The intersection of sport management and sociology of sport research: A social network perspective

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ARTICLE INFO

Article history:
Received 17 December 2010
Received in revised form 8 August 2011
Accepted 10 August 2011

Keywords:
Social network analysis
Collaboration
Coauthorship
Sport management
Sociology of sport

ABSTRACT

Numerous scholars have highlighted important connections between the sport management and sociology of sport disciplines. Heeding calls from scholars in both fields to utilize social network analysis as a lens of inquiry, the purpose of the current study was to empirically explore the relationship between sport management and sociology of sport via coauthorship patterns. Specifically, we analyzed coauthorship patterns in three of the oldest and most highly regarded journals in each field from 1987 to 2009. Through the use of social network analysis, the descriptive results present a view of coauthorship patterns in both fields and highlight influential actors in the network who appear to transcend and connect both disciplines. The information yielded by this research provides insight useful for exploring the historical development of the fields, assessing the current state of the fields, and imagining how the fields might grow and prosper in the future.

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Discussing the relative paucity of critical research in the field of sport management during her address as recipient of the Earle F. Zeigler Award, Frisby (2005) voiced concern that “perhaps we have left these types of studies to our colleagues in the sociology of sport” (p. 4). Other scholars have subsequently echoed Frisby’s criticism. Amis and Silk (2005), for example, lament the fact that sport management approaches to critiquing the industry are often farmed off to colleagues in other disciplines. Beyond the comments of scholars in the field, other signs point to important connections between sport management and sociology of sport. For instance, prominent sport management textbooks, such as Contemporary Sport Management by Parks, Quarterman, and Thibault (2007), often contain chapters dealing with sociological aspects of sport. The latest standards issued by the Commission on Sport Management Accreditation, meanwhile, include “social, psychological, and international foundations of sport” as one of its common professional component topical areas (Commission, 2010).

These apparent connections between the fields, in conjunction with calls for greater diversity of approaches to research in sport management (Skinner & Edwards, 2005), suggest there are potential benefits to be gained from greater interdisciplinary collaboration. Further, in sociology of sport, numerous scholars have voiced concern about a lack of application of research, fearing sport sociologists have had little impact on actual sport practice (e.g., Harris, 2006; Jones & Armour, 2000; Lüschen, 1980; Melnick, 1980; Yiannakis & Greendorfer, 1992; Yiannakis, 1989, 1992). Given this history of concern with application, sport sociologists may also see benefits from interdisciplinary collaboration with the field of sport management.

With such apparent connections between sport management and sociology of sport, considered alongside the possible benefits of interdisciplinary collaboration, the question arises as to how one might go about investigating the extent to which...
this relationship has existed in the past and currently exists today. After all, it is one thing to theorize about connections between the fields, but it is another matter to empirically investigate this relationship. The purpose of the current study, therefore, was to empirically explore the relationship between sport management and sociology of sport by conducting a social network analysis of coauthorship patterns from prominent journals in each field. The information yielded by this research provides useful insight for considering the historical development of the fields, assessing the current state of the fields, and imagining how the fields might grow and prosper in the future. Broadly conceived, this study is an exercise in the sociology of science, which is where we begin constructing our theoretical framework.

1. Theoretical framework

1.1. The sociology of science

The sociology of science is a body of work exploring the social structures and processes involved in scientific activity (Benz-David & Sullivan, 1975). Primarily beginning in the 1960s, there has been a significant amount of scholarly work in the sociology of science. In Science of Science and Reflexivity, Bourdieu (2001/2004) gives an overview of the sociology of science, discussing categories he labels as different “moments” or “strands.” In this discussion, it is clear that scholarship in the sociology of science represents a range of views and approaches.

The first “strand” in the sociology of science is the structural-functionalist or Mertonian tradition. While Bourdieu (2001/2004) seems positive about this line of research for its contributions to our knowledge of the scientific field, he is critical of the “concessions” it gives to the official vision of science, justifying or rationalizing scientific practices and taking certain aspects of scientific practice at face value. This orientation is found in work such as that of Merton (1957) and Cole and Cole (1967), which appears to view the maintenance of scientific norms and the reward system as being based upon functional utility. A problem with such work is that it “sees the scientific world as a ‘community’ which has ‘developed’ for itself just and legitimate regulatory institutions and where there are no struggles – or at least, no struggles over what is at stake in the struggles” (Bourdieu, 2001/2004, p. 11). The question of for whom the system is functional is one that research in the structural-functionalist tradition fails to consider.

A more critical perspective is found in the second “moment” in Bourdieu’s (2001/2004) discussion of sociology of science, which is exemplified by Kuhn’s (1962) examination of “normal science” and “scientific revolutions.” In Kuhn’s (1962) words, normal science “is predicated on the assumption that the scientific community knows what the world is like” and, in turn, “often suppresses fundamental novelties because they are necessarily subversive of its basic commitments” (p. 5). Scientific revolutions, meanwhile, are “tradition-shattering complements to the tradition-bound activity of normal science” (p. 6), and “the successive transition from one paradigm to another via revolution is the usual developmental pattern of mature science” (p. 12). In his work, Kuhn “demonstrated how science was often an ideological battleground where ideas and explanations competed, and those that ‘won’ were often those of the scientists with the most power” (Glesne, 2006, p. 7). As Kuhn (1962) argues, “we may have to relinquish the notion, explicit or implicit, that changes of paradigm carry scientists and those who learn from them closer and closer to the truth” (p. 171). This statement exemplifies the ways in which Kuhn’s perspective signaled a critical shift from previous work.

Bourdieu (2001/2004) finishes his discussion of sociology of science by noting the “strong program” (p. 18), exemplified by Bloom’s (1976) work, Knowledge and Social Imagery, as well as laboratory studies such as those by Latour and Woolgar (1982). The contribution of this line of work is summed up in the words of Knorr-Cetina (1992):

Scientific objects are not only “technically” manufactured in laboratories, but are also inextricably symbolically or politically construed, for example, through literary techniques of persuasion such as one finds embodied in scientific papers, through the political stratagems of scientists in forming alliances and mobilizing resources, or through the selections and decision translations which “build” scientific findings from within. (p. 115)

In other words, scientific legitimacy is created in the writing process as well as through networks of scholars interacting with one another. This brief overview highlights some of the potential ways in which a social network approach can be valuable in the sociology of science, for example, by exploring the community of scholars collaborating to build a knowledge base and examining how various shifts or trends may be influenced by actors in the field.

1.2. Social network analysis

In his comprehensive overview of social network analysis, Scott (2000) identifies the sociology of science as “one of the principle research areas in which a number of studies have invoked the idea of the social network” (p. 121). Specifically, he cites Crane’s (1972) study of the “invisible college” as one of the earliest pieces of research using “the idea of networks of

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1 Some of the literature included in this discussion of “sociology of science” might alternatively be labeled as being a part of the “sociology of scientific knowledge.” Commenting on these two fields of research, Collins (1983) notes that the relationship between the two specialties has often been perceived as one of competition, but he argues the sense of a necessary opposition is false. Bourdieu (2001/2004), meanwhile, seems to include work from both areas in his discussion. Therefore, although we use the term sociology of science, we realize our discussion includes a range of work that may be given different labels by different individuals.
communication among scientists as a way of explaining the growth of scientific knowledge” (p. 121). Further commenting on the utility of social network analysis in the sociology of science, Scott explains that such investigations can point “to the important role played by scientific cliques and circles in the promotion of particular ideas and approaches” (p. 122). Similarly, the current study allows us to explore and identify the existence of collaboration patterns between particular groups of scholars within sport management and sociology of sport and, in turn, think about how such patterns influence the idea space in the fields.

At a general level, Freeman (2004) suggests modern social network analysis consists of four features that together define the field: (a) an attention to structural intuitions based on ties linking social actors, (b) a grounding in systematic empirical data, (c) a use of graphic imagery, and (d) a use of mathematical and/or computational models. Among the first broader research efforts to include all four of the defining features of social network analysis was led by Jacob Moreno, whose work sought to explore issues such as how group relations served as both limitations and opportunities for an individual’s actions (e.g., see Moreno, 1934). Moreno called his approach sociometry, and he edited a journal by that same name from the mid 1930s to early 1950s. Due to a number of factors, however, the work of Moreno and his followers, as well as similar lines of research pursued by groups such as that led by W. Lloyd Warner at Harvard University in the 1930s and 1940s, failed to develop a unified paradigm for a social network perspective (Freeman, 2004). Social network analysis then went into what Freeman describes as a “dark age” until experiencing a “renaissance” at Harvard during the late 1960s and early 1970s. Since that time, social network analysis appears to have experienced relatively steady growth. Otte and Rousseau (2002), for example, found that between 1984 and 1999, there has been an almost linear increase in the number of areas in which social network analysis has been applied. Similarly, Knoke and Yang (2008) suggest publications in the social sciences with “social network” as a key concept have “accelerated exponentially during the past three decades” (p. 2). Building on this general momentum, the current study applied the defining features of social network analysis to examine coauthorship patterns in sport management and sociology of sport.

However, despite its relatively significant growth overall, social network analysis has thus far been used sparingly in the study of sport. In sociology of sport, Nixon (1992, 1993a, 1993b) is the only scholar who has made overt use of social network analysis, while Quatman and Chelladurai (2008b) have made the only explicit attempt to utilize social network analysis in the field of sport management. Although actual research is still lacking, calls have recently been issued in sociology of sport (Nixon, 2002) and sport management (Quatman & Chelladurai, 2008a) imploring scholars to adopt social network analysis as a lens of inquiry. The current study is an effort to engage with such calls to action.

In an important initial piece of work, Quatman and Chelladurai (2008b) provide a general picture of the social network structure in the field of sport management. They suggest, “employing a social network approach allows researchers to generate concrete maps and corresponding data matrices of coauthorship patterns between and among scholars” (p. 660). However, the descriptive utility of these maps of coauthorship patterns is limited if we do not know the identity of the actual scholars comprising the actors in the network (as is the case with the study by Quatman & Chelladurai, 2008b). Thus, in the current study, we collect publicly available information from scholarship published in leading journals from both fields in order to provide a more descriptive map of coauthorship patterns. By identifying the scholars found in key positions within the network, this study provides valuable insight for scholars in exploring the fields’ underlying social network structure. Quatman and Chelladurai (2008b) also state, “future research should examine the characteristics and structural traits that distinguish the members of cohesive subgroups from those not in such groups” (p. 669). Our study has the ability to provide this type of insight, allowing exploration of such factors as the type of research conducted by key actors in the fields, the methodological approaches to research favored by individuals in key positions, and the influence of institutional affiliations. Further, although their work provides important exploratory insight, Quatman and Chelladurai (2008b) note a limitation of their study as being that it does not provide “any information about how this social structure came about or how the structure relates to the actual idea space and topics circulating within the structure” (p. 673). In the current study, we provide a more descriptive picture of the field’s social network structure that can begin to provide answers to such questions.

2. Methods

In this study, we utilize a social network perspective to explore coauthorship patterns among scholars who have published in some of the top journals from sport management and sociology of sport. Specifically, our analysis includes three of the oldest and most prestigious journals sponsored by sociology of sport organizations – International Review for the Sociology of Sport (IRSS), Journal of Sport and Social Issues (JSSI), and Sociology of Sport Journal (SSJ) – and three of the oldest and most respected journals from sport management organizations – Journal of Sport Management (JSM), Sport Marketing Quarterly (SMQ), and Sport Management Review (SMR). Two of the sociology of sport journals (JSSI and SSJ) and two of the sport management journals (JSM and SMQ) are published by organizations in North America, while the remaining journal from each field is published outside of North America. Although SMQ is specific to the field of sport marketing (a sub-discipline of sport management), we have selected it for this study due to the length of time it has been published (since 1992), its perceived high status in the field, and the fact sport marketing represents one of the largest areas of sport management research (Dittmore, Mahony, Andrew, & Phelps, 2007; Mahony & Pitts, 1998). Our analysis consists of all articles published in each journal from 1987 through 2009. We chose 1987 as a starting point because that is the year in which the Journal of Sport Management, which is the oldest journal devoted specifically to the field of sport management, was founded. While this project is certainly limited by the particular journals we have selected, we are capturing a sample of research that is notable...
for having been published in the longest-running and most prestigious journals in each field. For those unfamiliar with the journals under investigation, we next provide a brief background on each of the six journals included in this study.

The *IRSS*, which is edited on behalf of the International Sociology of Sport Association (known as the International Committee for the Sociology of Sport prior to 1994), has been published continuously since 1966. As noted in its editorial statement, the main purpose of the *IRSS* is to disseminate research on sport throughout the international academic community, bringing together contributions from such fields as anthropology, cultural studies, geography, history, political economy, semiotics, sociology, and women’s studies, as well as interdisciplinary research. The *JSSI*, meanwhile, is the official journal of Northeastern University’s Center for the Study of Sport in Society and has been published continuously since 1977. The *JSSI*’s editorial statement indicates the journal publishes scholarship regarding the impact of sport on social issues from perspectives that include sociology, history, economics, media studies, gender studies, psychology, political science, cultural studies, anthropology, and ethnic studies. Finally, the *SSJ* is the official journal of the North American Society for the Sociology of Sport and has been published continuously since 1984. In its editorial statement, the *SSJ* is described as being designed to stimulate and communicate research, critical thought, and theory development on sociology of sport issues.

In the field of sport management, the *JSM* is the official journal of the North American Society for Sport Management. The journal’s editorial statement indicates that the *JSM* publishes scholarship examining a number of areas as they relate to the management, governance, and consumption of sport, such as organizational theory, behavior, and strategy; sport operations; law and policy; economics, finance, and accounting; marketing, consumer behavior, sponsorship, advertising, and licensing; media, communications, and public relations; sport tourism; facility and event management; and gender and diversity. *SMQ*, meanwhile, which has been published continuously since 1992, lists its mission as being to publish research that advances the study and practice of sport marketing and is relevant to the professional interests of the sport marketing community. Finally, *SMR* is the official journal of the Sport Management Association of Australia and New Zealand and has been published continuously since 1998. *SMR*’s editorial statement describes the journal as being concerned with the management, marketing, and governance of sport at all levels and in all its manifestations – whether as an entertainment, a recreation, or an occupation.

We investigated collaboration in the current study by recording instances of coauthorship to construct a network. Specifically, any time two or more scholars coauthored a paper in one of the aforementioned journals, a connection was created in the network. At a basic level, a network consists of a graph comprised of vertices (also called points or nodes), which represent actors or agents, connected by lines (also called edges), which represent ties between actors. In the network we constructed, each vertex represents an individual having published in one of the journals under consideration, while each line connecting vertices represents an occasion in which individuals coauthored a published article. By recording coauthorship patterns, we built a set of relational data. As *Scott*(2000) explains, relational data refer to the “contacts, ties and connections . . . which relate one agent to another” (p. 3), as opposed to attribute data, which consist of the “attitudes, opinions and behavior of agents” (p. 2). While variable analysis is appropriate for attribute data, *network analysis* is appropriate for relational data. What social network analysis offers is a methodology to analyze social relations and conceptualize the structure of social networks. In analyzing the network and positions of various actors in that network, we considered social network concepts such as *density*, *degree*, *reachability*, *components*, *bridges*, *k-cores*, and *complete subnetworks*. We also used the software program *Pajek*, which is specifically designed for the analysis and visualization of large networks. We will elaborate on specific social network concepts as well as our use of the *Pajek* program as we present and discuss our findings in the remaining sections of this paper. We have organized our writing in this way – defining specific concepts as we present and discuss our findings – to maximize readability of the paper for those who are relatively unfamiliar with social network analysis.

### 2.1. Data collection

In the process of collecting data for this study, we had to make a number of decisions about what content from each journal to include. In *SMQ*, for example, the journal often includes one article per issue that is labeled as a “case study.” The journal’s editor at the time the case studies first appeared explained that the “case study” designation was created for articles that did not have as extensive data collection as typical articles published in the journal. Somewhat similarly, the *SSJ* occasionally includes “research notes” in its issues. We decided to include these types of articles in our analysis because, despite the fact that such articles may not involve as extensive data collection as others, they still represent original contributions to the journal, add to the idea space of the fields, and may be subsequently used and cited by other scholars. In addition, some issues of journals (such as volume 24, issue 1 of the *SSJ*) utilized a format in which there was an original article, followed by a commentary on that article by another scholar, further followed by a response from the original author. In such cases, we included the original article and the commentary on the original article. However, we chose to exclude the original author’s reply to the commentary due to the fact that doing so would have given the appearance that the original author had two contributions in a single issue of the journal. We felt that a more accurate picture of the structure of the fields could be obtained by not giving an author “double credit” for both an original article and her reply to a commentary about that article. Somewhat similarly, we also excluded the relatively brief commentaries by editors that often appear in journals.

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2 Information was taken from the journals’ editorial statements as they appeared in 2009, the last year from which we included data in our study.
While there is no doubt that journal editors are influential individuals, including all commentaries of editors in this analysis of collaboration patterns would have given the editors a “misleading” number of publications. For example, if an individual had edited a journal for five years and written one editorial commentary for each issue of the journal during that time span, it would give the appearance that the individual had a total of 20 publications appearing in a single journal over a span of five years.

Another category of items on which we had to exercise judgment about inclusion was the introductions written by editors of themed special issues of journals. Many of these introductions are relatively brief commentaries that primarily serve to introduce the articles appearing in the remainder of the issue. In some cases, however, such introductions constitute more in-depth commentaries going well beyond just introducing other articles. In such cases where these introductions constitute an original commentary in their own right, we have included them in our analysis. However, when introductions to special issues do little else than introduce other articles appearing in the issue, we have excluded them. Overall, the fact that any individual engaging in a study of the coauthorship network in a field must make such decisions serves as a limitation of this study. Had someone made different choices about which articles to include and which to exclude in their analysis, they may obtain a slightly different picture of the structure of the field. However, due to the fact most articles appearing in journals do not fall into any special categories on which one would have to make decisions about inclusion, we believe our analysis of the collaboration network in sport management and sociology of sport can provide a valuable picture of the fields.

Another complication we faced in collecting data for this project was the inconsistent use of names and possible name changes of scholars during their careers. We used a number of strategies, however, to address these complications and to attempt to verify that publications all belonged to the same individual when possible discrepancies existed. For example, when multiple scholars had the same last name, we checked the individuals’ institutional affiliations for an initial indicator of whether two names referred to one individual or to two unique individuals. Sometimes, however, simply checking institutional affiliation did not resolve discrepancies with certainty. In such cases, we consulted the websites of departments at which the individuals worked for further information about them, such as a list of publications or curriculum vitae.

3. Results and analysis

The network of actors contributing to the idea space present in the six journals examined for this study was comprised of 2212 unique individuals. Due to the size of the network and scope of the data collected, our objective was to provide an overview of key trends, themes, and patterns we identified as being present in the collaboration network in the fields. We will first note some general collaboration trends before providing a more specific discussion of themes and patterns found in the coauthorship network structure. Prior to beginning our more detailed analysis of the fields, however, it is possible to identify some notable connections and individuals based upon an initial look at who had published articles, how many articles they had published, and in which journals they had published. Of the 2212 scholars having published at least one article in at least one of the journals under consideration in this study, 106 total scholars had published at least one article in a sport management journal and at least one article in a sociology of sport journal. This group of 106 scholars appeared to fall into a number of sub-categories, however. Twenty-seven individuals, for instance, had just one publication in each field. Of the remaining 79 scholars, 70 had three or more publications in one field but only one or two publications in the other field. We classified the remaining nine scholars as those that had published “consistently” in journals from each field. Specifically, those individuals are George Cunningham, Donna Pastore, Allen Sack, Michael Sagas, Michael Sam, Trevor Slack, Nancy Spencer, Ellen Staurowsky, and Lucie Thibault. With a specific focus on considering the connections between the fields, these nine individuals are notable because of the fact they had published consistently in prominent journals from each field.

3.1. General collaboration trends

Regarding general trends, there seems to have been a notable increase in rates of collaboration in sport management journals, while, in sociology of sport journals, there appears to have been comparatively little change in the rate of collaboration since 1987 (see Fig. 1). Interestingly, these characteristics found in sociology of sport seem to be somewhat in opposition to trends in the broader field of sociology as well as findings related to all academic fields in general. For example, while coauthorship is more common in the natural sciences than the social sciences, it has been steadily increasing across all fields (Endersby, 1996; Fisher, Cobane, Vander Ven, & Cullen, 1998; Hargens, 1975; Laband & Tollison, 2000). Specific to the field of sociology, Moody (2004) notes a general pattern of increasing coauthorship found in articles published in the American Sociological Review (ASR). In fact, during each year between 1994 and 1999 (the most recent data included in Moody’s study), more than half the articles appearing in ASR had two or more authors. This review of general collaboration patterns found in the fields brings us to two primary questions. First, what factors contribute to there being a higher rate of collaboration in sport management than sociology of sport? Second, what factors contribute to the relative lack of increase in collaboration found in sociology of sport compared to other fields? While it may not be possible to provide definitive answers to these questions, we propose a number of factors that may contribute to such trends.

With respect to the first question, departmental structure and the number of faculty employed in various departments is one factor that may contribute to the differing rates of collaboration. For example, while departments of kinesiology or physical education may commonly employ multiple faculty members whose primary research area is in sport management, it may be less common for a department to employ multiple faculty with a primary specialization in sociology of sport. Such
arrangements in which departments employ multiple sport management faculty members certainly help to promote collaboration. In contrast, sport sociologists are more likely to be somewhat “isolated” in their departments and even on their campuses (Nixon, 2010), making collaboration more difficult.

In addition to the number of faculty employed by departments, the type of research conducted in each field may explain some of the difference in collaboration rates. Specifically, theoretical and historical studies tend to have lower rates of coauthorship than quantitative work (Endersby, 1996; Fisher et al., 1998). Therefore, the presence of a greater proportion of quantitative research in sport management may encourage higher rates of collaboration. Sport sociologists, meanwhile, may be involved in research that is more difficult to divide, such as ethnographic work, or research that lends itself to being written by a single author, such as theoretical or critical work. Further, and closely related to the type of research conducted in each field, is the influence of external funding on collaboration in the research process. To the extent that funded research has been more common in sport management than sociology of sport, it may be that the pursuit of funding works to encourage greater scholarly collaboration.

Differing rates of growth in the two fields may also be a factor impacting collaboration, as sport management has seen rapid development during the past three decades. In fact, the North American Society for Sport Management website listed more than 325 institutions with sport management programs in North America as of early 2011. Given the extent of this growth, it may be the case that employment-minded students have looked relatively more favorably on sport management, while universities, in turn, have invested more in sport management than sport sociology programs (and faculty) because their investments have typically chased student credit hour production.

In regard to the second question, the distribution of faculty members in various departments may again play a role in sociology of sport’s relatively small increase in collaboration. For example, sociology departments at most universities generally employ a number of faculty members who are likely to interact with one another on a routine basis. Much like the number of sport management faculty members employed in a given department may influence their ability to collaborate on research, it is logical that sociologists working in departments with many other sociologists have more opportunities to collaborate than do sport sociologists working in departments of kinesiology. Again, the fact that sport sociologists are likely to be somewhat isolated on their campuses may serve as a barrier to collaboration in the field.

An additional insight provided by these general rates of collaboration is the extent to which we can expect the network of scholars to be connected, as less collaboration and a lower number of authors per paper decreases the size of clusters formed in the network through common authorship on a single paper (Moody, 2004). Thus, we can generally expect portions of the network consisting primarily of those having published in sport management journals to be more densely connected than portions of the network composed mainly of those having published in sociology of sport journals. Given an understanding of some general collaboration trends in the fields, we next present some visualizations of the network in order to further describe the network structure.

3.2. General visualizations of the network

In order to provide further insight into the relationship between the fields of sport management and sociology of sport, we now discuss more specific patterns found in the collaboration network. In this section, we also provide details about the process through which we went in analyzing and breaking down the network into various sub-groups. In this analysis, we give specific attention to individuals who have published in journals from both fields.

Because the human eye is trained in pattern recognition, network visualizations are helpful in tracing and presenting patterns of ties in a network (de Nooy, Mrvar, & Batagelj, 2005). In order to provide an initial visualization of the network, we used the Fruchterman Reingold 2D layout energy command contained in the Pajek program to draw an image of the coauthorship network. Because drawing a useful image of a network becomes increasingly difficult with a high number of vertices, we used a partition to limit the number of actors included in this initial visualization. As previously mentioned, a
total of 2212 scholars had authored or coauthored at least one article in the sample of journals we examined. To begin narrowing this network, we created a partition to identify only those scholars who published two or more articles during the time span, which reduced the number of actors in the network to 681, a more manageable number with which to work. Another justification for creating this partition is that any scholar having published just one article during this time span could not serve as a link between two scholars in the network who had not otherwise coauthored together. Thus, by eliminating individuals with only one publication, we do not lose any actors who would serve as bridges that could link portions of the network together.

An initial inspection of the network of scholars having at least two publications in the journals under consideration revealed several patterns. For example, there are a number of actors isolated from what appears to be a larger, connected main network. These isolates consist of two types of actors – those who had not collaborated (represented by vertices with no ties to other vertices) and those who had collaborated but are not collectively connected to the larger network (represented by subgroups of two or more vertices connected by lines but with no ties to the larger network). Additional insight about the structure of collaboration in the fields was gained by considering the intensity of ties between actors (i.e., the number of articles two actors had published together) and the amount of capital possessed by each actor (i.e., the total number of articles an actor had published). Further, because our particular focus was on the relationship between sport management and sociology of sport, we created a partition to shade the vertices according to the field in which the actors had published. In Fig. 2, the strength of ties between actors is represented by the thickness of lines connecting vertices, while the amount of capital possessed by each actor is represented by the size of an individual’s vertex. In this view, the positions within the network of the scholars with the most capital and those with the strongest ties begin to appear. Additionally, the white vertices represent scholars having published only in sociology of sport journals, while the black vertices represent scholars having published only in sport management journals. The dark gray vertices represent scholars having published at least once in a journal from each field, while the light gray vertices represent scholars having published consistently (at least three times) in each field. A number of scholars having published only in sociology of sport journals appear to be scattered around the periphery of the network, which is not entirely surprising given the lower rates of collaboration found in sociology of sport. A greater number of scholars having published in sport management, meanwhile, appear to be tied to the larger connected network in a number of more dense sub-groups. While these initial visual inspections of the entire network appear to yield a number of interesting patterns, we next present several social network analysis concepts to provide a more detailed view of the structure of the network.

3.3. Structural attributes of the network

To complement the information contained in the initial visual representations, it was beneficial to consider a number of structural attributes of the network. A consideration of these structural properties helped break down the network and search for more detailed patterns. Density, for example, is a structural attribute that refers to the extent to which points are connected in a network. Specifically, density refers to the total number of lines present in a network, expressed as a proportion of the maximum possible number of lines that could be present between actors. An analysis of the network of 681 scholars having published at least two articles in the journals under consideration in this study showed the density of the
network to be 0.0031, meaning that only 0.31 percent of all possible ties between actors in the system were present. It is not uncommon, however, to find such a low density score in a network of this size because density is inversely related to network size. As de Nooy et al. (2005) explain, “the larger the social network, the lower the density because the number of possible lines increases rapidly with the number of vertices, whereas the number of ties which each person can maintain is limited” (p. 63). Further, due to factors such as time constraints that limit the number of ties each person can maintain, “larger graphs will, other things being equal, have lower densities than small graphs” (Scott, 2000, p. 74). In a network of scholarly collaboration, for example, there is a practical limit to the number of other scholars with whom any individual may coauthor during his or her career.

Because density is so dependent upon the size of the network, it is also useful to consider the number of ties in which each actor is involved (de Nooy et al., 2005). Specifically, the measure of degree refers to the number of lines incident to a given vertex. In the network being explored in this study, the degree of a vertex represents the number of unique individuals with whom a given scholar had coauthored. In addition to the degree of a single vertex, it is also possible to calculate a measure of the average degree of all vertices in the network, which, unlike density, is not dependent on network size. In this study, we calculated the average degree of all vertices in the network to be 2.13; in other words, the actors in the network collaborated with an average of about two other scholars. The minimum vertex degree in the network was zero, representing those individuals who had not collaborated with another scholar in the network; a total of 178 individuals had a degree of zero. These individuals are among those appearing as isolates positioned on the periphery in the previously mentioned network visualizations. On the other hand, the maximum vertex degree found in the network was 20, which was the measurement associated with Dan Mahony. It is perhaps unsurprising that Mahony had collaborated with more unique individuals than anyone else in the network, given his positive stance toward collaboration (see Mahony, 2008). The full frequency distribution of degree scores for the network is illustrated in Table 1.

### Table 1

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<thead>
<tr>
<th>Degree score</th>
<th>Number of vertices</th>
<th>Percentage of vertices</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
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<td>26.13</td>
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3.4. Investigating cohesive subgroups

Following this initial consideration of the properties of density and degree, we began to look for more specific patterns by breaking down or narrowing the number of actors in the network. Given that 178 actors had not coauthored with anyone else in the network, we were left with a total of 503 individuals who had coauthored. In order to examine the extent to which these 503 actors were connected, we utilized the concept of reachability, which concerns the extent to which it is possible to reach one vertex from another vertex through the ties in a network. If we consider each line between vertices in a network to be a “road,” then it is possible to “walk” from one vertex to another so long as they are connected by a line. Thus, in social network analysis, the term walk refers to a series of lines through which it is possible to reach one vertex from another. Because walks can be somewhat meandering, the term path is used to designate “a walk in which no vertex in between the first and last vertex occurs more than once” (de Nooy et al., 2005, p. 67). In other words, a path refers to a more efficient way to get from vertex to vertex than does a walk; while all paths are walks, not all walks are paths.

The concepts of walks and paths were useful because they helped us identify the components present in the network. Formally, a component is a “maximal connected sub-graph,” meaning that all points in a component can “reach” one another through one or more paths, but they have no connections outside the component (Scott, 2000). An analysis of the 503 vertices remaining in the network revealed a total of 58 separate components of at least two vertices each. The largest of those components contained 312 vertices, which is the group constituting the larger or “main” network that appeared to exist in the initial visual images of the network. An image of this main network of 312 connected vertices produced using the Kamada-Kawai layout energy command contained in the Pajek program is shown in Fig. 3.

From this image of the main portion of the network, a number of additional patterns began to appear. Specifically, there appears to be a more densely connected portion of the network consisting primarily of individuals having published in sport...
management journals in the right half of Fig. 3. A less densely connected portion of the network, meanwhile, appears to contain mostly scholars having published in sociology of sport journals (left half of Fig. 3). In a study examining coauthorship trends in the field of sociology, Moody (2004) proposed three possible models for the large-scale network found in the field. The first, "theoretical fragmentation" or the "small-world" model, refers to a structure in which there are distinct clusters in a network connected to each other by a small number of links. The second possible model was the "star production" or "scale-free" model, which would represent a small number of very prominent scientists forming the core of each specialty's collaboration network. In this model, theoretical integration depends on ideas generated by star producers, as collaborators follow the lead of those responsible for connecting the entire network. The third model proposed by Moody was the "permeable theoretical boundaries and generic methods" or "structural cohesion" model, in which "authors with particular technical, empirical or theoretical skills will mix freely with those who have worked in different research areas, in an attempt to establish a new position by combining previous work" (p. 217). With respect to the current network, it appears the "small world" model best represents the structure found in the relationship between the sport management and sociology of sport "sides" of the network.

If greater structural cohesion existed between sociology of sport and sport management, we would see many links between the fields with scholars from each field mixed throughout the network structure. In contrast, the network structure appears to show a limited number of distinct paths connecting the two "sides" of the network. For example, one path connects Becky Beal, whose publications appeared only in sport sociology journals, to Todd Crosset, who had published in both fields. Crosset, meanwhile, had coauthored with Mark McDonald, who had published in both fields and collaborated with several individuals having published only in sport management, and Carol Barr, who had published only in sport management journals. It is notable that Crosset, McDonald, and Barr are all co-workers at the University of Massachusetts at Amherst, thus providing a proximity advantage for collaboration. Another path connects John Amis, who had published only in sport management, to Michael Silk, who had published in both fields. Silk, in turn, had collaborated with multiple sport sociologists. Another path connects Joanne MacLean (only sport management) to Lisa Kikulis (both fields) and Lucie Thibault (consistently published in both fields). In addition, a key link between the fields appears to be Trevor Slack, who had coauthored with several individuals having published in only sport management journals as well as several individuals having published in journals from both fields, including Lucie Thibault. The positions of these scholars are noted in the illustration of the network provided in Fig. 4.

In this illustration, it is possible to envision how the "small world" model (Moody, 2004), in which there are distinct clusters in a network connected by a small number of links, is useful as a descriptive concept. For instance, of the individual scholars previously mentioned, if one were to remove Todd Crosset, Trevor Slack, and Lucie Thibault, as well as the edge between John Amis and Michael Silk, the sociology of sport side of the network would no longer be connected to the sport management side. This illustrates the "theoretical fragmentation" (Moody, 2004) found in the network. Although such fragmentation may not be surprising (one would not necessarily expect theoretical unity to exist between the two fields), it is notable that key connections do appear to exist between sport management and sociology of sport with respect to coauthorship patterns in the network. Not all connections, however, are equal in relevance. For example, the link between Crossett and McDonald was provided by just one collaboration, which appeared in 1995. Slack and Thibault, meanwhile, appear to have provided much more consistent connections; in the journals under consideration here, Slack had collaborated with four individuals having published in sport management and six having published in both fields, while Thibault had collaborated with two individuals having published in sport management and seven having published in both fields. This is important because, as we previously suggested, it is one
thing to theorize about connections between the fields, but it is another important step to find empirical evidence of such connections. The prominent roles of Thibault and Slack also point to the importance of mentoring (particularly graduate student mentoring) in collaboration habits, as Thibault was a Ph.D. student of Slack at the University of Alberta.

While we have thus far provided some general description of the main network and connections between sport management and sociology of sport, the portion of the network comprised largely of scholars having published primarily in sport management journals still appears too tightly packed to effectively analyze in detail. Thus, to further break down this main component of 312 actors, we utilized the concept of $k$-cores. This concept involves identifying clusters of vertices in which each vertex has a particular minimum degree. Formally, a $k$-core is defined as “a maximal subnetwork in which each vertex has at least degree $k$ within the subnetwork” (de Nooy et al., 2005, p. 70). For example, a 3-core refers to a portion of the network in which each vertex has a degree of at least three within that portion of the network. By helping to identify relatively dense subnetworks, the concept of the $k$-core helped us find cohesive groups. An analysis of the remaining network of 312 actors revealed three distinct 3-cores, one comprised of four vertices (Graham Cuskelly, Simon Darcy, Russell Hoye, and Tracy Taylor), one comprised of five vertices (Grace Barnes, Michael Farrell, Merrill Melnick, Kathleen Miller, and Don Sabo), and one comprised of 91 vertices. An image of these three 3-cores is provided in Fig. 5. The 3-core comprised of Barnes, Farrell, Melnick, Miller, and Sabo is a group of scholars who have worked at universities located in upstate New York and who had collaborated on research focusing on topics related to the impact of sports participation on high school aged students. These scholars represent the only remaining individuals having published solely in sociology of sport journals at this raised level of connectivity. The group of Cuskelly, Darcy, Hoye, and Taylor, meanwhile, features scholars employed at Australian universities who had collaborated often regarding the topic of volunteer management. The larger group of 91 individuals, however, is primarily comprised of scholars having published in sport management journals.

Because a group of 91 scholars is still a relatively large number to examine in great detail, we further broke this portion of the network down using a higher, 4-core standard of connectivity. Extracting the 4-cores from this collection of 91 scholars left us with a group of 40 individuals, which is illustrated in Fig. 6. This group of scholars is comprised of individuals having published primarily in the field of sport management, which is not surprising considering the higher rates of collaboration in that field compared to sociology of sport. However, it is also interesting to note that institutional affiliation appears to be at least partially responsible for the collaboration pattern. For example, with a few notable exceptions, the majority of the left half of the network illustration is composed of scholars who were either employed by, educated at, or educated by graduates of Ohio State University. Furthermore, linked clusters positioned at the right and bottom of the network are comprised of individuals with connections to the University of Massachusetts at Amherst and the University of Northern Colorado, respectively. Timothy DeSchriveiver, James Gladden, Mark McDonald, Daniel Rascher,
Fig. 5. A 3-core network illustration of collaboration between sport management and sociology of sport scholars (n = 100) from 1987 to 2009.

Fig. 6. A labeled 4-core network illustration of collaboration patterns found in prominent sport management and sociology of sport journals from 1987 to 2009.
and Matthew Robinson appear to serve as influential connectors of these institutional affiliations within the overall network.

4. Conclusion

An important purpose of this research was to empirically explore the relationship between sport management and sociology of sport. In doing so, we heeded calls from scholars in both fields (Nixon, 2002; Quatman & Chelladurai, 2008a) to utilize social network analysis as a lens of inquiry. While the comments of numerous scholars point toward an important relationship between sport management and sociology of sport (Amis & Silk, 2005; Frisby, 2005; Skinner & Edwards, 2005), the current study found empirical evidence regarding the extent of this relationship by examining patterns of coauthorship. This research is limited in that it is primarily descriptive in nature and was intended to extend the more exploratory work of Quatman and Chelladurai (2008b). It is also important to keep in mind that the data presented here provides one particular picture of the network and that other interpretations gathered through different methods are certainly possible. Further, the network of coauthorship is also continually evolving as new scholars enter the field and new collaborations are formed. It is our hope that subsequent research may expand our initial descriptive effort to provide more explanatory work. Future directions for research might include investigation of citation patterns and interviews with actors holding key positions in the network to further understand relational patterns and influences within and between the fields. It is also our hope that this research stimulates further discussion about the future relationship between sport management and sociology of sport. Such discussion should consider not only the potential benefits (e.g., addressing concerns about a lack of diversity in sport management research and about application in sociology of sport research), but also the drawbacks and barriers to increased collaboration. It seems actively researching and discussing the relationship between the fields will continue to be a relevant topic in the coming years, as Dittmore et al. (2007) found sociology of sport to be the primary content area of 17.35 percent of sport management doctoral dissertations from 1999 to 2003, suggesting the future may be ripe for further collaboration.

References


