Loland, S., McNamee, M. (2016). Philosophical reflections on the mission of the European College of Sport Science: Challenges and opportunities. *European Journal of Sport Science, 17*, s. 63-69.

On the mission of the European College of Sport Science (ECSS): philosophical reflections upon scientific challenges and opportunities

Prof S. Loland, Dept of Social Sciences and Humanities, Norwegian University of Sport and Exercise Sciences, Oslo

Prof M. J. McNamee, College of Engineering, Swansea University, UK

Abstract

This article is a critical philosophical commentary on the rise of European sport science under the aegis and mission of the European College of Sport Science (ECSS). We show how differences in nomenclature identifying the field (such as Sport Science, Sport and Exercise Sciences, Kinesiology) reflect particular assumptions about the nature and methods of science, and hierarchies among them. We sketch the epistemological contours of three paradigms that are constitutive of sport science under the original mission of the ECSS: mechanistic, hermeneutic and critical. We then discuss from a philosophical perspective the possibilities and challenges of multidisciplinary, interdisciplinary and integrative approaches. We conclude with a plea for paradigmatic tolerance and recognition of the need for epistemically relevant criteria to be used in the evaluation of alternative scientific approaches in sports.

On the mission of the European College of Sport Science (ECSS): philosophical reflections upon scientific challenges and opportunities

Contextualisation of the development of sport science as a scientific field

Sport occupies a significant role in modern society. In most European countries, voluntary sport clubs enjoy mass participation, particularly among children and youths. In physical education (PE) classes in schools, students are introduced to a variety of sports, exercise and training forms in a pedagogical setting. Significant proportions of the adult European population report to train and exercise regularly. The sport industry represents a considerable economic force in society. Elite sport is among the most lucrative products on the international entertainment market.[i],[ii]

Traditionally, competence in the sport and PE field has been based on experience and best practice-models, often dominated by tradition. Since the early 1970s, however, an increased awareness of educational, health and social benefits of sport and PE has led to an emphasis on research and evidence-based practice (e.g. Renson 1989, Strong et al 2005). The study of sport has developed into a professional academic field generically referred to in Europe as 'sport science'.

Part of the development has been a steady rise in the number of sport science societies and journals. Most societies and journals have a specialized focus and build on one or a relatively small number of closely related scientific disciplines. Some however have the ambition to cover broader fields of the sport science field. European College of Sport Science (ECSS), funded in 1995, and its main publication *European Journal of Sport Science* (EJSS), belongs to this latter category and was created with aims specifically focused on the promotion and dissemination of knowledge of sport not only in disciplinary depth, but also in multi- and inter-disciplinary width.

The first part of the ECSS mission statement reads as follows:

> The purpose of the European College of Sport Science (ECSS) is the promotion of Sport Science in an international, multi-cultural, multidisciplinary, as well as interdisciplinary context. ECSS

> recognizes that scientific excellence in Sport Science is based on disciplinary competence embedded in the understanding that its essence lies in its multi- and interdisciplinary character. ECSS regards Sport Science as the integrator of knowledge of human movement as seen by natural sciences, medicine, social sciences, and the humanities.[iii]

This is a lofty ambition. In what follows, we reflect upon some epistemological challenges that have arisen in the development of sport sciences and in the attempt to realize the ECSS mission. How, if at all, can sport research meet the quest for integrated sport science with multi- and interdisciplinary perspectives? And what is the current status and challenges of sport science and the ECSS in this respect?

Terminology and epistemology

A first reflection on the field arises from the terminology used to designate the field. While some may argue about nomenclature merely being playing with words, a more critical analysis reveals deeper epistemological and ideological issues. Thus for example, the use of singular (science) and plural (sciences) is a deeply contested philosophical affair (McFee, 2009; McNamee, 2005; Parry, 2005) drawing on conceptions of the unity of science and scientific methods. While European scientists have used the word "science", many individual words in different languages operate with a conception similar to the German "Wissenschaft", which denotes a diversity of forms of systematic approaches to knowledge generation.

Two points are worth making here. The first is the use of the singular (ie in English "science", just as in German: "Wissenschaft") as opposed, say, to the UK that uses plural "sciences" to recognize differences in methodological approaches. Secondly, the "Wissenschaft" tradition (if we may call it that) privileges no particular methods or methodologies, whereas in the Anglo American tradition of science there are clear hierarchies. Thus the labels "hard" (experimental) science versus "soft" (social sciences and some humanities subjects, or human sciences that are theoretically driven and interpretive) have been widely used for a long time, by those more or less critical of the normative implications of these labels.

Only in apparent contrast, does the North American Academy (of

Kinesiology and Physical Education?) opt for the label "Kinesiology" (loosely translated from the Greek as the science of movement). But this labeling was the produce of intense scholarly and professional disputes in the 1980s (Renson 1989, Locke 1990, Maguire 1991, Newell 1990, Siedentop 1990, Slowikowski and Newell 1990). It was widely perceived by social scientists, humanities scholars and pedagogues, to privilege the "hard" sciences – typically anatomy, biochemistry, biomechanics, physiology and some branches of psychology, ably supported and shaped by statistics and statisticians. One positive aspect of this move to kinesiology was the avoidance of at least the singular plural tension since kinesiology made no assumptions about the unity of method applied to sports (McNamee, 2005). It left untouched however many of the deep ideological and philosophical tensions regarding the nature and methods of scientific enquiry and their hierarchies. In what follows, we will systematically discuss these tensions.

Paradigms in sport science

In sporting participation and performance, meaning is generated and interpreted primarily via individual and collective embodied postures and movements. By and large sport requires extensive bodily movement and challenges a variety of human movement abilities and skills. Hence, a central focus in sport science is the precise description, explanation and understanding of individual and collective human movement, and its many contexts and associated phenomena (such as organizations, institutions, rituals, emotions, and so forth).

The study of sport is based on several research approaches or what is often referred to as paradigmatic approaches. Before looking closer into these it will be useful to specify the meaning of what many find to be a slippery term: 'paradigm' (McFee, 2009; McNamee, 2005). Certainly, when cited in research methods courses and texts the word "paradigm" coined by the physicist and philosopher of science Thomas Kuhn. His seminal book *The structure of scientific revolutions* (1962) gave rise to the idea that the notion of scientists reading off nature, gathering data that were commensurate and progressively closer to the truth was a convenient myth. Only after the fame and use of the book and its central term developed apace, was it noted that Kuhn seemed to use the concept with less than fixed meaning[iv]. Nevertheless, one cannot simply ignore a term of art because of its conceptual vagueness, and the concept still has heuristic value in understanding the assumptions,

commitments and day to day workings of scientific communities.

Here, we shall use the term paradigm in a loose sense, following Kuhn's own later specification, as "embracing all the shared commitments of a scientific group" (1977, 294). More specifically, 'paradigm' will refer to the basic epistemological and methodological premises underlying a scientific approach, that is, the premises giving researchers the ideal ways of posing research questions, conducting research and explaining their findings.

What are the relevant paradigms in the study of sport and how can they meet the ECSS mission of an integrated sport science offering deep and comprehensive knowledge based on multi- and interdisciplinary perspectives?

The mechanistic paradigm: quest for causal explanation

A dominant approach in the study of human movement is that of the natural sciences: anatomy, physiology, physics, and (Western) medicine. In his overview of the basic traditions of Western science, von Wright (1971) refers to natural science as based on the Cartesian tradition. Simplistically speaking, the ideal is analysis, preferably in quantitative terms, with the aim to find mechanistic explanations (German: *Erklärung)* and then utilizing potential for predictions and intervention. The research process is characterized by a strict hypothetic-deductive structure. More specifically, the body and its movements are understood as systems of cause and effect-relationships. Let us call this the mechanistic paradigm.

In the study of the sporting body, the mechanistic paradigm has proved powerful. It provides insights into seemingly ever-deeper basic causal relationships between exercise, performance, and health and are standard elements in most sport science curricula. It serves too to predict outcomes of exercise and sport participation, it enables accurate measurement and comparison with pre- and post-research interventions, and has more or less (though not always uniform or uncontestedly) applications both when it comes to the development of performance and to health promotion and injury prevention and rehabilitation.

The ideal of mechanistic explanations has influenced social science as well. In sport psychology for instance work is done to understand connections between mental states such as performance anxiety and physiological reaction patterns. Moreover, mechanistic approaches have had impact on the didactics of learning and development in sport. For instance, with background in biomechanical analysis coaches' and athletes' attention is given to particular parts of the body and their movements; the knee lift in running, the high elbow in swimming, the rhythmic transition of the point of gravity in alpine skiing.

In spite of its many merits, however, the mechanistic paradigm has clear limitations. On the one hand, in the biology and the study of motor learning functionalist explanation and dynamic system approaches extend, wherever possible, clear-cut cause-effect explanations (Moreno and Mossio 2015, Davids et al 2003). On the other hand, quantitative descriptions and causal explanations of movement tell us little about the nature of sport as a social or cultural practice; its history, its perceived meaning and value to individuals and collectives; its socio-cultural significance and potential (Maguire, 1991). These are crucially important issues for the understanding of role of sport in human life and in society. In PE and mass sport, experience of meaning and value is decisive in learning and continued activity. In the execution of complex movement techniques, successful performances seem to be experienced as holistic *Gestalts* in which traditional distinctions between the body, the mind, and the environment merge into one unified whole (Loland 1992, 2009). From a mechanistic perspective, questions of individual and socio-cultural meaning and value do not make sense; their claims cannot be traced unproblematically to, nor indeed reduced to, quantitative descriptions and antecedent causes; nor can their truth claims be unproblematically evaluated.

The hermeneutic paradigm: interpretation of meaning

An alternative approach is to move from explaining the moving body as a mechanistic chain of events, or as an adaptive biological system, to interpretation of human intentionality and search for meaning. In the tradition of Edmund Husserl, the perspective is often referred to as a phenomenology (Kerry and Armour 2000).

Generally speaking, a phenomenological approach is directed towards the world as experienced and lived, or the 'life-world' (German:

Lebenswelt). To the phenomenologist, individuals are typically 'directed' and intentional in their interaction in and with the world. They 'are' their bodies in a fundamental sense. Von Wright (1971) considers the scholarly interpretation of intention and meaning as belonging to the Aristotelian tradition of Western science. The epistemological ideal is not mechanistic explanation *(Erklärung)* but that of hermeneutic understanding (German: *Verstehen)*.

This can be called the hermeneutic paradigm. Although researchers are united in their view of the significance of interpretation of human intention and the generation of meaning, the paradigm does not reach the level of uniformity that Kuhn had observed in the physical sciences. For instance, a clear methodological contrast between sociological and philosophical phenomenology has recently been argued for in the sport literature (Martinkova and Parry, 2011) that denotes differing methods and assumptions. This more pervasive contextedness of theory and method detracts in some way from the power of scientific proclamations of adherents of the mechanistic paradigm. To the mechanistic sport scientist there is much greater consensus on theoretical and methodological ideals, and thus greater acceptance of the possibility of scientific progress and the capacity to distinguish among the superiority of what are called "research programmes" (Lakatos, 1978).

Hermeneutic premises underlie qualitatively oriented social science and humanities; research within disciplines such as psychology, sociology, anthropology, pedagogy, history, and philosophy. Methodologically, researchers do not look primarily for quantifiable descriptions but work with systematic interpretation of meaning in written sources or through interviews and/or a variety of participant observation techniques. The ideal of the research process is not a clear cut hypothetic-deductive approach but implies a holistic iteration between empirical findings, research methods, and theoretical premises with theory development as part of the research. From a hermeneutic perspective the focus is on the meaning and value (or the lack of it) of sport to the individual, the group, and to society and culture.

An example illustrates the point. Players of a good soccer team or expert dancers may demonstrate extraordinary individual abilities and skills while at the same time having the ability to interact at a deep with their co-players or co-dancers. At the peak of their performance a group of experts moves almost like an organic unity; as one rhythmic, unified,

whole. The individual experience transcends into a collective experience of the group. Insights and knowledge of these qualities require theoretical and methodological approaches beyond that which is offered by the mechanistic paradigm. One possible approach comes from dynamic systems theory and motor control whereas another is hermeneutics based on the interpretation of 'lived experience' and meaning.

As with the mechanistic paradigm, the hermeneutic paradigm has both a basic and an applied side (Edgar, 2013). The hermeneutic approach offers possibilities for understanding the rise and development of sport in a historical perspective, and the current significance and meanings of sport to the individual and society (Harris, 1981). On the applied side, psychologists may examine what motivates individuals in a given group and in a given society to take part in sport, or how elite athletes can reach their best performance mode (Ryba, Stambulova and Wrisberg, 2005). Sociologists may study the development of body image among young athletes and provide insights into risk factors for distorted images and eating disorders (Dworkin and Messner, 2002; Jones, Glintmeyer and McKenzie, 2005). Similarly, philosophers might examine critically the justification of the doping ban. These studies represent important backgrounds for successful sport practice and policies.

Naturally, there are limitations with the general hermeneutic approach as well. In focusing on the experience of sport, structural aspects of research contexts such as institutional power, may be overlooked. Equally, because of the specificity of interpretation and contexts it can be challenging (and often impossible) to build generalisations or interventions with sufficient confidence or warrant, as is aspired to (or even obligatory) in mechanistic approaches.

The critical paradigm: examination of relationships of power

Taken together studies within the mechanistic and hermeneutic paradigms provide a fairly comprehensive and complementary knowledge of sport. The discussion above has demonstrated how one and the same movement pattern can be explained mechanistically and understood and contextualized as expression of human intention and search of meaning.

Still there are critical questions to be posed that are masked or simply ignored. Human movement patterns do not arise in vacuum but are shaped by the social and cultural ideals of the context in which they find their form (Mauss 1973). A third approach, inspired by critical social science, with feminist and anti-racist research as predominant examples, takes as its premise that sport can only be fully understood by considering the power relations and structures involved in its origins and development. The body and the processes of embodiment are seen as social constructions. Ideas of sport and sporting ideals are shaped by power structures and interests, and these ideas need to be exposed and examined critically. The approach should not really be termed 'paradigm' in the sense of strict sharing of theoretical and methodological premises, but rather in terms of the looser idea of shared commitments of a scientific group. This can be referred to as the critical paradigm.

Speaking in general terms, modern competitive sport was conceived of in 19th century England and based on the norms of industrialism and liberalism with emphasis on equality, merit, quantitative performance, progress and records (Guttmann 2004). Sport strengthened the existing normative schemes of the time. PE in schools express the norms and values of educational ideologies of the society of which is it is a part (Mangan 1981). Alternative sportive expressions challenging hegemonic power were repressed and neglected. The development of women's sport can only be fully understood by examining power struggles and opposition against traditional gendered roles.

To a certain extent, the critical paradigm shares theoretical and methodological premises with hermeneutics. Typically, perspectives in the critical approach are inspired by the social sciences and humanities. Feminist research has been a frontrunner in this respect. The critical paradigm however may also include studies within a mechanistic focus. One aspect relates to the very choice of research questions and projects. In the last decades, and as a result of increased awareness and acceptance of gender equality, far more studies in exercise physiology and sport medicine have been published with female subjects. The same phenomena could be observed more globally across sport (Sugden and Tomlinson, 2002), though with less immediacy, regarding issues of ability and disability (dis/abilty) (DePauw and Gavron, 2005) and ethnicity or race (Hylton, 2005).

In contrast with the mechanistic and hermeneutic paradigms, a critical perspective tends to include less basic and more explicit applied research; it often aims at a combination of knowledge and (political) change. The main goal is the development of research-based knowledge that exposes injustice and repression, and thus initiate social change in terms of increased justice and liberation. On a critical note, the approach is described by detractors as explicitly embodying bias . This refers to the aim which is considered not an open quest for new knowledge or truth but a planned search for knowledge in to support and help realizing what are considered 'political' goals. (McFee, 2009a; 2009b)

Realizing the ECSS mission: ideals of integration and multi- and inter-disciplinarity

In a brief and selective oversight, we have discussed three apparently different paradigmatic approaches in the study of human movement and sport. We return now to the question of whether a critical mass of studies within these paradigms can meet ECSS missions of an integrated sport science with multi- and interdisciplinary perspectives generating knowledge of sport in both depth and breadth.

A mechanistic approach provides precise analyses, causal explanations, and predictions and evaluates interventions based upon them. In hermeneutical and most critical constructivist approaches, researchers build on different premises and focus on inter-subjective interpretation and understanding of human intentionality and meaning. Working within these three paradigms, it seems that researchers have theoretical and methodological possibilities to respond to a wide range of both basic and applied questions related to sport. The ECSS quest for integrated knowledge of sport with multi- and interdisciplinary approaches can, it seems, be met. The question remains as to how, precisely, this can be done.

Based on the discussion of paradigms above, visions of complete interdisciplinarity and full integration of paradigms are hard to comprehend. On Kuhnian grounds, interparadigmatic understanding was thought impossible by definition. We know that there exist approaches in scientific research that build on radically different basic premises: mechanistic explanations of human movement versus understanding of movement in terms of intentionality and meaning. Interdisciplinarity makes sense primarily within, more than between, scientific paradigms.

Interdisciplinarity is only possible where they sufficiently meet requirements of theoretical and methodological commensurability: key theoretical and methodological concepts are shared and can be easily translated between the disciplines (Boyd 1991). This is a more moderate vision dominated by multidisciplinarity and partial integration of perspective, theory, and technique, rather than interdisciplinarity in a strict sense. Hence, our position would be in support of *conditional* multi- and interdisciplinarity (Loland 1992). Let us exemplify.

Hermeneutic and critical approaches seem to connect. Combining individual agency and socio-cultural contextualization seems commensurable and can be fertile ground for understanding both individual experience and socio-cultural contexts and power structures in sport. In a similar vein, the mechanistic paradigm offers rich possibilities for multi- and interdisciplinarity between for instance anatomy, physiology, bio-chemistry, and physics. Biomechanics and motor control and learning are referred to, and rightly so, as integrative perspectives complementing and extending mechanistic explanation with functionalist and dynamic system approaches. Mechanistic and hermeneutic-critical paradigms however cannot be combined in the same way as they build on completely different premises. Key theoretical concepts such as quantifiable mass, gravity, and force make little sense within phenomenological interpretation of human intention, meaning and value, and *vice versa*. Hence, the ideal of interdisciplinarity has its limits.

At this point, a modifying comment is necessary. Our discussion of paradigms and commensurability is based on the current situation of sport research. Kuhn's work demonstrates the dynamic character of science and the changing character of paradigms. Cutting edge research is innovative and often transcends paradigmatic boundaries. For instance, cognitive science combines perspectives from neuro-science, biology, linguistics, anthropology, psychology and philosophy and provide new understandings of the nature of the mind and human consciousness. Our call for conditional interdisciplinarity is not absolute but rather a call for a stance of critical and qualified openness for cross- and interparadigmatic research.

Compared to more traditional, disciplinary environments the sport sciences might actually be in a fortunate position in this respect. To explain and understand the complex phenomenon of sport, integration of

scientific perspectives is not just a possibility but, as stated by the ECSS, a mission and an ideal.

Realizing the ECSS mission in practice?

A final, critical question is whether the ECSS mission is realized in current practice. A cursory glance on the profile of the ECSS congresses and the publications in the EJSS is both promising and challenging. The promising part is that all paradigmatic approaches are represented both at conferences and in journal publications. The ECSS had enjoyed considerable growth over the last decades. European sport science seems to be flourishing.

Nevertheless, a challenge remains that can be analysed into (at least) two related aspects. The first aspect is the balance between paradigms. No doubt, the mechanistic approach is the dominant one in terms of volume of research; its visibility is high. This is not unreasonable as, more generally speaking, the volume on mechanistic research from an international perspective clearly outweighs the volume of the two other paradigms. It is alarming, however, if the hermeneutic and critical paradigms are further reduced in significance. This is a direct threat against the ECSS mission of sport science 'as the integrator of knowledge of human movement 'as seen by natural sciences, medicine, social sciences, and the humanities'.

The second aspect of the challenge is related to the first. Acknowledging the integrative character of, for instance, biomechanics and motor control and learning, it can still be argued that the mechanistic approach works on relatively clear and homogeneous theoretical and methodological premises. The hermeneutic and critical paradigms are different when it comes to theoretical and methodological premises. Even if they can be said to meet requirements of commensurability, they are far more diverse, and there are less clear methods by which to evaluate scientific progress. In psychology, for example, there are competing or rival theories on the nature and function of motivation. In sociology, there is no real agreement of the hierarchy of social forces that shape and develop sport in modern societies.

The challenge then is the misunderstanding that a mono-theoretical and stable "paradigm" is superior and more 'true' than a complex, contested, or diverse one. The Aristotelian dictum from Book I in his *Nicomachean*

Ethics comes to mind: One cannot demand a higher degree of precision from our research than the subject-matter allows. The study of individual and collective intention and generation of meaning cannot, at least not in the current state of social science, be reduced to quantifiable descriptions and causal explanations. Typically, the idea of the superiority of the mechanistic paradigm is the position of naïve positivists, many of whom still believe in the sustaining myth of linear, scientific progress, absolute objectivity, and the absoluteness of the fact: value distinction. To employ Kuhn's original vocabulary, the world of mechanistic science largely displays a coherence we could call "normal" while the critical and hermeneutic paradigms are far less stable[v]. As we have shown the word "paradigm" itself is complex. As should be evident from the argument above, no grand, unified scientific approach can explain all aspects of complex sport phenomena, and therefore demonstrate, in some neutral way, the superiority of one approach to sport science over any other.

The core ideal of research is to develop new, original and relevant knowledge of the phenomenon under study. If performed according to the standards of excellence of the field within which one works, in principle all scholarly approaches are of equal value. The ideal principled position of a sport researcher then is one of paradigmatic awareness, tolerance and respect. Ultimately, scientific hierarchies based on power relations and volume in numbers limit scholarly exploration of sport and the production of knowledge and represent the very counterpoint to the ideals described in the mission statement of the ECSS.

Concluding Comments

In this article we have attempted to place one of the core ideals of the ECSS – that of integrated sport science with multi- and interdisciplinary perspectives under a critical, philosophical microscope so to speak. We have argued that in order to describe accurately, explain and understand the complex phenomena of human individual and collective movement in sport and its contexts and associated phenomena, the ideals of the ECSS mission statement are crucial. Moreover, we have reflected upon three main paradigmatic approaches in this respect and pinpointed the significance of a conditional interdisciplinarity, that is, interdisciplinary research within partially commensurable, paradigmatic frameworks.

We have addressed, too, the challenge what can sometimes appear as implicit, normative hierarchical ideas of one kind of science or one paradigmatic approach as the 'real' and 'true' approach and other perspectives as less 'scientific' and of less value. As a response, we have argued in favor of the significance of paradigmatic (self-) awareness, respect, and tolerance: as long as a research approach meets the approved standards of excellence in the paradigmatic setting to which it belongs, it is of equal worth as any other research approach in any other alternative paradigm meeting the same requirements.

References

Boyd R (1991) Confirmation, semantics, and the interpretation of scientific theories. In: Boyd R, Gasper P, Trout JD: *The Philosophy of Science.* Cambridge, Mass.: Bradford, 3-35.

Davids K, Glazier P, Araujo D, Bartlett R (2003) Movement systems as dynamical systems: the functional role of variability and its implications for sports medicine. *Sports Medicine* 33 (4): 245-60.

Dworkin SL, Messner MA (2002) 2 Just do... what? Sport, bodies, gender. *Gender and Sport: A reader*. London: Routledge, pp 17-29.

Edgar A (2013) Sport and art: An essay in the hermeneutics of sport. *Sport. Ethics and Philosophy* 7 (1): 1-9.

Gratton C, Rowe N, Veal AJ (2011) International Comparisons of Sports Participation in European Countries: an Update of the COMPASS Project, *European Journal for Sport and Society* 8 (1/2): 99-116.

Guttmann A (2004) *From Ritual to Record. The Nature of Modern Sport*. New York: Columbia University Press. 2. ed.

Harris, JC (1981) Hermeneutics, interpretive cultural research, and the study of sports. *Quest*, *33* (1): 72-86.

Hylton K (2005) 'Race', sport and leisure: lessons from critical race theory. *Leisure Studies* 24 (1): 81-98.

Jones RL, Glintmeyer N, McKenzie A (2005) Slim bodies, eating disorders and the coach-athlete relationship a tale of identity creation and disruption. *International Review for the Sociology of Sport*, *40* (3): 377-391.

Kerry DS, Armour KM (2000) Sport sciences and the promise of henomenology: Philosophy, method, and insight. *Quest,* 52 (1): 1-19.

Lakatos I (1978) The methodology of scientific research programmes, vol. 1. *Philosophical Papers.* Cambridge: Cambridge University Press.

Locke LF (1990) Commentary: conjuring kinesiology and other political parlor tricks. *Quest*, *42* (3): 323-329.

Loland S (1992) The mechanics and meaning of alpine skiing. Epistemological and methodological notes on the study of sport technique. *Journal of the Philosophy of Sport* 19 (1): 55-77.

Loland S (2009) Alpine skiing technique – practical knowledge and scientific analysis. In Muller E, Lindinger S, Stöggl T (eds.) *Science and Skiing IV.* Achen: Meyer & Meyer, 43-58.

Maguire J (1991) Human sciences, sport sciences, and the need to study people "In the Round". *Quest* 43 (2): 190-206.

Mangan JA (1981) *Athleticism in the Victorian and Edwardian Public School*. Cambridge UK: Cambridge University Press.

Martínková I, Parry J (2011) An introduction to the phenomenological study of sport. *Sport, Ethics and Philosophy* 5 (3): 185-201.

Masterman, M. (1972) The nature of a paradigm. In Lakatos I, Musgrave A (eds.) *Criticism and the Growth of Knowledge*. Cambridge: Cambridge University Press, 59-89.

Mauss M (1973) Techniques of the Body. *Economy and Society,* 2 (1): 70-88.

McNamee M (2005) Positivism, Popper and paradigms: An introductory essay in the philosophy of science. In McNamee M (ed.). *Philosophy and*

the Sciences of Exercise, Health and Sport: Critical Perspectives on Research Methods. London: Routledge, 1-21.

McFee G. (2009a) *Ethics, knowledge and truth in sports research: an epistemology of sport*. London: Routledge.

McFee, G. (2009b) The epistemology of qualitative research into sport: ethical and erotetic? *Qualitative Research in Sport and Exercise*, 1 (3): 297-311.

Moreno A, Mossio M (2015) *Biological Autonomy. A Philosophical and Theoretical Inquiry.* Berlin: Springer.

Newell KM (1990) Kinesiology: The label for the study of physical activity in higher education. *Quest*, 42 (3): 269-278.

Parry SJ (2005). Must scientists think philosophically about science? In McNamee M (ed.). *Philosophy and the Sciences of Exercise, Health and Sport: Critical Perspectives on Research Methods*. London: Routledge, 21-23.

Renson R (1989) From Physical Education to Kinanthropology: A quest for professional and academic identity. *Quest* 41 (3): 235-256.

Ryba TV, Stambulova NB, Wrisberg CA (2005) The Russian origins of sport psychology: A translation of an early work of AC Puni. *Journal of Applied Sport Psychology* 17 (2): 157-169.

Siedentop D (1990) Commentary: The World According to Newel. *Quest* 42 (3): 315-322.

Slowikowski SS, Newell, KM (1990) The philology of kinesiology. *Quest*, 42 (3): 279-296.

Strong WB, Malina RM, Blimkie CJ, Daniels SR, Dishman RK, Gutin B, Hergenroeder AC, Must A, Nixon PA, Pivarnik JM, Rowland T, Trost S, Trudeau F (2005) Evidence based physical activity for school-age youth. *The Journal of Pediatrics*, 146 (6): 732-737.

Sugden J, Tomlinson A (2002) *Power games: A Critical Sociology of Sport*. Hove UK: Psychology Press.

Wright GH (1971) *Explanation and Understanding.* New York: Cornell UP.

---

[i] For an overview of sport participation in European countries, see Gratton et al (2011).

[ii] According to the International Olympic Committee, the 2012 London Summer Olympic Games were broadcasted in 220 nations with an estimated potential TV audience of 4. 8 billion people. See http://www.olympic.org/Documents/IOC_Marketing/Broadcasting/London_2012_Global_%20Broadcast_Report.pdf. Accessed Nov 17, 2015.

[iii] See http://sport-science.org/index.php?option=com_content&view=article&id=64&Itemid=84. Accessed January 12, 2016.

[iv] In short the word almost came to mean all things to all scientists. Masterman (1972) noted 22 different uses of the term within the original book, and Kuhn himself remarked 25 years later that the confusion that surrounded the book was principally due to a combination of the frequency and the 'excessive plasticity' (1977, 293) with which the term 'paradigm' was used.

[v] In Kuhnian language, this would be called 'pre-paradigmatic' but to explore this application to the present sports science context is not possible. See instead McFee (2009), McNamee (2005) and Parry (2005).