European Journal for Sport and Society

ISSN: 1613-8171 (Print) 2380-5919 (Online) Journal homepage: https://www.tandfonline.com/loi/ress20

Social networks and gender in organized youth sports

Håvard Bergesen Dalen & Ørnulf Seippel

To cite this article: Håvard Bergesen Dalen & Ørnulf Seippel (2019) Social networks and gender in organized youth sports, European Journal for Sport and Society, 16:4, 323-341, DOI: 10.1080/16138171.2019.1693143

To link to this article: https://doi.org/10.1080/16138171.2019.1693143

Published online: 03 Dec 2019.

EUROPEAN JOURNAL FOR SPORT AND SOCIETY
2019, VOL. 16, NO. 4, 323–341
https://doi.org/10.1080/16138171.2019.1693143

Taylor & Francis
Taylor & Francis Group

ORIGINAL ARTICLE

Social networks and gender in organized youth sports

Håvard Bergesen Dalen and Ørnulf Seippel

Department of Cultural and Social Studies, Norwegian School of Sport Sciences, Oslo, Norway

ABSTRACT

Sports are social, and the sociability of sports (e.g. individual experiences, group cohesion or generalised social trust) and its consequences (e.g. enjoyment, inclusion, or social capital) depends on the social networks in sports teams. In this study we investigate various types of social networks in sports—strong and weak—for boys and girls. We look at the number of social relations in each team (average degree), how centralised and hierarchical teams are, and how each team clusters and consists of subgroups. We hypothesise that: (i) Boys' and girls' teams differ in number of social relations, (ii) Boys' social networks are more hierarchical than girls' networks, and (iii) Girls' teams are more clustered than boys' teams. Network data from 387 adolescent athletes on 30 sports teams in football, handball, cross-country skiing and biathlon were collected with an electronic survey-questionnaire. The results reveal large differences in network structures between teams. We find that the total number of social relations is higher in girls' teams, that there are small gender differences with respect to networks' hierarchies, and that girls' networks cluster more than boys' networks.

KEYWORDS

Social networks; sports; gender; centrality; clustering

Introduction

Sports are social. Individuals report that meeting and socialising with friends are important reasons for taking part in sports (Crane & Temple, 2015), and most people have high expectations towards the social effects of sports participation (Seippel, 2019). For young people, other than family and school, sports are among the most important venues for socialisation (Coleman, 1961; Shakib, Veliz, Dunbar, & Sabo, 2011). At the organisational level, sports participation might lead to social cohesion (Carron & Brawley, 2000), and social relations and trust within sports groups could facilitate both participation and performance in sports (Lusher, Kremer, & Robins, 2014; Macdonald-Wallis, Jago, & Sterne, 2012; Warner, Bowers, & Dixon, 2012). Sports' sociability is, moreover, also supposed to impact larger issues such as social

CONTACT Håvard Bergesen Dalen haavardbd@nih.no Department of Cultural and Social Studies, Norwegian School of Sport Sciences, Postboks 4014, Ullevål Stadion,Oslo 0806, Norway

integration, inclusion and social capital (Ibsen et al., 2019; Nicholson & Hoye, 2008; Østerlund & Seippel, 2013; Seippel, 2006).

Even though we know quite a bit about several of the above issues, a recent review of social network studies in sports reveals consequential shortcomings in this field of research (Wäsche, Dickson, Woll, & Brandes, 2017). Whereas the most common topic addresses the link between social networks and performance, the least-studied topic concerns what actually goes on within sports teams: intra-organisational aspects (Wäsche et al., 2017). Social networks at this basic level of sports are, however, obviously of value both for those participating in sports and the larger social issues linked to sports participation: 'Fundamentally, to be concerned with intra-group relations of a team, a focus on actual relations between team members is important, … ' (Lusher, Robins, & Kremer, 2010, p. 212). In this study we take this challenge literally and ask directly what social networks within sports teams look like.

Those familiar to sports studies will know that sports are often heavily gendered (Theberge, 2000; Wicker, Breuer, & von Hanau, 2012). For social relations and gender, we, stereotypically, tend to presume that girls are emotionally unstable, mild, gentle, understanding and cooperative. They stick together and share strong relations in small networks. Boys, conversely, are presumed to be in emotional control and display competitiveness, aggressiveness and leadership. They have many friends in large networks with visible leaders. Given the gendered nature of sports and the scant attention paid to gender in the social network literature, we find it worthwhile to ask whether the social networks in sports groups vary by gender.

Against this background, we ask three questions: (1) What do the social networks within sports teams look like? (2) What are the differences between girls' and boys' social networks in sports? (3) How do we explain such differences? Answers to these questions would be interesting not only in themselves, but also because the quantities and qualities of such social networks will influence sports' ability to fulfil the social visions assigned to it.

To describe these networks and to look into the gender differences in these networks, we will rely on three of the most familiar concepts within social network theory (Borgatti, Everett, & Johnson, 2013; Prell, 2011; Robins, 2015; Wasserman & Faust, 1994) and recommendations by those promoting social network studies of sports (Lusher et al., 2010; Wäsche et al., 2017; Yim & Kim, 2017). *Average degree* shows us how many social relations persons on each team have on average. *Centralisation* tells us if athletes tend to focus their relations on many or few actors (i.e. whether networks are hierarchical or not). *Clustering* shows how athletes come together and form subgroups within the larger network. We also distinguish between *strong* and *weak* networks on each team to describe how social networks within sports might differ. To explain variation in network characteristics, we rely on theories on gender socialisation and three social network mechanisms—*propensity, reciprocity* and *transitivity*—that might tell us how gender translates into differences in social networks.

To answer our three questions, we first give an overview of previous research on gender differences in girls' and boys' socialisation and social networks and discuss how gender differences might matter for social networks in sports. Next, we present our data, which was collected using a survey of the social networks within 30

Norwegian youth sports teams (387 individuals, 11 girls' teams, 11 boys' teams and 8 mixed-gender teams). We then outline our methods before presenting our results, including: (1) a descriptive section based on visual presentation of our networks, and (2) a section systematically comparing measures of the various networks. We end the article with a discussion of our findings and some reflections on how to proceed with social networks studies within sports organisations.

Gender socialisation, networks and sports

Previous studies on differences in *socialisation* show that, beginning in early childhood, girls are more aware and observant of their social environments than boys. Later in adolescence, girls also place more emphasis on personal relations (Gilligan, 1982). Moreover, research on gender shows how differences in socialisation are more pertinent in some contexts than in others (Ridgeway & Correll, 2004).

Our focus is young athletes in sports *organisations*. Organisations' tendency to produce and reproduce cultural beliefs about gender has been documented (Acker, 1990), and in organised sports, the production of normative gender-based expectations is central. Dworkin and Messner state that 'Besides making money, making gender may be sports' chief function' (Dworkin & Messner, 2002, p. 17). Boys and girls have different expectancies when it comes to achieving competencies and developing identities in sports: Youth actively have to adapt or distance themselves from given gender *identities* (Connell, 2009). Messner (1990, 2011) finds, furthermore, that the adult-organised, gender-separated activities in sports represent a context leading to hegemonic gender-cultures: Masculinities go together with competition, physical strength and skills, while femininities are equated with cooperation, vulnerability and sensitivity. As a result, different gender-cultures could have the potential to influence behaviour and social network structures within sports (Brown & Light, 2012).

Two sets of findings are relevant for this study. First, as to socialisation, there are differences in girls' and boys' social lives: Girls prioritise intimate and close relationships, which makes some of their social networks more demanding (i.e. they require higher investments) and riskier (i.e. they are more vulnerable) than boys' networks (Dindia & Allen, 1992; McDougall & Hymel, 2007). Second, boys tend to have larger and more hierarchical networks than girls' networks, which are more exclusive, intimate, and difficult to access than those of boys (Gest, Davidson, Rulison, Moody, & Welsh, 2007; Pattiselanno, Dijkstra, Steglich, Vollebergh, & Veenstra, 2015).

As Wäsche et al. (2017) point out, the few studies on concrete social networks within sports groups reasonably assume that networks vary in their characteristics (e.g. relevance, cohesiveness, support of performance, inclusivity). Most groups contain other, parallel types of social networks. To link our more developed knowledge of gender differences to our more limited knowledge of the concrete social networks in sports, we start out with one of the most common and applied distinctions in social network studies: *strong* and *weak* networks. In strong networks, relations are of a certain emotional intensity; they require effort and resemble 'best friend' behaviour: personal, intimate, demanding and limited in numbers (Granovetter, 1973; Greenbaum, 1982; Sullivan, 1953; Zimmermann, 2004). Weak social networks (e.g. 'day-to-day'

interaction, sports typically in training sessions) are not as close, emotional and exclusive. They are, nevertheless, often important for athletes' socialisation (Granovetter, 1973; Krackhardt, 1992; Morrison, 2002). That different compositions of weak and strong networks—combinations of bonds, bridges and structural holes—matter for social issues is among the most studied topics in modern social sciences (Burt, 1992, 2005; Putnam, 2000, 2015). In our subsequent outline of network measures, we further link gender and network types to three social characteristics with supporting social mechanisms (Hedström & Ylikoski, 2010).

Average degrees and propensity: do young athletes have many or few friends?

Social network analyses start from the idea that social life is relational (Emirbayer, 1997); an initial social mechanism of *propensity*—a basic tendency to relate to other people—indicates how social networks emerge and develop. Outcomes of this propensity are the relations we measure as representing an *average degree* (i.e. how many social relations members in each team have, on average); this is a first, straightforward step in analyses of social networks (Marin & Wellmann, 2011; Wasserman & Faust, 1994).

Most people have more companions than close friends, and those persons' propensity for establishing relations characteristic of strong networks should be lower than that for weak networks (Hypothesis 1, H1). Whereas boys tend to invest less in each of their social relations, girls are inclined to appreciate closer social networks to which they devote more time and emotion. Girls' more intimate way of interacting does not encourage social propensities to the same degree as that of boys, and we assume that average degree will be higher in boys' than girls' networks (H2). We assume that differences in social structures are much larger between strong and weak networks than between male and female networks. Accordingly, it might be difficult to detect gender differences without also distinguishing strengths of the networks. We will, accordingly, look for gender differences in all networks, but primarily in strong and weak networks, separately. By investigating gender differences in general, we might also speculate about the differences between strong and weak networks. If generally speaking, we expect boys' networks to be larger than girls' networks, we suggest that these gender differences would be smaller in strong networks—where girls' modus operandi is dominant—than in weak networks (H3).

Centralisation and mutuality: friendship distributions and social hierarchies

Centralisation describes how relations are distributed in networks. When more social relations are concentrated in a few actors, the networks are more centralised and hierarchical. The centrality of a social network will depend on a second social mechanism, the reciprocity (i.e. *mutuality*) between individuals. The larger the differences in the number of reciprocal social relations between athletes in a team, the more hierarchy and centralisation exists (Freeman, 1978)

All networks in our analyses are, for methodological reasons, reciprocated (see section on data and methods). We still assume, however, that actors invest more in their

strong networks than in their weak networks (Greco, Holmes, & McKenzie, 2015). Because the weak networks are less intimate and demanding, we expect higher centralisation in weak than in strong networks (H4). Boys are more open to asymmetry in social relationships (Kamphoff, Gill, & Huddleston, 2005; Murcia, Gimeno, & Coll, 2008; Smith & Inder, 1993); girls are more restrictive with whom they interact (Dworkin & Messner, 2002). This variation suggests that girls invest more in their reciprocated relations than boys. All in all, we assume girls to invest more in their networks and, hence, to have less centralised networks than boys (H5). We have no explicit assumptions on how gender differences in centrality might differ between strong and weak networks.

Clustering and transitivity: friendships in subgroups

Clustering happens when actors relate to other actors who already are close—often a friend of a friend—but less so to other actors who are less close. Such groups result from a range of trust: We trust someone (to whom we relate) but distrust others (to whom we do not relate). The outcome is development of tight-knit groups within the larger network.

Strong networks consist of more intimate social relations (i.e. more trust-laden) where only some actors are included. This could happen due to clustering mechanisms. In weak networks, the relations will be more varied because level of trust is less important; the result is a lower level of clustering (H6). We apply the same logic to gender. Girls tend to invest more in their relations which tend to get riskier (Louch, 2000), leading to the establishment of fewer, more selective relations that result in clustering. In boys' relations, less intimacy and risk are involved, so the level of clustering will be lower (H7). When looking at both gender and strength of networks, it is reasonable to assume that girls' disposition towards close and intimate relations leads to larger differences in clustering between boys and girls in strong networks (H8). The general social mechanism behind clustering—*transitivity*—is also measured separately in this study. We expect transitivity to be higher in strong networks and among girls than elsewhere because the development of social relations is more selective in these groups (H9).

Data and methods

Participants and procedures

This study is based on data collected from surveys of 30 teams of athletes representing 387 individuals. Athletes are between 16 and 19 years of age, from 27 different clubs, and eight of 19 counties in Norway. Some of the 30 teams are from the same club; hence, the difference in team and club totals. We define teams as sections within sports clubs: e.g. 17-year-old girls playing handball, or gender-mixed groups aged 16 years who participate in cross-country skiing.

The athletes completed a survey on their participation in sports, their social relations to co-athletes within and outside the team context, and social background. We used portable tablets to collect data before or after a training session, or in other settings (e.g. social gatherings, meetings).

Because the data collection depended on cooperation with coaches of the teams, the sampling of teams started and subsequently developed from the main authors' social networks. We sought team diversity through snowball sampling (e.g. different sports, competitive levels, geography, ages and gender). Data collection started with each team's coach receiving a description of aims and procedures of the study. The coaches then reported the names of athletes they considered as members of their team. These lists were used to construct name rosters (i.e. lists of all athletes in each team) for the network questions in the questionnaire.

The response rate was 74% (i.e. 387 of the 518 athletes who consented to participate in the study completed the survey). Common reasons for athletes' not filling out the survey included absences at the scheduled times and athletes no longer on teams yet present on the name rosters. Finally, 54 athletes declined to participate in the study. We decided to exclude three of the strong networks because they contained too few relations for doing useful analyses. Accordingly, the strong and weak networks have different sample sizes. The sample of the weak networks is 30 (387 athletes) and for strong networks 27 (348 athletes) for the strong network.

In accordance with regulations provided by the Norwegian Centre for Research Data (NSD), *consent* was defined and registered as an athlete's completion of the survey. Respondents could at any time decline to participate or discontinue filling out the survey. Those respondents who were absent at the scheduled times received a reminder of the survey by email the next day. If the survey still was not filled out, a

Table 1. Variables in the study.

	Range	Mean	Max	Min	St. dev	N
Strong networks						
Average degree	0 to (N-1)x2[†]	1.86	4.92	0.29	1.21	27
Average degree, weighted	Average degree/N-1	0.17	0.41	0.02	0.11	27
Centralisation, degree	0 to 1	0.16	0.40	0.05	0.08	27
Clustering	0 to 1	0.12	0.47	0.00	0.16	27
Transitivity	0 to 1	0.49	1.00	0.00	0.43	27
Gender (N)						27
Boys	10					
Girls	9					
Mixed	8					
Size of teams (N)	6 to 20	12.93	20	6	3.57	27
Response rate	37:100	74.5	100	37	20.02	27
Respondents						348
Weak networks						
Average degree	0 to (N-1)x2	7.47	17.23	1.09	4.00	30
Average degree, weighted	Average degree/N-1	0.66	1.43	0.09	0.36	30
Centralisation, degree	0 to 1	0.33	0.47	0.13	0.09	30
Clustering	0 to 1	0.47	0.86	0.00	0.21	30
Transitivity	0 to 1	0.55	1.00	0.00	0.19	30
Gender (N)						30
Boys	11					
Girls	11					
Mixed	8					
Size of teams (N)	6 to 20	12.90	20	6	3.40	30
Response rate	37:100	78.5	100	36.7	19.3	30
Respondents						387

[†]Number of members in the group minus 1 multiplied by two: Each member might have a relation to everyone else in the group, except for oneself.

new e-mail reminder was sent once a week. We registered responses as *missing* if the survey was not filled out after three e-mail reminders (Table 1).

Operationalisation & measures

We study two types of networks in this article. *Strong networks* are close, demanding and intimate, and they are operationalised with a question: 'With which members of the group do you usually share [a] hotel room or sleep next to during away games or competitions?' This points to special occasions away from home, and we assume that the choice of persons with whom our respondents share these experiences point to important social relations; we assume they will choose others they feel close to or care for on this question. Sharing a room is a reciprocal situation that involves at least two persons. Since the purpose is to find strong relations, we only include the relations where actors nominate each other.

There are three difficulties with this question. First, it could be that the selection of roommates is decided by others, e.g. the coach. In most cases, this person would probably select persons who are already close; however, in some cases, this person may want to bring people together who otherwise would not seek each other out. We assume that organising social relations would be more relevant and feasible for younger athletes and that our respondents are old enough to choose roommates by themselves. Second, it could be that linking strong relations to travelling is less relevant for some teams where travelling is not normal. This does not rule out that teams who do not travel do not have strong networks, but the operationalisation could lead to an underrepresentation of strong relations in some of the teams. In an attempt to account for this potential bias, we chose to include only the strong networks that had a minimum of one mutual dyad in the strong network. Three networks did not fulfil this criterion and were thus excluded from the analyses. Third, our operationalisation is sports-specific, and a more general operationalisation could perhaps have given a different view of the strong networks.

Weak networks consist of more easy-going and less committed interactions: 'Who do you usually talk to during breaks in practice sessions?' These situations are reciprocal because they consist of two-sided, verbal, non-demanding, non-intimate communication, where people take turns talking, listening and answering. We assume that our athletes will talk to others with whom they have good social relations and will avoid talking and listening to those whom they dislike. Interactions will be influenced by temporal and spatial factors, and since weak relations are less demanding than strong relations, the sample of potential others is larger. Athletes responded to both these network questions by selecting names from the name rosters; they were free to mark as many team members they wanted on both network questions. Since both sharing a room and talking together in practice are situations that involve at least two persons, we excluded non-mutual dyads, where one person selected the other, but the other person did not respond. Thus, all analysed networks consist of reciprocal, undirected dyads.

We focus on average degree, centralisation and clustering in groups of networks. *Average degree* tells us how many social relations members of each team have on average (Wasserman & Faust, 1994, p. 181). Since the number of social relations will depend on the

size of the team (n) (i.e. the more team-mates, the larger possible relations), we operate with a weighted average degree measure: (average degree divided by (n – 1)).

Centralisation shows the distribution of relations on each team: i.e. whether some members have more relations than others. We use the most common measure of degree centralisation, which builds upon the simple idea that people with many connections are central (Borgatti, 2005; Prell, 2011; Wasserman & Faust, 1994). There is a large body of literature on subgroups and social cohesion in networks, and we have chosen to focus on *clustering*—the degree to which athletes in teams tend to come together and form subgroups in networks (Borgatti et al., 2013, p. 156). Clustering is based on triplets and triangles. A *triplet* consists of three nodes that are connected by either two (*open triplet*) or three (*closed triplet*) ties. A *triangle* consists of three closed triplets, one cantered on each of the nodes. Clustering measures the number of triangles connected to each actor in the network divided by the number of triplets surrounding the actors. The average cluster coefficient for each actor gives the cluster coefficient for the entire network.

To study our suggested social mechanisms directly, we look at *transitivity*. Transitivity tells us the tendency of actor a, who is related to actor b, to be linked to actor c if b is also linked to c. To measure transitivity, the number of observed triangles in the graph are divided by the total number of connected triples of nodes. Since each triangle contributes to three different connected triples in the graph, one cantered at each node of the triangle, the number of triangles is counted three times.

Software. We used R, an open source software, and the add-on package 'sna' to describe, visualise and analyse our data (Butts, 2008; Handcock, Hunter, Butts, Goodreau, & Morris, 2008; R Core Team, 2016).

Sample size and significance levels (SSS). Even though our study has a rather explorative character, we also want to compare network characteristics across groups. Since we only have thirty teams, only a few group differences are significant. To add some information on the potential for statistical significance for our analyses, we simulated what the significance levels would have been on larger samples (i.e. 20 to 1500). These estimations are based on the means and standard deviations found in our analyses comparing groups (e.g. strong and weak, girls versus boys). In Tables 2 and 3, we report the sample sizes needed for a significant finding ($p < .05$), given our empirical results.

Results

We first inspect and interpret the graphic representations of our two types of networks and some basic statistics. Next, we compare and discuss some of these statistical measures more systematically.

From Figure 1, we see that most of the teams have few strong relations. Some teams stand out and have more social relations (i.e. degrees), but only relative to size (and potential social relations). Teams 10, 12 and 25 have the highest weighted average degrees ('AD' in Figure 1): 0.4. Teams 13 and 22 comes next with a weighted average degree of 0.3. In many of the teams, however, we find few strong social relations. Teams 4, 12, 13 and 16 have the most hierarchical structures with a degree centralisation ('C' in Figure 1) between 0.3-0.4. The number of relations between members are more

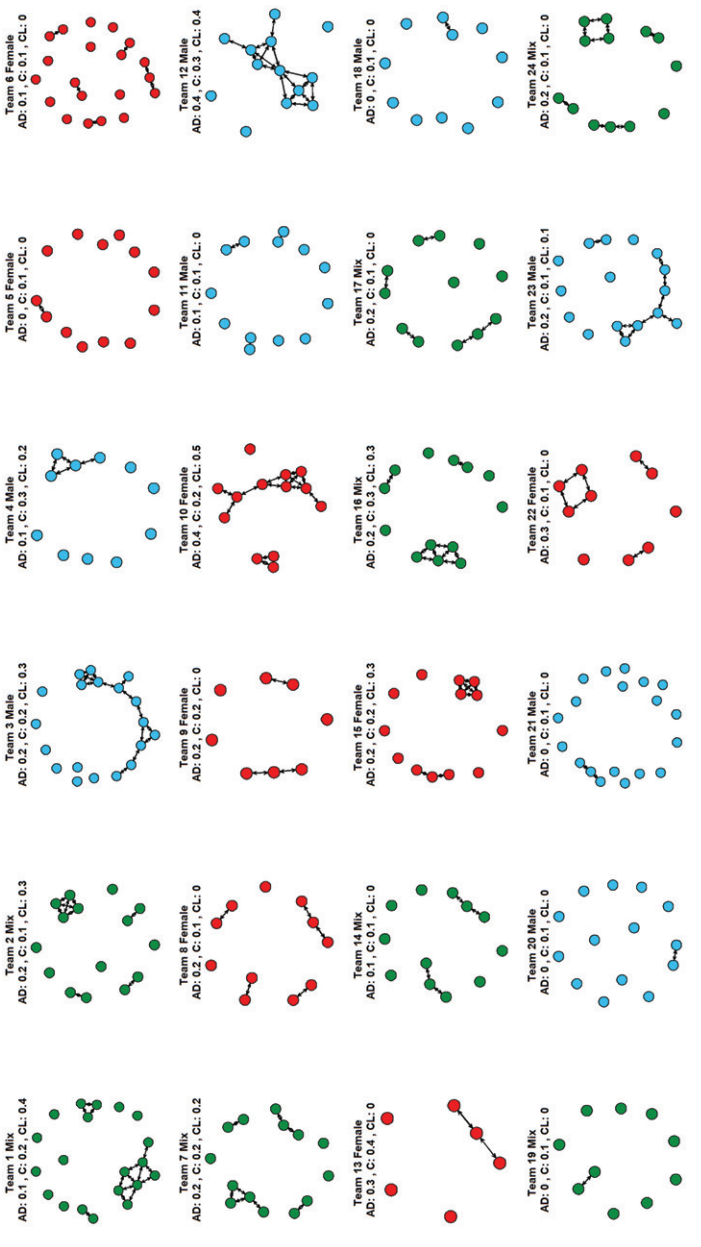

Figure 1. Strong networks. AD: Average degree (weighted); C: Centralisation; CL: Clustering.

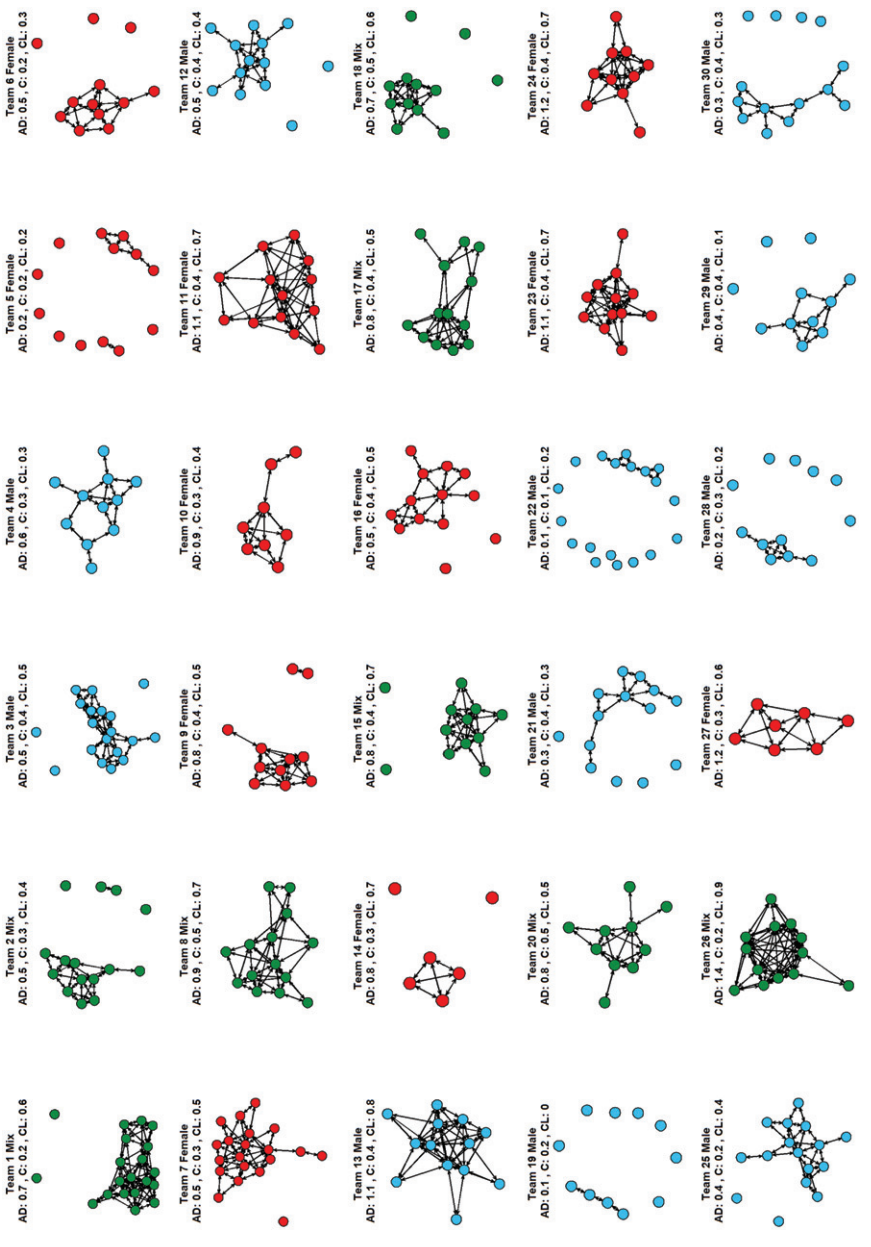

Figure 2. Weak networks. AD: Average degree (weighted); C: Centralisation; CL: Clustering.

consistent in the rest of the teams, as indicated by low degree centrality (0.1 and 0.2), and are, accordingly, less hierarchical. Teams that do not have any clustering are almost totally fragmented and have many isolates (i.e. Teams 5, 6, 13, 18, 19, 20, 21 and 27).

The weak networks in Figure 2 obviously have more relations than the strong networks and, thus, are denser. From mere observation, however, it is difficult to have well-founded opinions on both degrees and centralisation in these networks. Even though they all look dense, there are differences between them when we compare (weighted) average degrees. Average degrees range from a high of 1.4 (Team 26) to 1.2 (Teams 24 and 27); in contrast, Teams 19 and 22 have the lowest scores (0.1).

Next, we see that degree centralisation (Figure 2, 'C') for most teams is somewhat higher than for the strong networks. In general, then, the relations in our weak networks are less evenly distributed than in the strong networks, even if the relations in the weak networks appear more evenly spread out. Although there are also substantive differences when it comes to centralisation of our weak networks, the variation is smaller than that for strong networks. As with centralisation, it is difficult to interpret clustering by looking only at the charts of the networks; the statistics range from 0.9 for Team 26 to 0.8 for Team 13 to zero clustering for Team 19. These statistics show both the complexity and diversity of social structures in sports teams.

At an overall level, we find that the social relations within teams of athletes are both numerous and diverse. First, there is an important distinction between types of networks; some are strong (i.e. closer and more intimate) and some are weak (i.e. more superficial and easy-going). We find that most of our teams contain both strong and weak networks, and that there are far fewer weak social relations than strong social relations. Second, we also see that, within each of these categories, there are large variations. At this first step, therefore, we have identified a diverse and complex set of social structures within sports organisations and described that set of structures through their number of degrees, centrality and clustering structure.

Average degree shows the basic propensity for relations to develop across types of networks and gender. Members of our 30 teams have, on average, 4.81 social links to or from other members of their teams (weighted average degree is 0.43). For weak networks, average degree (weighted) is 0.66, showing that propensity for development of relations is markedly higher than in the strong networks, where the weighted average degree is 0.16 (see Table 2). This finding confirms H1, where we assumed that propensity for establishing relations characteristic of strong networks would be lower than that for weak networks. Furthermore, average degree is higher in girls' teams (0.54) than in boys' teams (0.27), thus rejecting H2, which stated that average degree would be higher in boys' than girls' networks. Yet, this effect is more complex if we check for gender differences in strong and weak networks separately (Table 3). The gender differences are most prominent in the weak networks, where average degree is higher in girls' teams (0.79) than in boys' teams (0.42) supporting H3. Average degree is also higher for girls' than boys' strong networks (0.22 versus 0.13), an indication that females have a higher propensity than males for establishing social networks. This is a refinement of H2, yet it is also a partial confirmation of how the interaction between gender and network strength might play out.

Table 2. Average degree in all networks, comparison of network characteristics by gender, and comparison of networks characteristics by network: means (standard deviations), F-statistics and *p*-values.

		Comparison of teams in all networks: Gender						Comparison of teams: Strength of networks				
	All teams	Girls' teams	Boys' teams	Mix teams	F statistic	*p*-value	SSS	Strong network	Weak network	F statistic	*p*-value	SSS
Average degree	4.81 (4.12)	5.11 (3.88)	3.45 (3.21)	6.22 (5.06)	2.23	.123	120	1.86 (1.21)	7.47 (4.00)	53.65	.000**	<20
Average degree W	0.43 (0.37)	0.54 (0.39)	0.27 (0.26)	0.50 (0.40)	4.00	.028*	60	0.16 (0.11)	0.66 (0.36)	52.97	.000**	<20
Centralisation, degree	0.25 (0.12)	0.26 (0.11)	0.23 (0.13)	0.26 (0.14)	0.30	.740	750	0.16 (0.08)	0.33 (0.09)	54.48	.000**	<20
Clustering	0.31 (0.26)	0.35 (0.27)	0.22 (0.21)	0.37 (0.28)	2.20	.126	120	0.12 (0.16)	0.47 (0.21)	49.25	.000**	<20
Transitivity	0.52 (0.32)	0.51 (0.35)	0.51 (0.32)	0.57 (0.31)	0.12	.881	1110	0.49 (0.43)	0.55 (0.19)	0.488	.489	980

*sign. at $p<.05$; **sign. at $p<.001$.
SSS: approximate sample size giving significance level = .05.

Table 3. Comparison of differences in network characteristics by gender in strong and weak networks respectively: Means (Standard deviations), F-statistics and *p*-value.

	Strong network						Weak network					
	Girls' teams	Boys' teams	Mix teams	F statistic	*p*-value	SSS	Girls' teams	Boys' teams	Mix teams	F statistic	*p*-value	SSS
Average degree	1.99 (1.20)	1.61 (1.52)	2.02 (0.83)	0.26	.774	480	7.66 (3.40)	5.13 (3.48)	10.44 (3.69)	4.9	.02*	30
Average degree W	0.22 (0.12)	0.13 (0.12)	0.16 (0.05)	1.47	.261	90	0.79 (0.36)	0.42 (0.29)	0.83 (0.27)	6.8	.007*	30
Centralisation, degree	0.18 (0.09)	0.15 (0.09)	0.16 (0.05)	0.22	0.800	420	0.33 (0.08)	0.31 (0.10)	0.37 (0.10)	0.62	.549	150
Clustering	0.13 (0.21)	0.10 (0.14)	0.14 (0.15)	0.13	.871	900	0.53 (0.17)	0.33 (0.22)	0.60 (0.15)	5.5	.01*	30
Transitivity	0.39 (0.48)	0.60 (0.40)	0.46 (0.42)	0.54	.592	240	0.61 (0.17)	0.42 (0.20)	0.65 (0.11)	5	.02*	30

* sign. at $p<.05$.
SSS: approximate sample size giving significance level = .05.

Table 2 also shows that degree centralisation, as expected (H4), is higher in weak networks than in strong networks (0.33 vs. 0.16), meaning that relations are more unevenly distributed in weak than strong networks. In terms of gender, our expectations (H5) of boys' networks being more hierarchical than girls' networks is not supported; though the difference is small overall, girls' networks (0.26) are more centralised than boys' networks (0.23). Looking at gender differences and whether they depend on strength of networks, we find (Table 3) that there are no clear gender differences for strong networks: Girls' social structures are more hierarchical than boys' social structures (0.18 versus 0.15). From these statistics, it appears as if the gender differences assumed in our theory are most significant in the weak networks. Specific-gender socialised networks are most prominent in the most common social interactions in athletes' daily lives at practice. Otherwise, gender differences are less distinct.

For our sixth hypothesis, we assumed that strong networks would be more clustered than the weak networks. Results in Table 2 show, contrary to our assumption (H6), that weak networks cluster more than strong networks: 0.47 versus 0.12. Girls' teams are more clustered than boys' teams (0.35 versus 0.22), supporting H7. Contrary to our expectations in H8, we see in Table 3 that the difference in clustering between girls' and boys' teams is largest in the weak networks: 0.53 versus 0.33. There is close to no difference in clustering between the strong networks. The tendency to transitivity is similar in both strong and weak relations and in both girls' and boys' networks (not supporting H9).

Our sample is relatively small ($n = 30$ for weak networks, $n = 27$ for strong networks). The Approximate Sample Size (SSS) in Tables 2 and 3 indicates the estimated sample size (based on the observed values) that will give findings at significance level 0.05. The SSS is, in most observed values, higher than 30; therefore, even though several findings are statistically significant, we have not commented on statistical significance. Our endeavour at this stage is more exploratory—to investigate what the social structures of sports teams look like and how they tend to have gendered patterns—rather than giving final and generalisable answers.

Discussions and conclusions

The first aim of this study has been to describe the social relations between young athletes: What do the social networks of various sports teams look like? The second aim has been to investigate how and why these networks might differ between girls and boys.

Our social networks were described through three measures. We looked at how many social relations members have with each other in each team (i.e. average degree); how these relations are distributed and how centralised and hierarchic the networks in each team are (i.e. degree of centralisation), and the extent to which sports networks are clustered. Moreover, assuming there are different types of social relations inside sports teams—some more serious, close and demanding, some less so—we chose to differentiate between strong and weak networks. Our study, then, consisted of (i) a description of the social networks within 30 Norwegian youth sports

teams based on these measures and network types and (ii) an analysis of how and why networks differ by gender.

On a first, descriptive level, we find that the sociability of sports teams is salient and obviously matters for many people, but also that it differs very much between teams and based on strength of network and gender (see Figures 1 and 2). In the weak networks, all athletes are at least linked to one co-athlete, and in some clubs these weak links are very dense (i.e. maximum 17 links per member); on average, an athlete has 7 to 8 weak social relations. For the strong networks, most teams are much more loosely connected, and many athletes are isolates who seem to lack intimate relations to their co-athletes; other teams have more sustainable, stronger social networks. In short: All teams contain at least a minimum of sociability; some teams are tightly and densely structured, and most are somewhere in between. This implies that sports teams probably play very different roles when it comes to fulfilling the many social visions ascribed to them: how participation is experienced, how inclusive they are, how structures contribute to performance and how they are conducive to social capital. We also find significant differences in centralisation: the weak networks are more centralised than the strong networks and girls' networks are slightly more centralised than boys' networks. As to clustering, the overall impression is that weak networks are more clustered than strong networks and girls' weak networks are more clustered than boys' weak networks.

As background for the investigation of gender differences, we presented some common stereotypes about girls and boys (e.g. girls being more intimate, close and committed in their social relations than boys). Next, we linked these assumptions to our network measures—average degrees, centralisation and clustering—and asked whether boys' teams had more social relations (because they invest less in each relationship), were more hierarchical (because they engage in their relations without necessarily expecting them to be reciprocated) and were less clustered (because they had more superficial relations).

Our analyses provide a more complex and—in part—contrasting picture. In terms of number of social relations (average degree, weighted) girls have more social relations than boys. Controlling for strength of the networks, we find that most of these gender differences are found in the weak networks, where girls are clearly more social (quantitatively) than boys. We assumed that socialisation makes girls' social orientations more intimate, caring and costly than those of boys, and we expected boys to have a higher propensity for establishing social relations than girls because they put less into their social relations. Given the opposite results (i.e. girls have more easy-going social relations), we must adjust our theoretical assumptions. It could be that girls' propensity (i.e. a yearning for social relations) is higher than we assumed—so much higher than boys' propensity that it dominates the cost-dimension, which we overvalued: There is more to the driving force of propensity than the cost of establishing failed social relations. Smaller differences in the strong networks could result from the fact that such close social relations are so important and existential that they are less vulnerable to the social propensity-inclinations and less concerned with costs and, hence, less different.

For centrality, we assumed that gender socialisation would lead girls to invest more in reciprocated relations than boys and, accordingly, that boys' social networks would be more centralised and hierarchical than those of girls. We do not find this tendency in either the strong or weak networks.

For subgroups, we assumed that girls' more selective approach to their social partners would lead to more clustering, especially in strong networks. We found that girls' networks do cluster more than those of boys. There are clear differences when controlling for strength of networks: There is more clustering both in girls' strong and weak networks, but the difference with boys' clustering is largest in the weak networks. The first finding (i.e. that girls are more selective and their networks, hence, more clustered, is in line with our assumptions: Socialisation leads girls to be careful. Why is the difference in clustering between girls' and boys' teams largest in the weak networks, where girls also have a higher propensity for social relations? The reason is probably related to the positive relationship between propensity for social relations and clustering; thus, when girls and boys develop networks, girls' networks will generally consist of more relations and be more clustered. In addition, because the propensity for social relations is higher in weak than in strong networks, the difference in clustering become most visible between girls' and boys' weak networks.

All in all, we have provided an intriguing though complex picture of what social networks might look like in teams within sports clubs, how they vary by gender, and what might help explain these findings. Our study has, as a first effort to grasp the social structures of grassroots youth sports, several obvious shortcomings. In future studies, there are many opportunities for improvement.

First, when conducting an original empirical study of this type, we have focussed exclusively on the network level, but future studies could and should include more individual attributes. It is possible to focus on other contexts: different nations or regions, or urban versus rural clubs. Laterally, we could compare sports teams to other types of organisations. A special case for study would be whether social relations outside sports are decisive for relations within sports: Do social networks within sports result from attending the same schools rather than from taking part in sports?

Second, our data do not give the opportunity to answer the questions of how variation in network structures impacts the most common questions within the social-network-organization discourse. Future research should look at how individual experiences, group cohesion, performance levels and social capital affect outcomes.

Third, even operating on the network level as we have, we could have included other measures. For example, an interesting discussion of which measure of centrality is most useful (Borgatti, 2005), within a wider spectrum of such measures, could have revealed different stories about centralisation.

Fourth, other types of operationalizations are possible. We chose to apply two of the most-used types of social networks (i.e. weak and strong) and two corollary questions to operationalise them. We could have opted for other types or nuances and different operationalizations. Especially our operationalisation of the strong networks could be questioned, and an operationalisation of strong networks as used by Lusher et al. (2014) could have yielded different results.

Fifth, there is the question of the sample. On the one hand, these types of data collection are costly and complex, and they will probably always be smaller and more convenient than optimal because such studies usually make contact through a club and a coach to access the players and the information (i.e. names) that are prerequisites for network studies. This approach will inevitably result in a mixture of strategic sampling and snowball sampling. We think we have achieved a sound variation in our sample, but it is a convenience sample that could be improved if more resources were available. What is controlled and a matter of choice, however, is the composition of the samples (e.g. gender, sports, level of competition).

Sixth, there are more social mechanisms (e.g. similarity) for which we could control, both as to social networks and as to individual attributes explaining network structures. Finally, the routine challenge (Emirbayer & Goodwin, 1994) of a better understanding of content, meaning and action—not only structures—is also valid for this study: How do boys and girls actually understand their social networks within sports?

Disclosure statement

No potential conflict of interest was reported by the authors.

References

Acker, J. (1990). Hierarchies, jobs. *Gender & Society*, *4*, 139–158. doi:10.1177/089124390004002002

Borgatti, S. P. (2005). Centrality and network flow. *Social Networks*, *27*, 55–71. doi:10.1016/j.socnet.2004.11.008

Borgatti, S. P., Everett, M. G., & Johnson, J. C. (2013). *Analyzing social networks*. London: SAGE Publications.

Brown, S., & Light, R. L. (2012). Women's sport leadership styles as the result of interaction between feminine and masculine approaches. *Asia-Pacific Journal of Health, Sport and Physical Education*, *3*, 185–198. doi:10.1080/18377122.2012.721723

Burt, R. (1992). *Structural holes. The social structure of competition*. Cambridge, MA: Harvard University Press.

Burt, R. (2005). *Brokerage & closure. An introduction to social capital*. Oxford: Oxford University Press.

Butts, C. T. (2008). Social network analysis with sna. *Journal of Statistical Software*, *24*, 1–51. doi:10.18637/jss.v024.i06

Carron, A. V., & Brawley, L. R. (2000). Cohesion: Conceptual and measurement issues. *Small Group Research*, *31*, 89–106. doi:10.1177/104649640003100105

Coleman, J. S. (1961). *The adolescent society*. New York: Free Press.

Connell, R. (2009). *Gender*. Cambridge, UK: Polity Press.

Crane, J., & Temple, V. (2015). A systematic review of dropout from organized sport among children and youth. *European Physical Education Review*, *21*, 114–131. doi:10.1177/1356336X14555294

Dindia, K., & Allen, M. (1992). Sex differences in self-disclosure: A meta-analysis. *Psychological Bulletin*, *112*, 106–124. doi:10.1037/0033-2909.112.1.106

Dworkin, S. L., Messner, M. A. (2002). Just do … what? Sport, bodies, gender. In A. Scraton & A. Flintoff (Eds.), *Gender and sport: A reader* (pp. 17–29). London: Routledge.

Emirbayer, M. (1997). Manifesto for a relational sociology. *American Journal of Sociology*, *103*, 281–317. doi:10.1086/231209

Emirbayer, M., & Goodwin, J. (1994). Network analysis, culture, and the problem of agency. *American Journal of Sociology*, *99*, 1411–1454. doi:10.1086/230450

Freeman, L.C. (1978). Centrality in social networks conceptual clarification. *Social Networks*, *1*, 215–239. doi:10.1016/0378-8733(78)90021-7

Gest, S. D., Davidson, A. J., Rulison, K. L., Moody, J., & Welsh, J. A. (2007). Features of groups and status hierarchies in girls' and boys' early adolescent peer networks. *New Directions for Child and Adolescent Development*, *2007*, 43–60. doi:10.1002/cd.200

Gilligan, C. (1982). *In a different voice*. Cambridge, Massachussets: Harvard University Press.

Granovetter, M. S. (1973). The strength of weak ties. *American Journal of Sociology*, *78*, 1360–1380. doi:10.1086/225469

Greco, S., Holmes, M., & McKenzie, J. (2015). Friendship and happiness from a sociological perspective. In M. Demir (Ed.), *Friendship and happiness: Across the life-span and cultures* (pp. 19–35). Dordrecht: Springer Netherlands.

Greenbaum, S. D. (1982). Bridging ties at the neighborhood level. *Social Networks*, *4*, 367–384. doi:10.1016/0378-8733(82)90019-3

Handcock, M. S., Hunter, D. R., Butts, C. T., Goodreau, S. M., & Morris, M. (2008). Statnet: Software tools for the representation, visualization, analysis and simulation of network data. *Journal of Statistical Software*, *24*, 1548–7660. doi:10.18637/jss.v024.i01

Hedström, P., & Ylikoski, P. (2010). Causal mechanisms in the social sciences. *Annual Review of Sociology*, *36*, 49–67. doi:10.1146/annurev.soc.012809.102632

Ibsen, B., Elmose-Østerlund, K., Feiler, S., Breuer, C., Seippel, Ø., Van der Roest, J.-W., & Scheerder, J. (2019). Democratic participation in voluntary associations: A multilevel analysis of sports clubs in Europe. *International Journal of Voluntary and Nonprofit Organizations*, *30*, 1–16.

Kamphoff, C. S., Gill, D. L., & Huddleston, S. (2005). Jealousy in sport: Exploring jealousy's relationship to cohesion. *Journal of Applied Sport Psychology*, *17*, 290–305. doi:10.1080/10413200500313578

Krackhardt, D. (1992). The strength of strong ties. In R. G. Eccles & N. Nohria, (Eds.), *Networks and organizations: Structure, form and action* (pp. 216–239). Boston: Harvard Business School Press.

Louch, H. (2000). Personal network integration: transitivity and homophily in strong-tie relations. *Social Networks*, *22*, 45–64. doi:10.1016/S0378-8733(00)00015-0

Lusher, D., Kremer, P., & Robins, G. (2014). Cooperative and competitive structures of trust relations in teams. *Small Group Research*, *45*, 3–36. doi:10.1177/1046496413510362

Lusher, D., Robins, G., & Kremer, P. (2010). The application of social network analysis to team sports. *Measurement in Physical Education and Exercise Science*, *14*, 211–224. doi:10.1080/1091367X.2010.495559

Macdonald-Wallis, K., Jago, R., & Sterne, J. A. C. (2012). Social network analysis of childhood and youth physical activity: A systematic review. *American Journal of Preventive Medicine*, *43*, 636–642. doi:10.1016/j.amepre.2012.08.021

Marin, A., & Wellmann, B. (2011). Social network analysis: An introduction. In J. Scott & P. J. Carrington (Eds.), *The SAGE Handbook of social network analysis* (pp. 11–25). London: SAGE Publications.

McDougall, P., & Hymel, S. (2007). Same-gender versus cross-gender friendship conceptions: Similar or different? *Merrill-Palmer Quarterly*, *53*, 347–380. doi:10.1353/mpq.2007.0018

Messner, M. (1990). Boyhood, organized sports, and the construction of masculinities. *Journal of Contemporary Ethnography*, *18*, 416–444. doi:10.1177/089124190018004003

Messner, M. (2011). Gender ideologies, youth sports, and the production of soft essentialism. *Sociology of Sport Journal*, *28*, 151–170. doi:10.1123/ssj.28.2.151

Morrison, E. W. (2002). Newcomers' relationships: The role of social network ties during socialization. *Academy of Management Journal*, *45*, 1149–1160. doi:10.2307/3069430

Murcia, J. A. M., Gimeno, E. C., & Coll, D. G.-C. (2008). Relationships among goal orientations, motivational climate and flow in adolescent athletes: Differences by gender. *The Spanish Journal of Psychology*, *11*, 181–191. doi:10.1017/S1138741600004224

Nicholson, M., & Hoye, R. (Eds.). (2008). *Sport and social capital*. Amsterdam: Elsevier.

Østerlund, K., & Seippel, Ø. (2013). Does membership in civil society organizations foster social integration? The case of Danish voluntary sport organizations. *Journal of Civil Society*, *9*, 391–413. doi:10.1080/17448689.2013.847548

Pattiselanno, K., Dijkstra, J. K., Steglich, C., Vollebergh, W., & Veenstra, R. (2015). Structure matters: The role of clique hierarchy in the relationship between adolescent social status and aggression and prosociality. *Journal of Youth and Adolescence*, *44*, 2257–2274. doi:10.1007/s10964-015-0310-4

Prell, C. (2011). *Social network analysis: History, theory and methodology*. London: SAGE Publications.

Putnam, R. D. (2000). *Bowling alone: The collapse and revival of American community*. New York: Simon & Schuster.

Putnam, R. D. (2015). *Our kids. The American dream in crisis*. New York: Simon & Schuster.

R Core Team. (2016). R: A language and environment for statistical computing. R Foundation for statistical computing, Vienna, Austria. 2014. Retrieved from

Ridgeway, C. L., & Correll, S. J. (2004). Unpacking the gender system: A theoretical perspective on gender beliefs and social relations. *Gender & Society*, *18*, 510–531. doi:10.1177/0891243204265269

Robins, G. (2015). *Doing social network research*. London: Sage.

Seippel, Ø. (2006). Sport and social capital. *Acta Sociologica*, *49*, 169–183. doi:10.1177/0001699306064771

Seippel, Ø. (2019). Do sports matter to people? A cross-national multilevel study. *Sport in Society*, *22*, 327–341. doi:10.1080/17430437.2018.1490263

Shakib, S., Veliz, P., Dunbar, M. D., & Sabo, D. (2011). Athletics as a source for social status among youth: Examining variation by gender, race/ethnicity, and socioeconomic status. *Sociology of Sport Journal*, *28*, 303–328. doi:10.1123/ssj.28.3.303

Smith, A. B., & Inder, P. M. (1993). Social interaction in same and cross gender preschool peer groups: A participant observation study. *Educational Psychology*, *13*, 29–42. doi:10.1080/0144341930130104

Sullivan, H. S. (1953). *The interpersonal theory of psychiatry*. New York: Norton.

Theberge, N. (2000). Gender and sport. In J. Coakley & E. Dunning (Eds.), *Handbook of sport studies*. London: Sage.

Warner, S., Bowers, M. T., & Dixon, M. A. (2012). Team dynamics: A social network perspective. *Journal of Sport Management*, *26*, 53–66. doi:10.1123/jsm.26.1.53

Wäsche, H., Dickson, G., Woll, A., & Brandes, U. (2017). Social network analysis in sport research: An emerging paradigm. *European Journal for Sport and Society*, *14*, 138–165. doi:10.1080/16138171.2017.1318198

Wasserman, S., & Faust, K. (1994). *Social network analysis: Methods and applications*. Cambridge: Cambridge University Press.

Wicker, P., Breuer, C., & von Hanau, T. (2012). Gender effects on organizational problems – evidence from non-profit sports clubs in Germany. *Sex Roles*, *66*, 105–116. doi:10.1007/s11199-011-0064-8

Yim, B. H., & Kim, K.-S. (2017). Utilizing social network analysis in social sciences in sport. *Asia Pacific Journal of Sport and Social Science*, *6*, 177–196. doi:10.1080/21640599.2016.1271534

Zimmermann, P. (2004). Attachment representations and characteristics of friendship relations during adolescence. *Journal of Experimental Child Psychology*, *88*, 83–101. doi:10.1016/j.jecp.2004.02.002