and especially the tension between racist stereotypes and self-determined appearance, see Farred (2008) and Saeed (2003).

only one element that – in connection with other elements – helps to define the event in terms of the rules, conventions, and classifications that make performances accountable and comparable. This constant shifting between displaying the body, displaying technology, and scrutinizing the athletic performance becomes even more complex when athletes themselves get involved in the interpretation of the images, as was actually the case here: Ali was shown a slow-motion replay of the 'phantom punch' on live television directly following the fight.[15]

A few minutes after the decision was announced, Ali was interviewed, still standing in the ring. The interviewer, Steve Ellis, repeatedly addressed him as Cassius Clay, though the boxer continuously insisted on being called Muhammad Ali. When asked if it was indeed his left hook that knocked Liston down, Ali immediately replied: "I would like to see the video tape if you have it." This in itself was a surprising request coming from an athlete, considering that in 1965 video replay was still in development. Since then, however, it has become one of the particularities of media sports that athletes do comment on images of their own performance. The ensuing conversation between Ali and Ellis provides useful insight into sports' use of slow motion.

First, slow motion and its visual qualities are a constant topic throughout the entire conversation. Ellis, answering Ali's request, says he is not sure if the replay is already available but announces about a minute later: "Do we have the video tape? Yes, we have it and let's try for viewers all over the world to see what we have […] we're gonna run it back, I believe in slow motion." Ali objects that he would prefer to watch the replay in regular speed, but Ellis insists that slow motion is more appropriate for "entertaining" the general audience – which seems to please Ali: He happily confirms that he is much too fast for normal viewers, who, he says, deserve to get something "for their money."

Throughout the four minutes it takes to re-watch the fight in slow motion, the speed of the video tape is constantly made explicit, mostly in relation to the famous speed of Ali and to the (non-)perceptibility of his movements. Ali insists that he hit so fast that Liston could not see the punch coming. He repeatedly mentions that it is good (for the audience) to see this in slow motion, and the interviewer confirms that he also would not have been able to see this properly at regular playback speed.

15 A re-transmission of the fight on ESPN is available on YouTube (http://www.youtube.com/watch?v=X8DR0P0PV5c, accessed: 11 April 2013); the original broadcast – with somewhat better sound and image quality – is accessible at The Paley Center for Media, Los Angeles (http://www.paleycenter.org/collection/item/?q=WORLD+HEAVYWEIGHT+CHAMPIONSHIP+BOUT+{LISTON+VS.+CLAY}&p=1&item=T79:0104, accessed 10 March 2013).

Their sometimes playful conversation is significant as it pays attention to the difference in perception produced by slow motion, and relates it to the differences in perception that already exist in sports. It is common enough to explain the capability and the success of athletes by describing their altered mode of perception, the 'flow' they are in, their sudden readiness of mind, their slowed-down or sped-up perception, etc. (Morse 1983, 56; Gumbrecht 1999, 366; with respect to Ali: Mailer 1991[1975], 88). Slow motion contributes to understanding performances both through distanced and analytical observation and through the imitation of the more subjective perception of the athlete. Media sports are thus characterized by a continuing discussion about the appropriate way of perceiving an event (the appropriate speed, the appropriate perspective – in both the technical and the narratological senses).

Second, the conversation about the slow-motion images constantly switches between praising Ali's body at work and a more analytical scrutiny. Just like the conversation before the start of the replay, it constantly switches between loaded political and religious issues on the one hand (Ali insisting on his new name, expressing thanks to Allah and Elijah Muhammad etc.) and sports-related issues on the other (whom Ali is going to fight next etc.). Ali complacently comments on the first scenes of the replay, underlining that no hitter has such a fast right hand, then exclaiming to images of him 'dancing' through the ring: "Look at that beautiful grace, you've never seen a man in history move like this, notice that, ain't that beautiful […] look at it, look!" This is characteristic for Ali, who systematically made his body and fighting style into a political statement: "as his self-proclaimed 'prettiness' statement reveals, he revelled in and gave a keen physical enunciation of the black cultural pride which was so pivotal to [1960s] politics" (Farred 2008, 244). The interviewer, however, insists on an analytical perspective, asking Ali: "What are you doing there with your feet?" Shortly before the decisive moment he prompts: "Now you're going to hit him – watch closely!" After they both confirmed that Liston was knocked down by Ali's right hand, they continue to discuss why Ali kept standing above him after the knockdown: "I was telling the bum to get up and fight".

The use of slow motion (just as that of *Sports Illustrated*'s still photography) is triggered by a particular event that is analyzed and granted significance through technical means and commentary; its transformed visibility, however, multiplies the matters and processes that can be commented on. It is remarkable that Ali and Ellis constantly summon each other (and the television audience) to look or watch closely. No matter whether they are talking about a performance-related aspect or a beauty-related one, they use the slow-motion replay to direct attention

to some detail that is considered to be both obvious and in need of special emphasis and instruction. Though Ali's body, with all its political implications, is at the center of attention, in the end it is not his body that is made visible in the process. Rather, his body is fragmented and classified as it is connected to the basic categories of boxing. Even Ali's elation about his own speed and grace (as well as his body politics) is anchored in the semantics of competition and comparison. It is important that he moves faster than any heavyweight boxer and that he moves so fast that his opponent could not follow. Additionally, his movements are connected to his tactics, to past and future fights. Sports' use of slow motion may offer a display of Ali's body, surely contributing to the public discourse on his beautiful body and contributing to a hermeneutic of his body's movements and capabilities – yet it also offers the categories and the contexts that structure the scrutiny of his performance more generally, extending it beyond his physical appearance.

Conclusion

Media sports offers spectacular images of the human body, and slow motion is the one technology that most contributed to this aspect of sports. The examples analyzed here have shown that slow motion at the same time became part of the endeavor to make performances more transparent, accountable and comparable, the endeavor that so characterizes modern competitive sports. Slow motion's technological development in the 1950s and 1960s was driven by the conviction that sports' rapid and complex actions could be better comprehended with the help of replays. The use of that technology to render visible the 'phantom punch' in 1965 showed that the techno-hermeneutics of sports first of all establish a possible field of contention: what to talk about, where to look at, which technology to use, how to classify the events, etc. This also implies that the use of slow motion in sports is one element in a much more comprehensive ensemble of different forms and technologies that all contribute particular dynamics to the representation of a competition.

The body is very present in most sports and in most of the media forms tackling them. Yet, media sports deals less with presenting one clear image of the body than with the question of how best to represent the body, which part, from which perspective – and with what kind of background knowledge. In sports, the body is questioned as often as it is made into a spectacle of strength or beauty. Even when a body is visible, it often is not the body but the strategy, the mental state, the quality of

the preparation, and so on, that is said to be at stake. One would have to forcibly isolate slow-motion images from the context of a competition and from other forms of knowledge that have been constitutive of sports since long before slow motion was available, to state that modern media sports is mainly defined by (beautiful or spectacular) bodies. More generally, the more the body becomes visible and scrutinized, the more the body becomes a medium to address nonphysical aspects of the performance. With the historical transformation of media, the nonphy-sical aspects gain a certain independence from the body images.

Of course, media sports has become more of a spectacle since the 1960s; the aforementioned Roon Arledge very explicitly favored a convergence of sports coverage and show business, and many European countries saw similar developments in the 1970s and 1980s. I do not wish to neglect, defend, or criticize these developments. What I do want to argue, however, is that despite these transformations, sports' contribution to culture more generally cannot be reduced to its images and concepts of the body. To come back to the three different layers of the bodies' involvement in sports: First, the media technologies discussed here are applied in the training and manipulation of the athletic body. Second, they contribute to the display of the body and therefore to the historically shifting concepts of gendered and otherwise categorized bodies. Third, media technologies establish a set of tools to communicate and compare performances. At this third layer, the object of discourse is not always the body. As long as the body is addressed, it appears in very heterogeneous forms and can itself act as a medium for addressing other aspects of a performance. Since it is mostly this third layer that distinguishes modern competitive sports from other physical practices (be it life reform movements, ballet, or noncompetitive 'fun sports'), the body in sports becomes heterogeneous and sometimes marginalized. Contrary to life reform movements, or fitness crazes, sports cannot be characterized by one particular ideal of the (e.g., 'natural', 'healthy', 'strong') body. A much more specific contribution of sports to contemporary culture can be found in the tools, procedures, and semantics used to organize competition and to make performances accountable. The body is often an important aspect of such perfor-mances, but sports characteristically, especially, and constantly extends and multiplies the possible explanations for a performance. The 'phan-tom punch' can quite easily be considered to be a result of a fix, of support from Allah, of a fitting fight plan and good preparation, or of a right hand that was just too quick to be seen. Sports offers multiple – but in no way random – procedures to scrutinize and explain events, and the share of the body in these procedures is never a given but something that has to

be determined. To this day, discussion of the 'phantom punch' continues on YouTube and other online media forums.[16] "Boxing aficionados have studied the films of the ensuing minute or so of action with the same fanatical attentions Kennedy assassination scholars have given the Zapruder film" (Remnick 1998, 156).

Statistics, narratives, slow motion, and online live scores all address sports' bodies quite differently and they are combined in different ways in film, television, or social media; it is the interplay of the different media that guarantees the accountability of performances and extends it beyond the body.

Bibliography

Alkemeyer, Thomas. 1997. "Sport als Mimesis der Gesellschaft: Zur Aufführung des Sozialen im symbolischen Raum des Sports." *Zeitschrift für Semiotik* 19: 365–96.

Blake, Andrew. 1996. *Body Language. The Meaning of Modern Sport*. London: Lawrence & Wishart.

Bouman, Margot. 2011. "The Mise en Abyme Effect. Politics and the Fantasy of Total Visibility." In *Space (re)solutions: Intervention and Research in Visual Culture*, edited by Peter Mörtenböck and Helge Mooshammer, 59–71. Bielefeld: Transcript.

Bourdieu, Pierre. 1978. "Sport and Social Class." *Social Science Information* 17 (6): 819–40.

Butler, Judith. 1990. *Gender Trouble: Feminism and the Subversion of Identity*. Thinking Gender. New York: Routledge.

———. 1998. "Athletic Genders: Hyperbolic Instance And/or the Overcoming of Sexual Binarism." *Stanford Humanities Review* 6 (2). http://www.stanford.edu/group/SHR/6-2/html/most.html.

Caysa, Volker. 2004. "Hochsterilisiert. Über Fußball als Fernsehspektakelsport." In *Abseits Denken. Fußball in Kultur, Philosophie und Wissenschaft*, edited by Andreas Hütig and Johannes Marx, 90–96. Kassel: Agon Sportverlag.

Collins, Tony. 2013. *Sport in Capitalist Society: A Short History*. New York: Routledge.

Debord, Guy. 1995. *The Society of the Spectacle*. Brooklyn, N.Y.: Zone Books.

Dinçkal, Noyan. 2013. "'Sport ist die körperliche und seelische Selbsthygiene des arbeitenden Volkes': Arbeit, Leibesübungen und Rationalisierungskultur in der Weimarer Republik." *Body Politics* 1 (1): 71–97. http://bodypolitics.de/de/wp-content/uploads/2013/04/Heft_1_04_dinckal_sport_end.pdf

Ettlinger, Adrian B., and Price E. Fish. 1966. "A Stop-Action Magnetic Video Disc Recorder." *Journal of the SMPTE* 75 (11): 1086–88.

Farred, Grant. 2008. "When Kings Were (anti-?)colonials: Black Athletes in Film." *Sport in Society* 11 (2): 240–52.

Fetter, C. H. 1933. "A New Way of Splitting Seconds." *Journal of the Society of Motion Picture Engineers* 20 (4): 332–42.

16 Cf. the YouTube comments on the video of the fight: http://www.youtube.com/watch?v=X8DR0P0PV5c, accessed 11 April 2013).

Frank, Sybille, and Silke Steets, ed. 2010. *Stadium Worlds: Football, Space and the Built Environment*. London & New York: Routledge.

Gamache, Raymond. 2010. *A History of Sports Highlights: Replayed Plays from Edison to Espn*. McFarland & Co Inc.

Gruneau, Richard. 1993. "The Critique of Sport in Modernity." In *The Sports Process. A Comparative and Developmental Approach*, edited by Eric G. Dunning, Joseph A. Maguire, and Robert E. Pearton, 85–110. Champaign: Human Kinetics.

Gumbrecht, Hans Ulrich. 1999. "Epiphany of Form: On the Beauty of Team Sports." *New Literary History* 30 (2): 351–72.

———. 2006. *In Praise of Athletic Beauty*. Cambridge, MA/London: Harvard Univ. Press.

Hiwatashi, H., E. Mio, and T. Kitagawa. 1960. "Slow-Motion Recorder for Television Pictures." *Journal of the SMPTE* 69 (4): 261–63.

Kreisky, Eva, and Georg Spitaler, ed. 2006. *Arena der Männlichkeit. Über das Verhältnis von Fußball und Geschlecht*. Frankfurt a.M./New York: Campus.

Lewis, Tim. 2014. "How Computer Analysts Took over at Britain's Top Football Clubs." *The Guardian*, March 9. http://www.theguardian.com/football/2014/mar/09/premier-league-football-clubs-computer-analysts-managers-data-winning.

Mailer, Norman. 1991. *The Fight.* New York/London: Penguin (first published 1975).

Mittell, Jason. 2006. "Narrative Complexity in Contemporary American Television." *The Velvet Light Trap* 58 (1): 29–40.

Möhring, Maren. 2002. "Nacktheit und Sichtbarkeit." In *Geschichte schreiben mit Foucault*, edited by Jürgen Martschukat, 151–69. Frankfurt a.M./New York: Campus.

Morse, Margaret. 1983. "Sport on Television: Replay and Display." In *Regarding Television: Critical Approaches – An Anthology*, edited by E. Ann Kaplan, 44–66. Los Angeles: American Film Institute.

Mulvin, Dylan Wesley. 2012. "'Human Eye Inadequate'. Instant Replay and the Politics of Video". McGill University (Canada). http://digitool.library.mcgill.ca/R/-?func=dbin-jump-full&current_base=GEN01&object_id=106597.

Oates, Thomas Patrick. 2009. "New Media and the Repackaging of NFL Fandom." *Sociology of Sport Journal* 26 (1): 31–49.

Putman, Richard E. 1967. "Progress Committee Report for 1966." *Journal of the SMPTE* 76 (5): 411–57.

Remnick, David. 1999. *Muhammad Ali and the Rise of an American Hero.* London: Picador.

Saeed, Amir. 2003. "What's in a Name? Muhammad Ali and the Politics of Cultural Identity." In *Sport, Media, Culture: Global and Local Dimensions*, edited by Alina Bernstein and Neil Blain, 51–72. London/Portland: Frank Cass.

Sarasin, Philipp. 2001. *Reizbare Maschinen. Eine Geschichte des Körpers 1765–1914*. Frankfurt a.M.: Suhrkamp.

Silver, Nate. 2012. *The Signal and the Noise. Why so Many Predictions Fail – but Some Don't*. New York: Penguin Press.

Sloterdijk, Peter. 2011. *Du mußt dein Leben ändern. Über Anthropotechnik*. Berlin: Suhrkamp.

Sobchack, Vivian. 2006. "'Cutting to the Quick': Techne, Physis, and Poiesis and the Attractions of Slow Motion." In *The Cinema of Attractions Reloaded*, edited by Wanda Strauven, 337–54. Amsterdam: Amsterdam Univ. Press.

Solnit, Rebecca. 2004. *River of Shadows : Eadweard Muybridge and the Technological Wild West*. New York: Penguin Books.

Stauff, Markus. 2009a. “Affektfernsehen. Zum Status des Gesichts im Fernsehfußball.” In *Am Ball der Zeit. Fußball als Ereignis und Faszinosum*, edited by Rebekka Ladewig and Annette Vowinckel, 75–95. Bielefeld: Transcript.

———. 2009b. “The Faces of Athletes: Visibility and Knowledge Production in Media Sport.” *FlowTV*. http://flowtv.org/?p=4419.

Stiehler, Hans-Joerg, and Mirko Marr. 2003. “Attribution of Failure: A German Soccer Story.” In *Sport, Media, Culture: Global and Local Dimensions*, edited by Alina Bernstein and Neil Blain, 139–65. London/Portland: Frank Cass.

Stone, Gregory P. 1971. “American Sports: Play and Display.” In *The Sociology of Sport: A Selection of Readings*, edited by Eric Dunning, 47–66. London: Frank Cass.

Vogan, Travis. 2014. *Keepers of the Flame: NFL Films and the Rise of Sports Media*. Urban: University of Illinois Press.

Werron, Tobias. 2009. *Der Weltsport und sein Publikum: Zur Autonomie und Entstehung des modernen Sports*. Weilerswist: Velbrück.

———. 2010. “World Sport and Its Public. On Historical Relations of Modern Sport and the Media.” In *Observing Sport. System-Theoretical Approaches to Sport as a Social Phenomenon*, edited by Ulrik Wagner and Rasmus Storm, 33–59. Schorndorf: Hofmann.

———. 2013. “‘Die Liga’: Entstehung, Funktionen und Schwächen eines Konkurrenzmodells.” In *Geschichte des Fußballs in Deutschland und Europa seit 1954*, edited by Wolfram Pyta, 51–83. Stuttgart: Kohlhammer.

Whannel, Garry. 1984. “Fields in Vision: Sport and Representation.” *Screen* 25 (3): 99–107.

———. 1992. *Fields in Vision: Television Sport and Cultural Transformation*. London/New York: Routledge.

Whittaker, John R. 1962. “Slow-Motion Playback of Television Film Recording.” *Journal of the SMPTE* 71 (8): 578–79.

Wildmann, Daniel. 2009. *Der Veränderbare Körper: Jüdische Turner, Männlichkeit und das Wiedergewinnen von Geschichte in Deutschland um 1900*. Tübingen: Mohr Siebeck.

Woodward, Kath. 2012. *Planet Sport*. Routledge.

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