

**Zooming in and out:
Connecting Individuals and Collectivities
at the Frontiers
of Organizational Network Research**

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Abstract

The role of individual action in the enactment of structures of constraint and opportunity has proved particularly elusive for network researchers. In this paper we propose three frontiers for future network research that zooms back and forth between individual and collective levels of analysis. First, we consider how dilemmas concerning social capital can be reconciled. Actors striving to reap maximal network advantages may benefit or detract from the collective good; investigating these trade-offs, we argue, will advance our understanding of learning and knowledge processes in organizations. Second, we explore identity emergence and change from a social network perspective. Insights about how networks mold and signal identity are a critical foundation for future work on career dynamics and the workplace experiences of members of diverse groups. Third, we consider how individual cognitions about shifting network connections affect, and are affected by, larger social structures. As scholarly interest in status and reputational signaling grows, articulating more clearly the cognitive foundations of organizational networks becomes imperative.

The networks within which people and groups are embedded have important consequences for the success and failure of their projects. Over the past decades we have learned a great deal about what kinds of networks produce desirable outcomes and what situational characteristics shape the possibilities within which people and organizations construct their social networks.¹ Empirical findings have converged on several principles, including the value of bridging ties and structural holes, and the embeddedness of economic transactions in social networks (Burt, 1992; Granovetter, 1985; Uzzi, 1996). Contingency approaches followed, delineating the characteristics of people and situations that make being connected in one way or another more or less useful (Burt, 1997). Yet today we still have much to learn about how people use, adapt and change the networks of relationships that form such a critical part of our working lives. In this paper, we aim to capture the individual in the context of the larger network picture. This is a necessary part of investigating the link between structure and action, but has proved particularly elusive for network research.

Although early research on social networks was predicated on the importance of linking personal networks with larger network systems (e.g., Boissevain, 1974), the organizational literature has grown as two separate camps, with few bridges linking the micro and macro, and no joint agenda. In the micro camp, studies tend to focus on individual ego networks but neglect the larger context of constraints within which such networks are embedded (Fernandez and Gould, 1994). The structural context of action is often missing from studies that focus exclusively on the strategic actions of

¹ Given the rapid increase in the volume of network research, a series of important reviews have helped researchers keep up to date with ongoing developments (e.g., Borgatti and Foster, 2003; Monge and Contractor, 1999) concerning such long-lasting debates as closure versus structural holes (e.g., Ahuja, 2000; Burt, 1992), strong versus weak ties (e.g., Hansen, 1999; Podolny and Baron, 1997), and the absence or presence of network theory (e.g., Kilduff and Tsai, 2003). Our objective in this paper is neither to comprehensively review scholarly findings nor to catalogue conceptual debates that have long subsisted in the field; we refer the reader to the excellent reviews that already exist.

individual actors. On the other hand, studies in the macro camp tend to focus on the structure of network relationships and organizational actions but neglect the role of individuals. There is a need for scholars in this camp to “bring the individual back in” when conducting structural analysis (Kilduff and Krackhardt, 1994). Our objective is to redirect the next generation of network researchers to the benefits of considering individuals and social structures simultaneously.

With this goal in mind, we divide this article into three sections, each highlighting promising frontiers of social networks research at the intersection of the individual and the collective. In the first section, “Social Capital and the Individual-Collective Dilemmas,” we consider social networks as forms of social capital for both individuals and collectivities, and ask how dilemmas concerning social capital can be resolved. How is organizational learning, for example, affected when individuals strive to maximize their own information advantages? We investigate four plausible scenarios in which individual and collective interests may coincide or differ. In the second section, “Networks as Identity Construction Mechanisms,” we build on the growing literature on the dynamics of identity and identity change. We argue that incorporating an explicit social network perspective will allow researchers to take extant research on career transition and on the workplace experiences of diverse groups in new directions. The notion that the organizational world can be understood as a marketplace of perceptions is the foundation of our third section, “Organizations as Networks of Cognitions.” Perceptions of advantage or disadvantage, belonging or exclusion are contingent on the social context in which these perceptions are formed. In this final section, we blend insights from research on cognitive networks with ideas about signaling and tipping points to suggest future work on the social construction of

reputation. In focusing on these three domains, this paper zooms back and forth between individual and higher levels of analysis, taking advantage of the network perspective's characteristically wide-angled approach to how individuals enact structures of constraint and opportunity within systems of relations.

Social Capital and Individual-Collective Dilemmas

As one of the basic orienting concepts in organizational network research, the social capital concept refers to the social relations and resource advantages of both individuals and communities (Coleman, 1990; Kilduff and Tsai, 2003; Portes, 2000). But, the nuances of the concept have tended to vary greatly depending on whether individual or collective advantage is the focus. Social capital, for individuals, refers to the benefits that accrue from individual network connections (cf., Tsai and Ghoshal, 1998). This stream of research has tended to assume that individuals use network ties instrumentally, pursuing opportunities that benefit the self (Bourdieu, 1985). For example, individuals have been depicted as striving to capture diverse information and resources through connections that bridge between disconnected clusters (Burt, 1992). In contrast, work focused on communal social capital, has been largely based on the assumption that connections between actors promote public goods to the benefit of the entire network (Putnam, 1993; 1995).

Within formal organizations, public goods typically include good citizenship behaviors, such as helping others beyond the narrow confines of job descriptions. Public goods can also include more systematic organizational endeavors, such as knowledge transfer that allows task-relevant information and tacit understandings to permeate subunit boundaries. Organizations with high levels of good citizenship and

cross-cutting collaboration networks may be said to have high communal social capital that promotes high performance and innovation (see the discussion in Bolino, Turnley, and Bloodgood, 2002). Whether and when these communal network benefits also promote the careers and purposes of the individuals and groups involved is an important question for future research. As we describe in more detail below, dilemmas emerge when these two types of social capital are juxtaposed. Table 1 shows some possible scenarios.

-Table 1 about here-

The first scenario (cell 1) -- the value congruence network -- represents the situation when both individual and communal social capital are high. In this scenario, individual actors' self interest in networking coincides with the collective interests of the entire network. An example might be a community of high-tech entrepreneurially-driven individuals whose networking activities, pursued for individual advantage, contribute to communal learning. Silicon Valley might be representative of such a value congruence network according to research that portrays the systemic advantages that accrue as a result of the intensive networking of specialists in pursuit of interesting technical challenges and individual wealth (Saxenian, 1994). Evidence suggests, however, that some types of individual networking (such as bringing in new knowledge from outside the community) can benefit both the individual and presumably the community, whereas other types of networking (such as brokering relationships between disconnected and perhaps discordant parties within the community), can detract from individuals' own business success (Oh, Kilduff, and Brass, 2004).

The value congruence network may, therefore, fail to emerge, either because the community interest overrides that of individuals or because individuals' interests override those of the community. Individual rationality can sometimes lead to collective irrationality (Kollock, 1998). In the latter "tragedy of the commons" (Hardin, 1968) scenario, individual actors (perhaps unintentionally) erode the social capital of the whole community as they strive to maximize their own network benefits (cell 2). In one organizational example of the development of what the authors described as "diseased social capital," an individual arranged for large numbers of friends and family members to be hired over a 30-year period unbeknownst to management (Burt and Ronchi, 1990). This individual operated as an organizational politician, managing his developing constituency for his own private advantage. When the entrepreneurial individual was fired in a routine cost saving exercise, his social network of strong ties contributed to a situation of incipient violence directed at top management combined with resistance to managerial directives. We need further research exploring the consequences, for organizations, of the unfettered pursuit of networking advantages on the part of individual employees.

Are there situations where only minimal social capital is required for organizational functioning? Social capital theory implies that in the presence of perfect markets, social network ties should prove to be irrelevant as far as the efficiency and effectiveness of transactions are concerned (Burt, 1992). However, even in the context of financial markets -- often reputed to be the most efficient of all markets -- research has shown the importance of communal structures of formal and informal rules combined with a reliance on networks of trust between individuals (e.g., Abolafia and Kilduff, 1988; Baker, 1984). The recent emergence of high-functioning

"atomized markets" has highlighted the possibility (depicted in cell 3 of Table 1) that modern technology can reduce the transactional reliance on individual and communal social capital. Online auctions feature actors -- both individual people and individuals as representatives of organizations -- buying and selling in relative anonymity with only a minimum of structural rules to facilitate transactions. The study of such markets from a social network perspective represents unexplored territory.

In some "total institutions," opportunities for individuals to build personal social capital are drastically reduced (Goffman, 1961). In such organizations, the development of communal social capital comes at the expense of individuals' social capital (depicted in cell 4 of Table 1). Attachments between individual members may be prohibited and, if discovered, the guilty parties may be severely punished. For example, in some religious orders, personal affection between nuns is regarded as sinful and contrary to the organizational ethos (Goffman, 1961). As one network classic has reminded us, religious orders may regard the development of informal networks as a threat to hierarchy, tradition, and discipline (Sampson, 1968). Even military organizations, in which camaraderie is surely important, may act to destroy naturally-occurring friendship bonds that threaten the development of disciplined troops (Goffman, 1961). Similarly, strong culture organizations may achieve an equilibrium in which all members belong to a single fully-connected group of homogenous people (Carley, 1991).

The distinctions highlighted in Table 1 represent starting points for the analysis of how individuals' networks affect and are affected by the collectivities to which they

belong. Yet, we still do not understand how organizational networks might be configured to provide the most benefits to all members, or how these same organizations might protect themselves against the predatory networking activities of self-centered individuals. Some new directions that may shed light on these important questions involve recent work on organizational learning and knowledge sharing in networks (e.g., Beckman and Haunschild, 2002; Brown and Duguid, 1991; Hansen, 1999; Tsai, 2000).

Evidence suggests that when the knowledge base of an industry is complex, expanding, and widely dispersed, the locus of innovation is likely to reside in the interstices between organizations rather than in individual firms. Collaboration is likely to coexist with competition, and firms not linked to the central hub of activity are likely to suffer from a "liability of unconnectedness" (Powell, Koput, and Smith-Doerr, 1996). Systems of linked organizations can promote knowledge sharing and organizational learning across strong ties to the benefit of both the collective and the individual organization (Kraatz, 1998). Although individual network ties permit individual organizational actors to benefit from others' knowledge, system-wide social ties facilitate collective learning that cannot be achieved by individual actors alone.

Inside organizations, we also find that individuals centrally connected tend to be more active in organizational innovation roles (Ibarra, 1993). The effective functioning of the organization clearly requires the sharing of useful knowledge among organizational members rather than the reinvention of techniques and ideas by

separated individuals and units within the organization (Kogut and Zander, 1992). However, facilitating knowledge sharing among organizational members is not an easy task, particularly in multiunit organizations where units compete with each other for internal resources and external market rewards (Tsai, 2002). Individual units may have incentives to hoard rather than share knowledge given that potential gains are higher when few others have access to scarce knowledge. Units that are central in the intra-organizational knowledge-sharing network are quicker than others in accessing new resources (Tsai, 2000). Individual social capital allows units to prosper to the extent that they occupy structurally advantageous positions in the overall organizational knowledge-sharing network (e.g., Tsai and Ghoshal, 1998; Tsai, 2001). But an organization as a whole may fail to benefit if each unit maximizes its own individual social capital without advocating collective interests. An organization also needs to develop communal social capital facilitating the emergence of trust and cooperation among organizational members to reap the benefits of interunit knowledge sharing.

An organization in which individual units learn from and trust each other represents a value congruence network (cell 1 of table 1, as discussed earlier) -- an ideal scenario for individual and collective learning. Even if such an ideal state is achieved (within a multiunit organization, for example), the principle of entropy would appear to guarantee maintenance difficulties. Some units are likely to take advantage of organizational knowledge offered by others, and refrain from sharing their own useful knowledge, leading the organization as a whole into the tragedy of commons scenario (cell 2 of table 1). Future research can investigate the factors that affect the

trajectories of an organization's movement from one scenario to another and the likelihood for an organization to be in a particular scenario.

As we investigate how individual network strategies coalesce with or detract from the emergence of organizational public goods and collective learning, questions concerning the reciprocal effects of individual and organizational networking behaviors will naturally arise. How do the networks of individuals affect an organization's ability to change and adapt? Recent work suggests that the friendship networks among chief executive officers can significantly affect propensity to adapt and change in response to poor performance (McDonald and Westphal, 2003). We need more work like this examining the social systems through which learning takes place, and the ways in which such learning, in turn, affects individuals' networking. We also need to know why some organizational networks constantly change and provide new opportunities for members whereas other networks remain stable and become stagnant over time. Organizational networks can be conceptualized as transformational engines that differentially facilitate knowledge exchange and learning (Crossland, Kilduff, and Tsai, 2004). But the complexities of such transformations are yet to be explicated. These concerns relate to the identity and cognition themes that we develop in the next two sections.

Networks as Identity Construction Mechanisms

Traditional approaches within the social sciences have tended to neglect processes of reciprocal causation and coevolution concerning individuals and the networks within which they are embedded. Individuals tend to be portrayed either as making decisions in splendid isolation from the force-field of influences that surround them (Knoke and

Kuklinski, 1982:2) or as governed by social norms that provide relative immunity to network influences (Granovetter, 1985). But these reciprocal and co-evolutionary processes underlie many important phenomena including identity construction itself. Exploring the reciprocal interaction between networks and identities is particularly pertinent in a world in which individuals enjoy considerable choice regarding occupation, employer, and career path (Albert, et al, 2000: 14). Network research that studies processes of self-reinvention and that examines transitional states between clearly articulated identities and well-established network roles may be particularly valuable). We argue that the reciprocal influences of social identity and social networks can shed light on a range of important research domains including the study of career dynamics and the experience of women and minorities in the workplace. In this section of the paper we address how networks shape social identity and how demographic identity affects networks. We also discuss throughout how networks and identity coevolve, and what this coevolution implies for career trajectories.

Network effects on social identity. Although networks have been thoroughly studied as conduits for information and resources, we still know little about the role they play in creating and shaping identities. Social networks socialize aspiring members, regulate inclusion and convey normative expectations concerning roles. As such, they confer social identity (Podolny and Baron, 1997). They segment social space into clusters and positions populated by actors who share common social characteristics and, thus, are social referents for each other. These structurally demarcated “identities” motivate a wide range of behaviors including the diffusion and adoption of innovations (Burt, 1982; Strang and Meyer, 1993; Kraatz, 1998) and participation in industry

groups, strategic alliances and other institutional relationships (Rao, Davis, and Ward, 2000).

We take as given, therefore, that social identity emerges through network processes: the people around us are active players in the co-creation of who we are at work. Our work identities are created, deployed and altered in social interactions with others. Identities, therefore, change as we change roles, jobs and organizations (e.g., Becker and Carper, 1956; Hill 1990; Ibarra, 1999). How people negotiate, with themselves and with others, what identities they craft as they assume a new work role, and what “raw material” serves as input to that crafting process, however, has only begun to receive empirical attention.

We know that network characteristics affect variation in the creation, selection, and retention of possible selves (Yost, Strube, and Bailet, 1992). People may adapt to new professional roles by experimenting with provisional selves that represent trials for possible, but not yet fully elaborated professional identities (Ibarra, 1999). The essential processes -- selective observation and imitation -- are highly dependent on incumbent professional networks, from which are selected more or less adequate models for identity trials. Network characteristics such as the number and diversity of models, the emotional closeness of relationships, and the extent to which models share with the focal individual salient social and personal characteristics are likely to affect what possible selves people try and test. These networks, however, are not static inputs to the adaptation process. Rather, they evolve in concert with people's

identity experiments. As new role aspirants seek more suitable models, they alter their networks and forge new relationships premised on new possible selves.

Moving into a new career or learning a new line of work is a social learning process in which people become active participants in the practices of a social community, constructing new identities in relation to this community and its members by participating in initially peripheral yet legitimate ways (Lave and Wenger, 1991). Every entrance into a new community network of relationships represents a departure from a previous set of contacts. We have little research examining how exiles from one community affect the identities of those in the work networks they have left behind (Kilduff and Corley, 1999). We also don't know much about how individuals' experiences as central or peripheral players in one community of relationships may affect the speed with which they move from the periphery to the center of new professional or occupational networks.

In career change the process of assuming a new professional identity unfolds in parallel with a process of “becoming an ex” and is rarely a simple matter of adaptation to an existing and easily observable role but rather a process of identifying or creating one’s own possibilities (Ebaugh, 1988; Ibarra, 2003a). Our current theories, fashioned with empirical work on early career socialization, well-institutionalized status passages, and easily identifiable role incumbents, are not well equipped to explain the dynamics of changing well-entrenched professional identities and making work role transitions in which both the destination (i.e., what career do I want next?) and processes for getting there are relatively undefined at the outset.

Network studies can clarify influences on the necessary transition period that lies between role endings and beginnings, a time when identity is multiple, ill-defined and provisional (Bridges, 1989; Turner, 1969). This transition period appears to be shaped by small alterations in a person's work activities, their social networks, and the self-narratives they construct to explain why they are changing (Ibarra, 2003a). Transitions may be facilitated by a process of *shifting connections*, which consists of dual network tasks – forging new connections with people and groups who can help a person in transition explore possible selves, while at the same time ending or diluting the strong ties within which outdated identities had been previously negotiated (Ibarra, 2003b). Encounters with people in alternative careers provide validation for changes a person may be contemplating and knowledge about the feasibility and attractiveness of new options, such as free-lance work (Barley, 2002). Commitment to a new career escalates as salience and intensity of relationships premised on that career increase; at the same time, an eroding commitment to the old career, its professional norms and referents unfolds with decreased social contact in that sphere (Hoang and Gimeno, 2003; Stuart and Ding, 2003).

Emerging research on the role of networks in career change exemplifies the links between individual and collective phenomena that we hope to encourage. University scientists socially proximate to ex-colleagues now employed by biotech firms are more likely to leave academia for biotech themselves (Stuart and Ding, 2003). Proximity to biotech entrepreneurs facilitates the formation of a reference group that condones what the scientific community sanctions. But, as the number of defections from academia increases, the effect of prior local adopters declines. The changing

proportions of academic and commercial scientists, and the ties that link them, facilitate or obstruct any given person's transition into the for-profit world. Research that places individual career choices within a broader context where changes are also occurring in the status, legitimacy or relevance of a new career and industry is another frontier for organizational network research.

Identity effects on social networks. The social networks within which individuals are embedded have effects on their social identity development, but identity also affects social networks, specifically those aspects of identity that are ascribed rather than achieved. Demographic characteristics such as gender and ethnicity are particularly salient aspects of individuals' identities, and can have strong effects on network ties, and through these ties, on career outcomes. For women and ethnic minorities, in particular, reliance on homophilous (i.e., within group) ties provides access to valuable social support but may limit access to resources and information in organizations.

In skewed organizational settings, in which white men dominate in positions of power and authority, women and minorities tend to experience both exclusionary pressures from the dominant group and heightened preferences for same-race or gender ties as a basis for shared identity (Mehra, Kilduff, and Brass, 1998). These dynamics may lead women and minorities to develop "functionally differentiated" informal networks: one for access to task-oriented networks and resources through the mostly white, male co-workers who populate the power structure, the other for friendship and social support from co-workers who are similar in race or gender (Ibarra, 1993). But this dual

network strategy is not without negative consequences: in many organizations, industries and geographical settings, friendship networks overlap significantly with task-oriented networks; keeping the two separate necessarily reduces access to the power elite.

Rather than continuing to focus on the incidence and consequences of homophily, future research may focus increasingly on the social processes by which demographic characteristics such as gender and race become more or less salient in affecting interaction patterns (Wharton, 1992). For example, identity confirmation is a network formation mechanism that operates independently of friendship or membership in a similar social category (Milton and Westphal, 2003; Mollica, Gray, and Trevino, 2003). By the same token, different motives are in play when managerial women rely on same-gender contacts for social support or friendship than when they turn to other women for career advice and strategizing (Ibarra, 1997). The latter is also an identity mechanism: the pertinence of male colleagues as role models can be limited since ways of conveying competence and confidence are often gender-typed (Ibarra, 1999). Studies that consider identity and homophily as different network formation mechanisms, therefore, are uncovering insights that may guide future investigations

When contact with “like” peers or superiors is severely limited within one’s own organization, an alternative network strategy consists of building ties to other departments or functional areas and joining professional networks anchored outside one’s firm and occupation. Identity concerns also explain the frequent finding that successful minorities tend to be well connected to both minority and majority circles

and have wide-ranging networks that extend outside focal work units and firms (Ibarra 1995; Thomas and Higgins, 1999). Similarly, minority directors tend to be more influential if they have direct or indirect social network ties to majority directors through common memberships on other boards (Westphal and Milton, 2000); and ethnic businesses tend to be more successful to the extent that their owners develop wide-ranging network contacts outside the immigrant community (Oh, Kilduff, and Brass, 2004). The notion that members of underrepresented groups particularly benefit from cosmopolitan networks raises questions about the optimal demographic composition of networks, and, as suggested in the previous section, whether the interests of the individual and the collective are aligned on this issue.

We have argued that instead of acting only to maximize, or to trade-off, instrumental and expressive resources, by forging, maintaining and dissolving network links, people develop, manage and change their identities. As reflections of social identity, networks also serve as signals to others about the current status or probable future of an individual. The ability to signal desirable traits such as competence and career advancement potential in turn affects an individual's ability to attract influential actors to his or her network circle. People's cognitions about network ties, therefore, are likely to be important factors in understanding the social construction of identity within and across networks. We turn next to a specific consideration of the developing area of cognitive network theory.

Organizations as Networks of Cognition

Organizational networks are complex relational systems that include people, organizational units, behaviors, procedures, and technologies. How people think

about the nodes that make up the network and the relationships between the nodes may affect the structure of the network itself. In turn, network structure may affect individuals' perceptions and sensemaking. Given the complexity of networks of informal relations in organizations, it remains an open question as to how these complex structures affect people's perceptions and behaviors, and whether people's accurate or distorted perceptions of such network structures help constitute the network relations that both constrain and enable.

The 1990s witnessed the beginning of a cognitive turn in organizational network research, concurrent with the cognitive turn in sociological approaches more generally (e.g., DiMaggio, 1997; Schwarz, 1998). Previously, theorists had tended to invoke the importance of individuals' perceptions (Burt, 1982) while neglecting to measure these perceptions (as pointed out by Krackhardt, 1987). As in other areas of organizational research (e.g., top management team diversity -- see Lawrence, 1997), organizational network research has moved towards examining the perceptions of individuals directly (e.g., Kilduff, 1990; Michaelson and Contractor, 1992) rather than relying exclusively on objectively derived proxies. As research at the macro level increasingly concerns itself with hypothesized perceptual processes concerning important outcomes such as organizational reputation and status (e.g., Podolny, 1998; Zuckerman, 1999), it becomes important to understand the micro foundations of network research.

Early research showed that network structures bias cognitions. For example, different patterns of cognitive distortion result between members of a dyad depending on the

extent of social equality, prior acquaintance, and level of mutual esteem (Samson, 1968). Less powerful organizational members are likely to experience pressure to adapt the cognitive perspectives of more powerful members (Walker, 1985). We also know that cognitive biases affect perceptions of social structure. Experimental evidence (De Soto, 1960; Freeman, 1992) suggests that people think of friendship relations in terms of reciprocated ties (if John likes Alan, Alan will like John) and in terms of transitive ties (if John has two friends, the two friends will be friends of each other) in support of Heider's (1958) notion of a strain toward balance in relations involving sentiment. Actual data from organizations, however, tend to show surprisingly low average levels of perceived reciprocity and transitivity together with a tendency for individuals to perceive friendship relations close to and distant from themselves as more balanced than friendship relations of intermediate distance (Krackhardt and Kilduff, 1999). The individual, then, appears to extend a vision of a proximate balanced world to the relations between comparative strangers at the periphery of the organization -- this represents a bias, given that, in this particular study, actual friendship relations were controlled for. As part of this biased set of perceptions concerning friendship, people are also likely to see themselves closer to the center of friendship networks in organizations than do the other members of the organization (Kumbasar, Romney, and Batchelder, 1994).

There are important questions that remain to be explored concerning cognition and organizational networks, the most basic of which concerns accuracy -- under which circumstances does it matter whether individuals have accurate cognitions concerning who is connected to whom in organizational networks (cf. Krackhardt, 1990)? Do accurate perceptions of organizational networks lead to power or are people who

become powerful in organizations more interpersonally aware in general? Given the importance of cognitive heuristics in the perception of network relations, can more accurate individuals potentially take advantage of others' biased perceptions to promote their own agendas?

There are many different types of network relations, but research on cognitive schemas has tended to focus almost exclusively on friendship and influence networks (e.g., De Soto, 1960; Krackhardt and Kilduff, 1999). Different types of networks may exhibit different types of cognitive schemas driving perceptions (see the discussion of communication rules in Monge and Contractor, 2003, page 88). To what extent is behavior a function of competition between activated network schemas (cf., Macrae and Bodenhausen, 2000)? How are network schemas activated in the first place? To the extent that schemas in general are slow to change and represent generic expectations about the world, we need to know more about how slow (i.e., schematic) learning of social network connections combines with the fast learning of novel connections to produce cognitive maps and social consensus (cf., March, 1991).

Future research can try to examine the importance of individual perceptions of network relations at the organizational level. For example, we know that managers who have previously worked in organizations where they perceived structural holes tend to be better able to see such holes in new organizational settings, and are thereby more likely to forge viable top management team coalitions (Janicik, 2000). The perceptual approach to structural hole research raises questions concerning the extent to which an individual broker can profit if the two parties connected by the broker

themselves perceive the network opportunity and view the broker to be self-interested (Fernandez and Gould, 1994). What might be the implications for members of cliques who belong to overlapping social circles in organizations remaining unaware of their membership in these larger collectivities (cf. Kadushin, 1966)?

Although researchers have identified many discrete structures in organizational social networks, including dyads, triads, cliques, and social circles, the extent to which individuals automatically encode and therefore perceive these structures as entities in themselves remains unknown. Research suggests that there may be important differences flowing from the tendency to recognize certain group structures as entities (e.g., Campbell, 1958; McConnell et al, 1997; see also recent work on perceptions of dyads in organizations by Krackhardt and Kilduff, 2001). We also know little concerning people's ability to record changes in organizational social structure. We know, for example, that humans have difficulty in keeping track of the movements of more than four units at a time (Dehaene, 1997), but we have little research concerning whether members of even relatively small organizational networks are able to accurately record changes in connections. To the extent that organizational members remain unaware of their structural constraints and opportunities, many of the purported benefits that can flow from network embeddedness and connectedness may fail to materialize.

Future research is likely to pursue the cognitive turn to include the whole organization as a network of cognitions. Fundamental to such an effort will be the reconceptualisation of organizations and environments as cognitions stored in the

minds of participants. For example, a jazz orchestra can be analyzed in terms of network ties between such nodes as: time spent rehearsing, availability of new numbers, number of criticisms received, and the number of people present at rehearsal (Bougon, Weick, and Binkhorst, 1977). As cognitions, many disparate organizational elements can be included in the same analysis, thus fulfilling one of the aims articulated by the actor-network theory research program (e.g., Law and Hassard, 1999) that has proved relatively intractable for the more quantitatively oriented social network research perspective.

The perceptual approach reminds us that different individuals perceive very different networks even when looking at the same set of nodes and relationships (cf. Kilduff and Krackhardt, 1994). The organization may resemble a holographic system of relationships, with the whole network idiosyncratically viewable from any node (Kilduff and Hanke, 2004). Thus, instead of the traditional emphasis on social networks in organizations consisting of pipes through which resources flow, the cognitive perspective places the emphasis on the network as a prism through which actors' relations and changes to those relations can be perceived as positive or negative depending on, for example, the status of exchange partners (Podolny, 2001).

An emerging perspective suggests examining the importance of network relations as signals of intrinsic (unobservable) quality. According to signaling theory (Spence, 1973), in order for a signal to be convincing, it must be difficult or expensive to produce (e.g., a Harvard diploma). How might this be relevant to network ties? High status partners, difficult to form ties with, may serve as signals of an individual's or an

organization's quality. The organization can be understood as a marketplace of perceptions within which what counts is whether individuals are perceived to have ties to high status partners (Kilduff and Krackhardt, 1994). As with any marketplace, there may be attempts to deceive. That is, deceitful signals concerning who is tied to whom may be broadcast in order to boost ego's perceived status. There may be a cognitive tipping point, such that perceptions, shared among a few key players, may create consensus in the whole network. The social construction of reputation may therefore be a highly fragile undertaking. Such social constructions can extend not only to individual people, but also to the creation of "celebrity firms" (Rindova, Pollock, and Hayward, forthcoming).

Organizational social network research has increasingly focused on outcomes at the individual actor level, as we have articulated in the section on social capital. In order to deepen our understanding of how, on the one hand, network position affects individuals' perceptions of opportunities, and, on the other hand, how individual differences contribute to differential perceptions of network structure, we may have to extend the cognitive turn in organizational network research to encompass a broader and deeper "micro" turn that connects individual identity and organizational identity (see the section on identity in this paper). As part of this effort, we foresee a greater emphasis on specific individual differences.

One promising trend in this direction concerns the personality variable of self-monitoring that differentiates between individuals on the basis of ability to modify attitudes and behaviors to meet the demands of different audiences (Snyder, 1974;

Snyder, 1979). We know that the high self-monitors, the chameleons of the social world, are more likely than the true-to-themselves low self-monitors to build social networks in organizations that span across different groups (Mehra, Kilduff, and Brass, 2001). We also know that, for a community of ethnic entrepreneurs, the high self-monitors are more likely than the low self-monitors to establish network links with a range of actors outside of the community (Oh, Kilduff, and Brass, 2003). There is also evidence that among top managers high self-monitors relative to low self-monitors tend to be more central in the care-giving network -- helping employees to manage their negative emotions (Toegel, Anand and Kilduff, 2004). But, so far we have failed to follow up research that suggests high self-monitors tend to outperform low self-monitors on tasks that include accurate person perception (Hosch, Leippe, Marchioni, and Cooper, 1984; Hosch and Platz, 1984), accurate emotional perception (Geizer, Rarick, and Soldow, 1977), and accurate interpretation of nonverbal behavior (Mill, 1984). It may be that different networking strategies depend on differences in networking "social intelligence." It is also possible that individuals who occupy different positions in organizational social networks (in terms of centrality, for example) perceive the network connections around them differently. Thus, theories, such as self-monitoring, concerning the nature of the self, may have important implications for how cognitions affect the structuring of networks, and how the different roles that people play in these networks affect cognitive processes. This research is really just beginning, and we anticipate further connections between individual differences and network structures (cf. Burt, Jannotta, and Mahoney, 1998).

Conclusions

As members of and representatives of organizations, our projects, careers, and identities develop within webs of interactions connecting us and, in some cases, isolating us from others -- this is the fundamental insight of the social network perspective. In this paper, we try to reinvigorate network research by reconnecting individual actors to the structural contexts within which they are embedded. We identified three frontiers for future research, each exemplifying aspects of the micro-macro tension. First, how does the individual pursuit of network advantage detract from or contribute to the emergence of public goods? Second, how do networks and identity reciprocally affect each other? Third, how do individual biases in the perception of organizational networks contribute to the emergence of consensually shared cognitive domains in organizations?

The underlying premise that individual-level identities, cognitions and interactions are the engines of stability and change in the macro structures that define or constrain social networks also dictates a somewhat different methodological approach than has been common in organizational network research. In order to bridge the gap between causal processes at the macro-structural level of socioeconomic organization and those operating at the individual level, therefore, we will also need to become better versed in a broad range of methodologies.

One of the distinctive advantages of the network approach has always been its ability to bring together quantitative, qualitative and graphical analyses, and focus these resources on theory-driven research questions concerning change processes in organizational

settings. For example, early research within the tradition of industrial anthropology investigated initial failure and eventual success of strike action in an African factory from a network perspective, combining detailed discussion of social actors in context together with network analytic techniques (Kapferer, 1972). More recent organizational network research that avoids methodological narrowness has continued to extend the frontiers of understanding concerning role relationships (Barley, 1990), interfirm alliances (Larson, 1992), strategic action (Stevenson and Greenberg, 2000), and business success (Uzzi, 1996). The types of research questions we have identified in this paper -- concerning social dilemmas, identities and cognitions -- will also respond to flexible combinations of research methods, particularly as processes of change in network relations move to the forefront of discussion. We need careful theoretical guidance in specifying appropriate time windows within which changes in network relations are to be expected. Career theory, with its long history of investigating cycles and stages, may provide suggestions concerning the investigation of network change.

Although we have tried to keep separate the distinctive issues concerned with the alignment of individual and collective networking interests, the ways in which identity is shaped by and helps shape networks, and the emerging perspective of organizations as networks of cognitions, research at the juncture of two, if not all three, of these areas may be especially productive. Recent research arguing that an organization's ties to other actors influences how it is perceived by actors outside the organization (Podolny, 1993, Stuart, Hoang, and Hybels, 1999) and that these ties are used to signal or change identity (Rao, Davis, and Ward, 2000), for example, suggests that cognitions about network relations are likely to be important factors in understanding the social construction of identity within and across networks.

The cognitive turn in organizational network research has drawn attention to the ways in which the emergence of social capital is in the eye of the beholder (Kilduff and Krackhardt, 1994; Podolny, 2001). Extending these cognitive insights, we might suggest that individuals implementing what appear to others to be purely selfish networking strategies may perceive themselves as contributing to communal social capital. Self-serving biases in the perception of network relations may be particularly likely when individuals evaluate their own social capital contributions to organizations. Linking cognitive theories to emerging research on social capital, therefore, is another potentially productive frontier for network research.

Yet a third example of productive cross-linkages among the three areas we have identified pertains to research on diversity. We have outlined the importance of membership in minority or majority groups in terms of how network processes affect identity salience and development. Of course, people belong to multiple groups, and have multiple bases of similarity from which to extend experimental identity extensions. All individuals, at some point in their organizational careers are likely to experience themselves as members of minority groups. The perception of shared bases of identification is an important avenue for future research connecting network cognition and identity. Identity development is likely to be influenced by individuals' perception of linkages among different actors, routines, or elements inside the organization. For example, an individual's perception of the causal link between a reward system and organizational effectiveness may influence the pattern of the individual's social interactions with other employees. As a result, a new identity may emerge around the perception of this causal link. Network research on cause maps

can investigate how different individuals' identities are constituted in terms of their distinctive perception of the interrelation of organizational elements.

Although we have focused our comments on new frontiers for social network research, the research agenda we have articulated can also stimulate research and theory development on social capital, identity and cognitions, respectively. For example, in recent years, the notions of identity and identification have served as powerful lenses for understanding a wide range of organizational phenomena including culture, career socialization and strategic change (see Albert, et al, 2000, for a review). After a productive period in which identity scholarship focused on that which is central distinctive and enduring about a person or group (Albert and Whetten, 1985), more recent theorizing has started to tackle the inherent multiplicity of identity and dynamism of identity processes. The network focus suggested here can help identity scholars uncover the processes by which identities evolve and change.

We have argued that infusing network research with ideas about social capital, identity and cognitions has the potential for offering insights that cannot be obtained from any single perspective. The three frontiers for network research that we propose are not exhaustive. Yet they define fundamental categories for organizational studies: how we allocate information, knowledge and support; how we define ourselves; and how we see the world around us. In tackling these questions, any network research that fails to consider both individuals and the collectivities within which they are embedded will provide only partial explanations.

Table 1. Individual and Communal Social Capital

		Communal Social Capital	
		Low	High
Individual Social Capital	High	2. Tragedy of Commons	1. Value Congruence Network
	Low	3. Atomized Market	4. Total Institution

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