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Bridging gaps to promote networked care between teams and groups in health delivery systems: a systematic review of non-health literature

Jeffrey Braithwaite

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Australian Institute of Health Innovation, Centre for Healthcare Resilience and Implementation Science, Macquarie University, Sydney, New South Wales, Australia

Correspondence to
Professor Jeffrey Braithwaite;
jeffrey.braithwaite@mq.edu.au

ABSTRACT

Objectives: To assess non-health literature, identify key strategies in promoting more networked teams and groups, apply external ideas to healthcare, and build a model based on these strategies.

Design: A systematic review of the literature outside of healthcare.

Method: Searches guided by Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) of ABI/INFORM Global, CINAHL, IBSS, MEDLINE and Psychinfo databases following a mind-mapping exercise generating key terms centred on the core construct of gaps across organisational social structures that uncovered 842 empirical articles of which 116 met the inclusion criteria. Data extraction and content analysis via data mining techniques were performed on these articles.

Results: The research involved subjects in 40 countries, with 32 studies enrolling participants in multiple countries. There were 40 studies conducted wholly or partly in the USA, 46 wholly or partly in continental Europe, 29 wholly or partly in Asia and 12 wholly or partly in Russia or Russian federated countries. Methods employed included 30 mixed or triangulated social science study designs, 39 qualitative studies, 13 experimental studies and 34 questionnaire-based studies, where the latter was mostly to gather data for social network analyses. Four recurring factors underpin a model for promoting networked behaviours and fortifying cross-group cooperation: appreciating the characteristics and *nature of gaps* between groups; using the leverage of *boundary-spanners* to bridge two or more groups; applying various mechanisms to stimulate *interactive relationships*; and mobilising those who can exert positive *external influences* to promote connections while minimising the impact of those who exacerbate divides.

Conclusions: The literature assessed is rich and varied. An evidence-oriented model and strategies for promoting more networked systems are now available for application to healthcare. While caution needs to be exercised in translating outside ideas and studies, drawing on non-health ideas is useful in providing insights into other sectors.

Strengths and limitations of this study

- This is a large systematic review of the non-health literature applying strategies originating outside of healthcare to counterbalance healthcare insularity and for learning to develop more connected, networked systems of care.
- It creates a model for facilitating networks.
- It provides strategies stakeholders can adopt to increase networked collaboration between and across teams and groups.
- Findings need to be interpreted with caution, as always when applying ideas and evidence from other sectors to healthcare.

BACKGROUND
Introduction

Healthcare has been criticised, implicitly or explicitly, for being inward-looking.[1–3] There are exceptions to this general rule. Attempting to apply aviation knowledge to medicine,[4–6] generic quality-improvement methods to health systems[7 8] and basic science techniques to medical research[9] are cases in point. A failure to resort to ideas, theories or evidence from outside the sector can lead to claims of tunnel vision, blinkeredness or insularity. Those who have difficulty exploiting external solutions may be unduly resistant, merely uninformed or using defensive routines[10 11] aimed to protect the status quo or to save face in the light of external evidence that could otherwise alter their practice or worldview.[12] Recent work argues for the importance of going outside healthcare to understand the mechanics of its networking.[13] Relatively new ideas have been imported from or influenced by other sectors, including interprofessionalism[14 15] and its close cousin multidisciplinarity,[16 17] systems thinking,[12 18] 'small world'

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networks,[19] culture-change models[20] and teamwork[21][22] (eg, through virtual teams[23–25]).

There are many examples from sociology or systems theory which can be drawn on to understand networking, or more broadly, to promote collaborative concepts. Table 1 provides definitional guidance for the key terms used. Of particular interest, Weick's original idea of tight and loose coupling,[26][27] for instance, raises attention to the relative flexibility or rigidity of organisational structures. To understand coupling, Weick hypothesised that events, departments, groups and other organisational entities can be tightly bound or more loosely connected depending on the cultural characteristics of the organisation, the technical rules imposed on people and the extent to which those in authority attempted to induce tightness or looseness. In tightly coupled organisations, the tendency is to be rules-governed, prescriptive and to operationalise control mechanisms. In loosely coupled organisations, people have more scope to exercise discretion and may be relatively autonomous decisionmakers.

Taking a different but related track, early network theorist Granovetter[28] examined the ties between people in networks. In social network theory, people are depicted as nodes and the connections between them as lines between the nodes. People can be connected directly (one degree of separation between them) or less directly (two or more degrees of separation between them). Those with strong ties between them are those who are typically connected closely, who know each other within a group, or who have first order relationships. They directly know, relate to and deal with each other. Weakly tied people are less directly connected. They are acquaintances, those on 'nodding' terms, and friends-of-friends—those who can be sought out for help or information beyond people's immediate social circles.

The problem and attempts to induce more networked behaviours to date

What is common among the competing theoretical paradigms, such as Weick's and Granovetter's hypotheses, is the degrees of connectivity or extent of fragmentation between networking or potentially networking groups. Effective communication and relations across organisational teams and groups are by no means universal. In healthcare, the professional divides,[29][30] entrenched subcultures,[31][32] organisational silos,[33][34] isolated cliques, uncommunicative teams, poorly relating groups, and disconnected wards, units and departments[35][36] are often the norm. Unfortunately, examples of effectively networked or collaborative care in health settings, such as Wagner's chronic care model,[37][38] the patient-centred medical home[39][40] and local initiatives, such as the collaborative care model for Alzheimer disease,[41] are relatively isolated instances, but exemplify how more joined-up behaviours can be encouraged.

The popular response in health settings to address this type of problem, involving attempts to induce

greater levels of networking, has been to study, promote or induce teams or microsystems,[42] fortify within-group cooperation,[43] nurture better internal relationships[44] or promote productive, trusting interactions.[45] There have also been attempts in some health sectors to encourage clinical networks across delivery systems.[46–49] However, progress has been slow. There remain many striking examples of fragmented healthcare organisations and systems,[50–52] poorly performing services[53] or dysfunctional cultures.[54][55] Few, if any, healthcare policymakers, managers, clinicians or researchers have failed to experience these. Fragmentation is also evident in sectors outside healthcare, but there are also studies of interconnected systems and studies of networking from these sectors. These can inform the thinking of healthcare insiders, and are the focus of this paper.

Aims

To apply learning from other sectors to healthcare, the paper takes a specific focal point. Intensifying efforts to create better internal teamwork does not logically improve *cross*-team behaviours. Building connected systems of care is likely to need greater understanding of behaviour at the edges of, and gaps between, teams and groups, rather than how well they work internally. The legendary quality improvement thinker W Edwards Deming's ninth point in his 14 key principles for organisational transformation in *Out of the crisis*[7] is the exhortation to "break down barriers between departments". The aim, therefore, is to figure out how to join groups together collaboratively across pre-existing divides and barriers. There are sporadic examples of how to do this in healthcare.[13][35][56][57] However, this is a wicked problem, and more work is needed.

A recent review of between-group behaviour in healthcare identified 13 studies,[35] concluding that fragmented systems and services are prevalent, and that individuals with roles that promote interaction across teams and groups, such as clinical opinion leaders or those with high levels of sociability, represent potential forces in forging greater levels of connectivity. In order to document a wider range of ideas and possibilities, this review builds on that work and the research it synthesised by examining non-health literature on gaps, disconnections, weak ties, social spaces and structural holes between teams and groups on the one hand, and the edges and boundaries of these on the other. The aim is to identify and apply lessons on cross-group activities from outside the health sector. Following this, a model will be developed to provide insights into how to promote more joined-up, networked care.

METHODS
Literature search
Systematic review procedures adopted conform to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines[58] and have been

Table 1 Definitions

Term	Definition
Absent tie	Where individuals or groups are in close proximity but remain disconnected, or have the opportunity to connect, but do not do so
Between-group behaviour	The activities and psychological relationships across two or more groups—closely related to the concept of intergroup dynamics
Boundaries	The perimeters of a social entity (SE), differentiating those who belong and those who do not. Language, dress, and rituals are often used to create boundaries
Boundary spanners	People who bridge two or more SEs, enabling exchange of information or communication
Bridges	Those who span otherwise isolated SEs
Cliques	Small inclusive circles of people with shared interests, who systematically exclude outsiders
Collaboration	The act of working together over time to share information, knowledge or resources in order to achieve mutual aims, goals or objectives
Collaboration in healthcare	This can be construed at several levels: cooperative, joint effort manifesting across departments, wards and units; across professional groupings of doctors, nurses and allied health professionals; across relationships between clinicians, managers and policymakers; across healthcare organisations or sectors; or across macro, meso and micro components of the system
Connectors	People linking two or more SEs
Cooperation	Working together to meet mutual aims in a more short term superficial manner than collaboration
Cosmopolites	Persons with wide-ranging interests and interactions
Coupling	Links, connections or pairings between individuals or groups; these can be tight or loose
Degrees of separation	The number of connections between any two people. The famous phrase 'six degrees of separation' refers to the theory that any person on earth is no more than six steps away from any other person
Disconnections	Disjunctions, breaks, inconsistencies or disparities between two or more SEs
Edges	The borders or outside limits of an SE
Fragmentation	The splintering or breaking up of groups often on the basis of politics, or differing cultural or subcultural perspectives
Gaps	The spaces, breaks or openings between two or more SEs
Groups	Individuals conjoined or located proximally, or considered or classed together as an SE, typically sharing a common identity and creating mutually recognised obligations
Identity	The group's or person's conceptualisations of their individuality, affiliations or characteristics
Influence	The capacity or actuality of exercising power in order to shape, control or manipulate something or someone
Integration	Where individual and group effort is coordinated, and the usual barriers to collaboration or cooperation have been reduced
Interactive relationships	The members of two or more SEs interfacing, mingling or exchanging information
Joined-up healthcare	Collaborative, integrated efforts across formal or informal organisational or service boundaries to thereby tackle shared issues
Liaisons	People who shuttle between SEs, enabling relations and communication
Loose coupling	The somewhat detached or distant connections, links and relationships between individuals and groups. When social entities are loosely coupled there is said to be a degree of flexibility
Mavens	Folks with a wide circle of contacts across multiple SEs
Microsystems	Small-scale ecological components of a larger system within which people work, interact and network
Networking, social	The practice of extending connections or relationships among pre-existing or new, or weak or strong ties in social systems
Networks, social	Sets of connections, relationships or ties among individuals. Social structures comprising nodes representing individuals or groups describing relationships and flows of information between them
Opinion leaders	Influential individuals to whom others turn to for advice or information
Organisational silo	A bounded organisational arrangement with limited interaction with other groups, units or divisions
Reciprocity theory	People will respond in kind to others. Positive examples are gift exchange or returning acts of kindness with kindness; negative examples are retaliation or returning hurtful acts equivalently
Social identity theory	An account suggesting that people's self-concept is grounded in their views about their membership of one or more social groups. This is reflected in how they behave, how they identify with others and understand themselves
Social networks	A group of interconnected people who exchange information, resources, contacts or experience
Social space	The gaps, holes or weak ties between SEs
Strong tie	Where two or more individuals or groups are directly connected in a close relationship

Continued

Table 1 Continued

Term	Definition
Structural holes	Interpersonal gaps in networks; in Burt's theory, they provide opportunities for players in competition to bridge the discontinuities and create social capital or improved relationships with other players
Subculture	Within a larger culture, a smaller group differentiating from the larger host culture with distinguishable beliefs, interests or behaviours
Teams	People coworking interdependently, sharing accountabilities, meeting the needs of their customers and themselves by purposefully accomplishing goals. When performing effectively, teams are seen as performing such that their outcomes are greater than the sum of the performance of individual members
Teamwork	The combined activities of a group of people working effectively toward common ends
Tertius gaudens	"The third who enjoys": the party who benefits from competing or quarrelling with others
Tertius iungens	"The third who joins": the party who connects network members
Tie	Connections between people (individuals or groups) such that they can readily share or transmit information, culture, goodwill or enmity
Tight coupling	SEs which are closely adjacent or tightly connected to each other. Tightly coupled groups are typically seen as rules-bound and prescriptive
Tit-for-tat	The way players respond to others, particularly in game theory, with equivalent retaliation
Trust	Faith, belief or confidence in the reliability, truth, capacity or ability of someone
Weak ties	Those with whom people are relatively poorly connected, for example, acquaintances

documented elsewhere.[13] [59] A comprehensive literature review aiming to assess papers published until June 2012 was conducted by interrogating the ABI/INFORM Global, CINAHL, IBSS, MEDLINE and Psychinfo electronic literature databases since their inception, closely following a published guide to systematic reviews in healthcare.[59] By utilising brainstorming techniques, a mind-mapping exercise, previous research,[13] and a preliminary review of the literature, the following search terms were generated: 'social boundar*', 'group boundar*', 'network boundar*', 'social network boundar*', 'social group boundar*', 'liminal boundar*', 'social edge*', 'group edge*', 'network edge*', 'social network edge*', 'social group edge*', 'liminal edge*', 'social space*', 'group space*', 'network space*', 'social network space*', 'social hole*' and 'structural hole*'. Selection criteria restricted the target references, depending on database, to 'human', 'English language' and 'scholarly journals'.[13]

Literature review

Citations, abstracts and complete references that where available were downloaded into Endnote X5, a bibliographic software management package. Of the 9025 references found in the search, 7908 remained after duplicates were removed and these were narrowed further to 842 research articles by excluding non-empirical work. All empirical research designs were included to provide an overview of the types of studies being conducted. The sample of references was further refined by subjecting these to scrutiny by three independent researchers. The articles had to fulfil three criteria: including work specifically related to cross-social groupings and clusters (eg, teams, groups and networks) in social spaces (eg, structural holes, weak ties and

gaps), at the borders (eg, edges, boundaries) and in specific places (eg, in industries, organisations, communities, schools and churches). All papers were assessed against the inclusion criteria by two reviewers (JT and DD initially, and in a second round, by JB and DM, see acknowledgements), who assessed study quality and met to reconcile any disagreements, discussing these until consensus was reached.

Literature analysis

The remaining references which met the inclusion criteria (n=219) were then further restricted to 2005-June 2012, emphasising relative recency. Apart from some older papers that were considered key to the topic area, two papers were added via snowballing (n=129), and the sample separated into health (n=13) and non-health (n=116) subsets. The review of the health literature was published[35]; the systematically-oriented review of the non-health literature is the subject of this paper.

RESULTS
Content analysis

A Leximancer content analysis[60] applying data mining techniques to the 116 research papers yielded key concepts (table 2) and themes (figure 1), identifying the number of times each concept was used, indicating how widespread it prevailed in the literature and its relevance to the overall sample. Concepts in the Leximancer terminology (see table 2) are clusters of words that relate together, similar to those that would be found in a thesaurus. Themes are groups of concepts sharing commonalities or connectedness. Thus, concepts are more fine grained and themes are more broad language

Table 2 Ranked list of key concepts and connectivity in the literature on organisational social spaces, networks, boundaries and holes

Concepts	Count	Relevance (%)	Concepts	Count	Relevance (%)
Network	4851	100	Technological	900	19
Social	3656	75	Collaboration	899	19
Capital	3506	72	Practice	884	18
Knowledge	3260	67	Contacts	860	18
Research	2467	51	Behaviour	846	17
Used	2384	49			
Study	2316	48	Market	831	17
Information	2309	48	Terms	825	17
Related	2200	45	Public	822	17
Work	2070	43	Form	819	17
Group	2014	42	Systems	813	17
Management	2012	41	Units	799	16
Different	2008	41	Context	795	16
Organisation	1805	37	Integration	770	16
Relationships	1785	37	Approach	770	16
Individuals	1731	36	Design	755	16
Ties	1712	35	Significant	744	15
Structure	1695	35	Task	744	15
Positive	1660	34	Impact	740	15
Effects	1648	34	School	732	15
Sharing	1519	31	Following	726	15
Members	1417	29	Service	722	15
Process	1404	29	Building	709	15
Interactions	1386	29	Others	709	15
Learning	1378	28	Community	709	15
Time	1320	27	Paper	702	14
Identity	1295	27	Particular	688	14
People	1264	26	Negative	687	14
Employees	1252	26	Theory	676	14
Performance	1238	26	Boundaries	663	14
Support	1225	25	Transfer	662	14
Business	1211	25	Control	659	14
Activities	1177	24			
Innovation	1176	24			
Case	1132	23	Power	634	13
Team	1132	23	Identities	631	13
Available	1113	23	Common	628	13
Role	1106	23	Local	608	13
Organisational	1099	23	Environment	605	12
Model	1094	23	Education	592	12
Data	1087	22	Trust	592	12
Analysis	1085	22	De	589	12
Including	1079	22	Students	585	12
Resources	1078	22	Government	575	12
Development	1074	22	Perspective	567	12
Communication	1051	22	Policy	561	12
Industry	1026	21	Places	561	12
Culture	1020	21	Spaces	552	11
Project	1018	21	Workplace	522	11
Experience	1014	21	Economic	506	10
Participants	987	20	Software	502	10
Cooperation	964	20	Sense	491	10
Personal	939	19	National	451	09
Example	930	19	Global	408	08
Change	918	19	Academic	406	08
Value	909	19	Social	397	08
Based	904	19	White	203	04

Figure 1 Map of key themes in
the literature on organisational
social spaces, networks,
boundaries and holes.

clusters. In the Leximancer thematic map of the literature (figure 1), each circle is a theme and each dot a concept, with the connecting lines illustrating how related they are.

The central concepts and themes show that the literature repeatedly discusses *networks, social, capital* and *knowledge* in *social* context, emphasising *collaboration* and *cooperation*. It is centrally about *communication, work* and *activities,* and their *management* in *groups* or *organisations.*

Systematically-oriented review

The 116 studies were systematically reviewed. Full papers were assessed by two independent researchers (JB and DM, see acknowledgements) and a random sample checked by a third (CW, see acknowledgements) and the key features abstracted (see online supplementary table S1). Common themes were identified using grounded theory, following the procedure outlined by Glaser and Strauss.[61] The researcher and supporting

reviewer (JB and DM, see acknowledgements) assessed the papers until these themes emerged as the most commonly occurring premises.

The research involved subjects in 40 countries, with 32 studies enrolling participants in multiple countries. This literature includes 40 studies conducted wholly or partly in the USA, 46 wholly or partly in continental Europe, 29 wholly or partly in Asia and 12 wholly or partly in Russia or Russian federated countries. Methods employed included 30 mixed or triangulated social science study designs, 39 qualitative studies using various social science methods (interviews, ethnography, focus groups), 13 experimental studies (in psychology laboratories, for the most part) and 34 questionnaire-based studies, the last category mostly to gather data for social network analyses. Many studies were theoretically informed, particularly concerning group and team theories, and many drew on constructs from social network theory.

DISCUSSION

Overall, this research synthesised wide-ranging studies centred on the core constructs of networks, gaps and fragmentation across gaps in organisational settings. What does it indicate to those hoping to induce more productive networked structures, and apply that knowledge to healthcare?

The literature in perspective

Understanding how teams and groups interact across their boundaries, through formal and informal members operating at the edges and relating to each other to a greater or lesser extent collaboratively or competitively, is a crucial phenomenon to understand. Organisational gaps and boundaries underpin the mechanisms by which behaviours, practices, attitudes and values spread; how innovation diffuses and cultural characteristics permeate into systems; and how ideas, knowledge and messages translate and migrate across systems and subsystems.[62–65] Barriers and obstacles to creating joined-up teams and groups are omnipresent.[31 32 34 56] In one study, obstacles manifested as three types—psychological, situational and social—and women perceived more barriers to networking across teams and groups than did men.[66 67]

Taken together the results show that, as a general rule, teams and groups tend to promote an inwardly-focused identity. Strong in-group norms and behaviours operate within teams and groups. People not only identify with the group to which they belong, but their psychological well-being is often bolstered by their membership, particularly if their group is perceived to be prestigious or beneficial to them.[68] Members will collectively draw mental or physical boundaries around themselves, circumscribing their group. People also perennially favour their group: the manifestation of in-group bias is strong and seemingly ubiquitous.[69] Professions and organisational units, for example, almost always support and favour internal members over their counterparts in external professions or units. Indeed, who is in or eligible for membership, and who is not is in large part what defines a team or group. The phenomenon does not stop there. Teams and groups seem to be characterised by tacit or explicit knowledge about their membership or who is eligible for membership, and can readily identify those who are not members.[69] This poses considerable problems for those seeking to encourage networked behaviours and collaborative structures.

People then align themselves, and identify closely with their own team or group.[70] Teams and groups often demand or uphold loyalty from members. Deviants or those who are antigroup or antisocial can be subject to various forms of punishment[71] such as being frowned on, gossiped about, left out, shunned or treated as being disloyal. These, among other determinants signifying identity, can lead to strong 'us and them' perspectives vis à vis other groups. Outgroups are often treated indifferently,
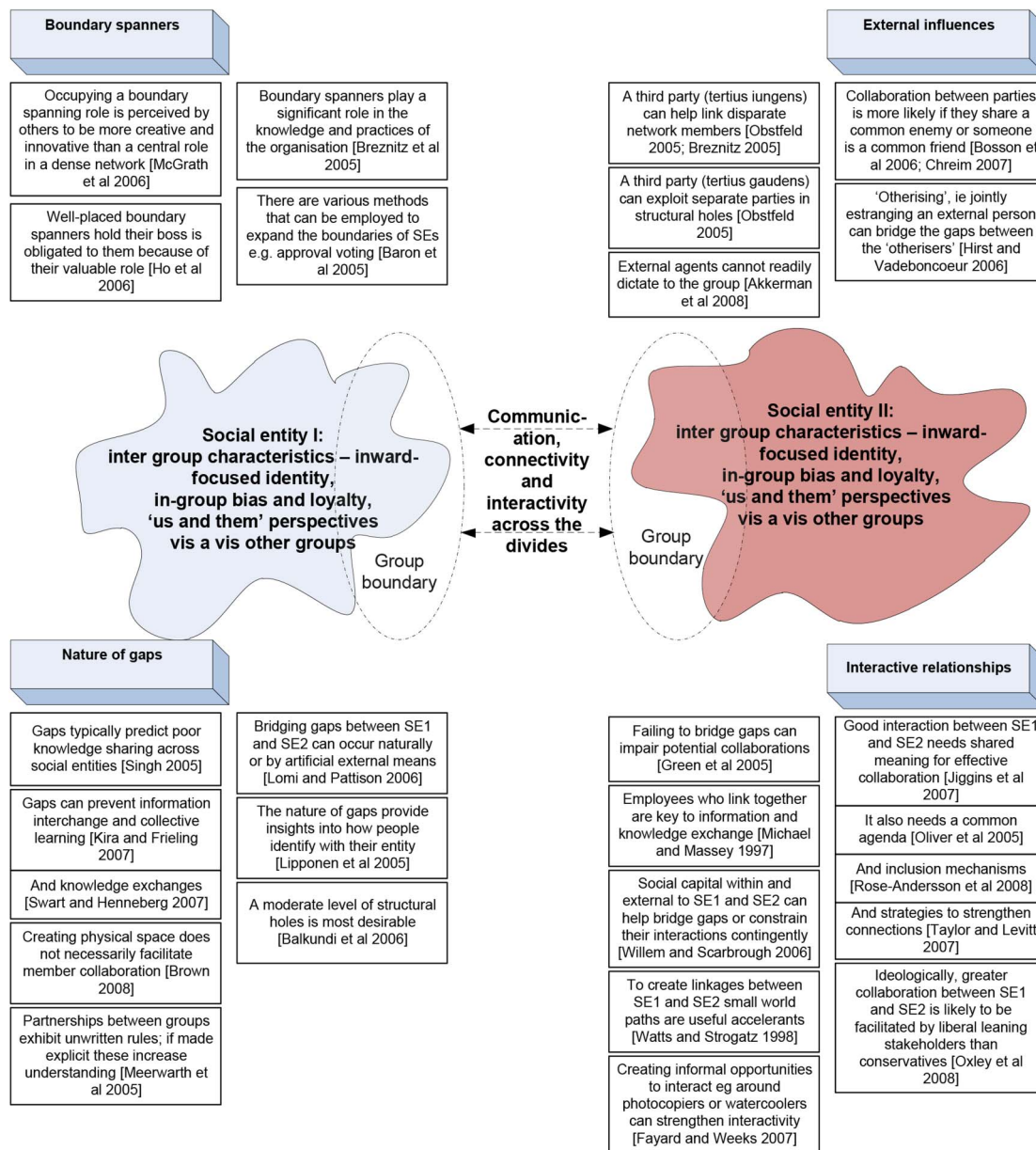
unsympathetically or suspiciously.[68 72 73] There can be prejudice, enmity or even hostility between groups.[69 74] All told, this state-of-affairs calls for active strategies to promote collaboratively-oriented systems. However, can disparate teams and groups actually be joined-up by active agency into more expansive networks?

A four-factor framework for collaboration across teams and groups

From the literature assessment and content analysis, a framework synthesising and integrating the current state of knowledge was derived. Figure 2 provides four core factors for appreciating networked efforts: understanding the nature of gaps, using the leverage of boundary spanners, stimulating interactive relationships and exerting power via external influences. These were frequently occurring common factors embedded implicitly or accounted for explicitly in the included literature. Within each factor, various strategies with utility for sponsoring networked collaboration across teams and groups are evident.

The figure depicts two social entities interfacing each other across an organisational divide. These could be, for example, two wards or two organisational units; or a group of doctors interfacing with another group of doctors; or a group of nurses or allied health professionals, working adjacent to each other. They are bounded, and will have greater or lesser levels of communication, connectivity or interactivity between themselves across the social space delineating them as separate groupings. The question is how to bridge the gap and thereby, help to promote networked connectivity. With that in mind, we turn to a brief description of the four factors and how these operate according to the synthesised studies in the non-health literature. This provides us with lessons about networking and how it operates elsewhere.

The *nature of gaps* (social or physical spaces, structural holes, disconnected ties) between teams and groups can be characterised and this information used to help join-up those who are unduly divided. Gaps can clearly act as barriers to knowledge and information exchange.[63 75–77] However, gaps can also be useful: structural holes in networks,[78 79] for example, offer opportunities for bridging behaviours. Once these gaps are recognised, people can begin to act to close gaps between teams and groups. All in all, a moderate level of spacing between teams and groups in complex social systems seems optimal in promoting interaction.[80 81] Too many gaps or too wide the spacings between groups can indicate disunity or disintegration, which makes it hard to enhance linkages. Too few gaps, and narrowness increases the risk of poorly formed localised identities or the system being overconstrained, with no breathing space between the team or group. Building effective relationships across gaps or structural holes looms[78 79 82] as an important activity in joining-up teams and groups. Collaboration and partnerships can be encouraged by

Boundary spanners

Occupying a boundary spanning role is perceived by others to be more creative and innovative than a central role in a dense network [McGrath et al 2006]

Boundary spanners play a significant role in the knowledge and practices of the organisation [Breznitz et al 2005]

Well-placed boundary spanners hold their boss is obligated to them because of their valuable role [Ho et al 2006]

There are various methods that can be employed to expand the boundaries of SEs e.g. approval voting [Baron et al 2005]

External influences

A third party (tertius iungens) can help link disparate network members [Obstfeld 2005; Breznitz 2005]

A third party (tertius gaudens) can exploit separate parties in structural holes [Obstfeld 2005]

External agents cannot readily dictate to the group [Akkerman et al 2008]

Collaboration between parties is more likely if they share a common enemy or someone is a common friend [Bosson et al 2006; Chreim 2007]

'Otherising', ie jointly estranging an external person can bridge the gaps between the 'otherisers' [Hirst and Vadeboncoeur 2006]

Social entity I: inter group characteristics – inward-focused identity, in-group bias and loyalty, 'us and them' perspectives vis a vis other groups

Group boundary

Communication, connectivity and interactivity across the divides

Social entity II: inter group characteristics – inward-focused identity, in-group bias and loyalty, 'us and them' perspectives vis a vis other groups

Group boundary

Nature of gaps

Gaps typically predict poor knowledge sharing across social entities [Singh 2005]

Gaps can prevent information interchange and collective learning [Kira and Frieling 2007]

And knowledge exchanges [Swart and Henneberg 2007]

Creating physical space does not necessarily facilitate member collaboration [Brown 2008]

Partnerships between groups exhibit unwritten rules; if made explicit these increase understanding [Meerwarth et al 2005]

Bridging gaps between SE1 and SE2 can occur naturally or by artificial external means [Lomi and Pattison 2006]

The nature of gaps provide insights into how people identify with their entity [Lipponen et al 2005]

A moderate level of structural holes is most desirable [Balkundi et al 2006]

Interactive relationships

Failing to bridge gaps can impair potential collaborations [Green et al 2005]

Employees who link together are key to information and knowledge exchange [Michael and Massey 1997]

Social capital within and external to SE1 and SE2 can help bridge gaps or constrain their interactions contingently [Willem and Scarbrough 2006]

To create linkages between SE1 and SE2 small world paths are useful accelerants [Watts and Strogatz 1998]

Creating informal opportunities to interact eg around photocopiers or watercoolers can strengthen interactivity [Fayard and Weeks 2007]

Good interaction between SE1 and SE2 needs shared meaning for effective collaboration [Jiggins et al 2007]

It also needs a common agenda [Oliver et al 2005]

And inclusion mechanisms [Rose-Andersson et al 2008]

And strategies to strengthen connections [Taylor and Levitt 2007]

Ideologically, greater collaboration between SE1 and SE2 is likely to be facilitated by liberal leaning stakeholders than conservatives [Oxley et al 2008]

Figure 2 A conceptual framework for networked behaviours.

understanding the nature of the outgroup and inter-group behaviours,[68] and the unwritten rules between groups such as those that inform each potential partners' views on their own and the others' strengths, limitations and capabilities.[83 84] Wenger's work on communities of practice[85 86] and its application[87 88] is a case in point.

Boundary spanners depending on the circumstances can bridge two or more groupings, and enable exchange and communication. Such roles are often highly regarded and those occupying them can make a valuable contribution in promoting connections between people and groups.[89] Useful initiatives to promote boundary crossing include: identifying those with facilitation skills,[90] or encouraging potential bridge-builders (those who span or straddle otherwise isolated teams and groups), connectors (people actively linking two or more teams and groups), liaisons (people who shuttle between teams and groups, enabling relations and communication), mavens (folks with a wide circle of contacts), opinion leaders (influential individuals to whom others turn to for advice or information) or cosmopolites (persons with wide-ranging interests and interactions). However, boundary spanners, in the process of fulfilling their role by bridging gaps inevitably alter relationships, and by their efforts to join-up two previously divided groups can create different boundaries and gaps elsewhere. Interestingly, liberal-leaning rather than conservative-leaning individuals are more likely to bridge gaps or boundary span, and advance collaborative activities.[91] Gatekeepers play an important protective role in healthcare. For example, in some countries, general practitioners prevent patients from unnecessarily

entering specialised healthcare and being over-serviced. However gatekeepers,[92] blockers and manipulators can inhibit boundary-spanning behaviours. They need to be identified and their negative influences negated or minimised if networked, collaborative behaviours are to be realised.

This leads to the challenge of how to stimulate *interactive relationships*. Recurring ideas in the literature include: building joint social capital by emphasising mutual goodwill across teams and groups;[74 93] formally linking otherwise disparate groupings together;[92] providing informal opportunities to inter-relate,[77 94] including creating commonly-available public space in which to intermingle;[25 95] promoting dialogue and shared meaning between groups;[96] agreeing on joint agendas;[97] striving for inclusivity;[98 99] supporting social diversity[100] and generally encouraging, over time, connections and exchanges between teams and groups. These strategies can, depending on the circumstances, strengthen communication and information exchange. Leaders who support informal social activities and promote social ties, for example, after-work activities, can improve productivity and particularly, intergroup functioning and performance.[101] People who have strong relationships across teams and groups, and are embedded in the larger organisational culture are less likely to signal an intention to leave their organisation,[102] and this can be important in building long-term connectivity. Trust is an important commodity in linking teams and groups;[103–105] so building up of trust is an important endeavour. Taken together, these strategies can help connect teams and groups. The right strategy-mix will need to be determined by formal and informal leaders and members of the teams and groups themselves, and are often defined by the context.

External influences can also play a bridging or dividing role. A *tertius iungens* agent ('the third who joins') who builds bridges can help facilitate group interaction, but a *tertius gaudens* agent ('the third who enjoys') can exacerbate existing divides, exploiting these for his or her own benefit.[78 79 106] While there is some support for the notion that outsiders cannot readily dictate to teams and groups,[67] other work suggests that group members who share a common enemy[107 108] or jointly emphasise their distance from or aversion to other groups, thereby differentiating themselves,[109] will be more likely to collaborate with each other. This has been a long held belief: if, as the old Arab proverb states, "the enemy of my enemy is my friend" then it is also likely to be the case that "my friend's enemy is my enemy". Whether or not this is so, teams or groups sharing a negative attitude about or a perceived threat from a third party will be likely to move closer to each other.[107]

Some key theoretical perspectives

Various theoretical perspectives can be mobilised to explain these empirical findings and the four-factor model. We have specifically encountered two: Weick's tight-loose coupling helps us to understand the extent to which characteristics, such as rules or discretion, are at work in having greater or lesser effects on connectivity between teams and groups. Granovetter's strong and weak ties asks whether people adjoining each other are in a direct relationship, or more distant from each other, that is, merely acquaintances. Either theory can help to some extent illuminate networked patterns of behaviour, and suggest mechanisms to strengthen interactions.

Two other theoretical accounts stand out in further explaining the model. The phenomenon of 'us and them' is a subset of social identity theory,[108 110–112] which suggests that humans have strong self-concepts tied to needs for belongingness with those in their in-group, and seek to identify with, be part of or embrace the attitudes and behaviours of their fellow group members. Consequences foreshadowed by social identity theory include robust bias in favour of the in-group, and preferential treatment for fellow members. In-group members are often seen to be estranged from, prejudiced about, competing with, scapegoating or even hating those in out-groups. Clearly, there can be strong pressures or motivations to affiliate with one's group and to distrust, treat warily or actively dislike other groups. Antidotes, such as those described in the conceptual framework for networking (figure 2), will likely need concerted, longitudinal effort to tackle 'us and them' feelings and behaviours. Even then, gains are not likely to be huge.

Another mechanism underpinning networking is described by reciprocity theory, also known as tit-for-tat,[113 114] which predicts that teams and groups will retaliate equivalently. Tit-for-tat theory suggests that the way group members treat those in other groupings, whether badly or well, is more than likely to be reciprocated. This is exemplified by many game theory studies[100] and much of the literature from the earliest time period, for example, "do unto others as you would have them do unto you" and "an eye for an eye and a tooth for a tooth". Successive iterations of reciprocity can readily hard-wire into collaboration or hostility. This phenomenon is strongly related to trust.[77 115] An optimal response pattern for collaboration across teams and groups seems to be: always start relationships cooperatively, do not be the first to defect, and practise forgiveness when wronged.[114]

Of course, there are other theoretical accounts which could be developed to help understand groups' relationships. These include explaining how some teams or groups come to be especially good at connecting with nearby teams or groups compared with others who are not; the mechanisms of affiliation across teams and groups when it spontaneously occurs; specifying how one group comes to be dominant and another subservient; and concepts of mutuality versus rivalry, manifesting most frequently as cooperation versus competition. Each of these is likely to be fruitful to a greater or lesser extent in contextualising the relationships between

teams and groups, and could be useful gateways to further research.

The nature of gaps and boundaries, and applications in healthcare

The core ideas of gaps, boundary spanners, interactive relationships and external influences found in the literature review are very well suited to the analysis of healthcare. There are concrete implications for healthcare settings.

Gaps interfering with joined-up services, a key feature of health systems, are very hard to bridge. Gaps can be the physical area between one department and another, the silos operating to structurally delineate medicine, nursing and allied health staff or the temporal divides that separate two or more groups working shifts. These can also emerge as the conceptual gulf between the attitudes of people in one part of the healthcare organisation or system and another. Gaps often manifest as the cultural differences demarcating one unit or professional group ('us') and the other ('them'). All organisations create barriers and partitions which inhibit or prohibit collaboration because of specialisation, myopic internal focus or tribalism. Problems arise where this interferes with effective organisational functioning or the delivery of good care.

Boundaries are phenomena of interest if we have to learn to bridge gaps and create better networked systems of care. Boundaries can be sharp and obvious, as between hospitals and nursing homes or amorphous and unclear, as when two or more organisational groupings remain as separate entities, but share resources, leaders, staff or physical space (eg, different specialists; physicians and nurses; or day and night shift staff). In healthcare there are formal organisational gaps, that is, 'you are department A and we are department E', and physical or location gaps, that is, 'we work here and you, behind that partition, across the corridor, on another floor, or in another building, are over there'. There are conceptual gaps, manifesting in differentiable mental models, that is, 'you think that way, but we don't'. And there are behavioural gaps, as in 'this is how we dress, speak, and practise, compared with you'. Gaps can be emotional, for example, two teams who have come to detest each other and are poles apart, or conceptually different, as in the gap between achieving a 'personal best' in a team developing a new model of care and a rival teams' normal, everyday performance. However, categorised gaps and boundaries distinguish teams and groups, and define where one ends and another begins. For those seeking to influence the health system to thereby create networked care, these gaps and boundaries should not be ignored. Instead, by identifying the nature of gaps and boundaries, we can begin to focus on the efforts that are needed to join them up, and create more synergistic effort to improve care for the benefit of patients. This is perhaps the major lesson to take home from this review.

LIMITATIONS

Systematic reviews including this one are limited by the constraints of the inclusion criteria, in this case the terms and the date of the review period (2005–June, 2012). Applying ideas from other settings to healthcare may pose challenges.

CONCLUSIONS

This systematically-oriented review provides an assessment of a large volume of non-health literature, presenting a four-factor model and strategies for translating insights and ideas to the health sector. It sought to facilitate access to external thinking as an antidote to health sector insularity, and as a way of understanding how to build more connected, networked systems of care. While caution is warranted in translating unmediated ideas and evidence from other sectors to healthcare, drawing on outside ideas to tackle hard problems is useful in at least providing insights and seem to be overdue.

These findings may be of benefit to healthcare stakeholders seeking greater levels of networked collaboration. However, no one should doubt the immense challenges facing those seeking to build more productive networking across healthcare delivery systems.

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