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NETWORK AGENCY

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The question of agency has been neglected in social network research, in part because the structural approach to social relations removes consideration of individual volition and action. However, recent emphasis on purposive individuals has reignited interest in agency across a range of social network research topics. Our paper provides a brief history of social network agency and an emergent framework based on a thorough review of research published since 2004. This organizing framework distinguishes between an ontology of dualism (actors and social relations as separate domains) and an ontology of duality (actors and social relations as mutually constituted) at both the individual and the social network level. The resulting four perspectives on network agency comprise individual advantage, embeddedness, micro-foundations, and structuration. In conclusion, we address current debates and future directions relating to sources of action and the locus of identity.

> The tertius plays conflicting demands and preferences against one another and builds value from their disunion. (Burt, 1992: 34)
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> Cosimo de' Medici did not design his centralized party, nor did he intend (until the very end) to take over the state. . . Only very late in the game, we shall argue, did the Medici adaptively learn of the political potential of the social network machine that lay at their fingertips. In almost Hegelian fashion, oligarchs crafted the networks of their own destruction. (Padgett & Ansell, 1993: 1287)

Social theory has long wrestled with problems of whether and how people make decisions independently of the structures within which they are embedded (see Emirbayer & Mische, 1998, for a review). Karl Marx (1852) noted that people "make their own history, but they do not make it as they please; they do not make it under self-selected circumstances, but under circumstances existing already, given and transmitted from the past." For organizational research, the problem of agency is particularly relevant given the wide range of choices that modernity offers to individuals (Whittington, 1992). People, it has been suggested, in modern organizations express agency through actions and decisions that recursively modify behavioral routines over time (Barley & Tolbert, 1997), taking advantage of organizational shocks (e.g., Tasselli, 2019) to instantiate change (e.g., Barley, 1986).

But despite widespread attention in organization theory (see the special issue edited by Bouchikhi, Kilduff, & Whittington, 1997), the problem of agency has been neglected in organizational social network research, partly as a consequence of the emphasis on the structure of network relationships vis-à-vis the power of individuals. From a structural perspective, the "static position of the actor in the network has been assumed to explain his or her actions in social settings" (Stevenson & Greenberg, 2000: 652). The key assumption is that "people act on all network opportunities"—thus, "agency can be ignored because it is coincident with opportunity" (Burt, 2012: 545). This explaining away of agency is, perhaps, less satisfactory in a field in which a growing interest in social network micro-foundations puts individual action and decision making back into focus (e.g., Tasselli, Kilduff, & Menges, 2015). From this micro-foundational view, emphasis is given to the ways people take action in social networks. Although all

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network researchers would tend to agree that individuals' positions in networks reveal "the potential for action" (Stevenson & Greenberg, 2000: 652–653), it is nevertheless clear that "people [not networks] are the source of action" (Burt, 2012: 545).

Building on this emerging debate in the organizational social network literature, in this paper we address questions concerning the extent to which social capital and its consequences result from actions of purposive individuals (the locus of agency at the individual level) versus resulting from social network phenomena beyond the control of individuals (the locus of agency at the network level). The question concerning network agency, therefore, defines the *locus of action* involving individual choices and structural patterns of network interaction (e.g., Emirbayer & Goodwin, 1994). Advocates of the structural side of the debate explain that "a rock dropped from the same place in the same way has the same outcomes regardless of whether it was dropped on purpose or by accident" (Borgatti & Halgin, 2011: 1178). However, advocates of a micro-foundational perspective see the nodes in social networks not as inanimate lumps but as individuals with motives, cognitions, and personality.

This tension concerning agency has been latent in social network theory since its inception (e.g., Moreno, 1941), but has emerged more recently in leading theoretical approaches to social interactions, including weak tie theory (Granovetter, 1973), structuration theory (Giddens, 1984; Stones, 2005), and structural-hole theory (Burt, 1992, 2007, 2010). The agency of individuals in social network contexts has been particularly resonant in research that has brought the person back into the analysis of social networks (Kilduff & Krackhardt, 1994) through the study of network cognition (e.g., Krackhardt, 1987) and personality antecedents of social network positions (for reviews, see Kilduff & Buengeler, 2019; Landis, 2016). Previous reviews on social networks in organizations have focused on key concepts (Borgatti & Foster, 2003; Kilduff & Brass, 2010), including brokerage (Halevy, Halali, & Zlatev, 2019; Stovel & Shaw, 2012); on the antecedents of social networks (Tasselli et al., 2015), including cognition (Brands, 2013; Smith, Brands, Brashears, & Kleinbaum, 2020) and personality (Kilduff & Buengeler, 2019; Landis, 2016); and on network advantage (Burt, Kilduff, & Tasselli, 2013). The *agency issue*, and thus the links between network structure and individual action, has rarely surfaced (for partial exceptions, see Gulati & Srivastava, 2014; Kirschbaum, 2019), despite the relevance of agency for network theory (e.g., Emirbayer & Goodwin, 1994) and research at the intraindividual (e.g., Landis, Kilduff, Menges, & Kilduff, 2018), interindividual (e.g., Burt, 2012; Quintane & Carnabuci, 2016), and organizational (e.g., Clement, Shipilov, & Galunic, 2018; Stevenson & Greenberg, 2000) levels.

In this paper, we articulate how agency has been discussed; in doing so, we aim to make sense of past theory and influence the development of future theory. We review, categorize, and discuss recent and current research on network agency; we address contemporary debates and issues; and we envisage and discuss future research implications and directions on agency in social networks. We include empirical, conceptual, and meta-analytic studies addressing network agency.

CHOOSING WHICH LITERATURE TO REVIEW

Because our focus is on agency in the context of social network research, we began by including all apparently relevant papers on social networks in organizations published in leading journals in the last 15 years (2004–2019),[1] and then retaining only papers that addressed network agency. We chose 2004 as the starting point because of the influential review published in that year that touched on issues of agency and structure (Brass, Galaskiewicz, Greve, & Tsai, 2004). Based on our conceptual focus, we retained only articles that focused on interpersonal networks. Research at other levels of analysis (e.g., interorganizational) were included only if there were relevant implications for either interpersonal networks or issues related to the locus of action at the interpersonal versus network level. We excluded reviews, commentaries, and methodological papers. We then made our search more comprehensive by reviewing all the reference lists of these and related articles to be sure that we captured intellectual

[1] We searched for research on "organizational social networks" published in 12 leading journals in management, organizational psychology, and sociology, reading all titles and abstracts of the articles published in those journals (*Academy of Management Journal, Academy of Management Review, Administrative Science Quarterly, American Journal of Sociology, American Sociological Review, Journal of Applied Psychology, Journal of Management, Journal of Management Studies, Management Science, Organization Science, Organization Studies, Strategic Management Journal*). We limited our search to the last 15 years, from 2004 to 2019 (including articles accepted or published online in that year). The result of this first search was a list of 271 papers.

lineages. This iteration provided links to additional, relevant research in management, organization studies, sociology, and social psychology. The final list included 236 articles, all of which are summarized and referenced in Appendix A with respect to their implications for agency. Because this is the first review paper concerning network agency in relation to management and organizational research, we also delved into prior research to provide context for contemporary developments.

Brief History of Network Agency

There has been longstanding intellectual interest in network agency. Are individuals, in their idiosyncratic differences and choices, in the driving seat? Or do network properties and structures shape the actions and identities of individuals in networks? The intellectual history of free will versus determinism in relation to social theory has been covered in depth elsewhere (e.g., Emirbayer & Mische, 1998). Here, we trace influences from the social sciences on how network research addresses issues of agency.

Foundations in social psychology. The founder of sociometry, Jacob Moreno, was among the first to recognize the embeddedness of individuals in chains of influence. For Moreno, the basic unit of analysis is the "social atom," which consists of "an individual and the people (near or distant)" to whom the individual "is emotionally related at the time" (Moreno, 1947: 80). Moreno, indeed, may lay claim to have discovered the ego network that has been a feature of much research, particularly in large organizations (e.g., Burt, 2004). In the work of Moreno (1941: 16), social networks are seen as "catalyzers" leading otherwise "passive agents" to action. In analyzing how behaviors (such as the absconsion of delinquent girls from their group home [Moreno, 1934]) resulted from both social network connections within the social atom and individual predispositions, Moreno anticipated the modern debate concerning network structure versus personality explanations for such outcomes (e.g., Burt, 2012; Kilduff & Lee, 2020).

The tension between internal and external forces as influences on human action was also at the core of Lewin's (1936) field theory. Lewin emphasized a topological psychology that examined patterns of interaction between the individual and the social field in which the individual is located. Fritz Heider was influenced by Lewin in focusing on the subjective representation of human experience, but differed from Lewin in working to explain, through the development of balance theory, the dynamics of individual perception of other people's actions (Heider, 1946, 1958). From Heider's perspective, people experience a strain toward balance in friendship relations, such that when people perceive that their friends are not friends of each other, they may cognitively distort relationships or take action to balance relationships (for an empirical test, see Krackhardt & Kilduff, 1999). If the network relationships in an organization move toward perfect balance, two subgroups emerge within which positive ties predominate and between which negative ties separate, irrespective of people's volition and even of their cognitive awareness (Cartwright & Harary, 1956). This intuition inspired recent research on the structural implications of network change (Tasselli & Caimo, 2019) and on the dynamics of between-group conflict and negative ties (Labianca, 2014).

Foundations in anthropology. The major influence of anthropology has been in the area of network cognition. A basic interest in anthropology concerns the accuracy of informant recall of interpersonal relations such as communication ties. Anthropologists showed that people are frequently inaccurate in recalling their recent interactions (for a review, see Bernard, Killworth, Kronenfeld, & Sailer, 1984). However, people are relatively accurate at reporting the enduring sets of relationships within which they are embedded (Freeman, Romney, & Freeman, 1987), even though they tend to overestimate their own centrality in, for example, department friendship networks (Kumbasar, Rommey, & Batchelder, 1994). These combined results raise the question of the extent to which people's attitudes and behaviors are influenced by their daily interactions (even though they tend to forget these meetings), or whether it is their remembered and familiar relationships that contribute to attitudes and behaviors such that they overestimate the extent of social support for their initiatives. The focus on network cognition that was pioneered by anthropologists has become a significant strand of social network research in organizational settings (for a review, see Brands, 2013).

Another focus of anthropological network research concerns how roles are shaped by social interactions (Nadel, 2013). For example, the work of Elizabeth Bott (1957) showed that working class married couples in London tended to enact traditional gender roles with each other when wives were embedded in networks of family and neighbors, and husbands were embedded in networks of work and friends. However, when these couples were moved out of their familiar social contexts to another part of

London where prior social bonds were unavailable, role relationships changed toward mutual dependence on each other, and gender equality. Agency, in terms of the daily enactment of obligations and norms, changed as the embeddedness in external social relations diminished.

Foundations in sociology. In sociology, the towering figure for network research is Georg Simmel, who articulated key concepts, including *tertius gaudens*—the broker who gains from others' lack of connection; the distinction between dyads and triads in terms of, for example, majority influence; and the positive effects of conflict relationships (see Coser, 1998). Recent research has developed ideas of brokerage to contrast different types of agency (Long Lingo & O'Mahony, 2010). The *tertius gaudens* keeps people apart or bridges between them (Burt, 1992), thereby providing advantages including good ideas, whereas the *tertius iungens* brings interested parties together in the furtherance of project completion (Obstfeld, 2005).

There has also been lively debate concerning Simmelian brokerage, a structure in which an individual is a member of two or more cliques. The Simmelian broker has been variously described as paralyzed by the competing demands of rival cliques (Krackhardt, 1999) or active in engendering innovation across boundaries (Vedres & Stark, 2010). A recent reconciliation of different perspectives proposed and found that the extent to which individuals are effective in the Simmelian broker role depends on the fit between their personality and the network structure in which they are embedded (Tasselli & Kilduff, 2018).

In the Simmelian perspective, there is an emphasis on action. The broker seizes opportunities and shapes others' behaviors. However, in much of the traditional sociological research on networks, agency at the level of individuals is absent. Instead, the focus is on how "relationships structure resource allocation under conditions of scarcity" (Wellman, 1988: 6). Agency has been seen to rest on the "interlock and interaction of objectively definable social relationships" (Boorman & White, 1976: 1442). The study of the individual has been considered a "dead end" (Mayhew, 1980: 335), and the social network approach defined as a "scientific revolution" (Berkowitz, 1982: 150) incommensurable with other perspectives that incorporate an active role for individuals. Following this "anti-categorical imperative" (Emirbayer & Goodwin, 1994: 1414), structurally informed network researchers have tended to dismiss the study of individual attributes because of measurement difficulty (e.g., Pfeffer, 1983) or irrelevancy (e.g., McPherson, Popielarz, & Drobnic, 1992). The micro-foundations movement in organizational social network research has contested the absence of agency at the individual level (e.g., Tasselli et al., 2015).

Modern developments. A growing body of research has brought the "person back in" to the study of social networks in the form of antecedents of structural positioning. These antecedents include demographic factors (e.g., Ingram & Morris, 2007; Jehn & Mannix, 2001), organizational roles and actions (e.g., Tasselli, 2015), personality (for a recent meta-analysis, see Fang, Landis, Zhang, Anderson, Shaw, & Kilduff, 2015), cognition (e.g., Brands & Kilduff, 2013), and genetics (e.g., Burt, 2008, 2009; Fowler, Dawes, & Christakis, 2009). This recent agentic trend in social network research (e.g., Burt et al., 2013) altered the landscape, such that articles positing personality effects on brokerage have come to be published even in sociology journals (e.g., Burt, 2012). However, this still leaves an unsatisfactory dualism between individuality (representative of the "push" factor of motivation from within) and social networks (representative of the "pull" factor of structures of opportunity from without). In considering agency it is also helpful to incorporate a relational approach that views social life as a dynamic interplay of idiosyncratic individuals constrained and enabled through their social network ties (Kilduff, Tsai, & Hanke, 2006).

NETWORK AGENCY: AN EMERGENT FRAMEWORK

Network agency represents "an analytical category in its own right," as it involves consideration of the "embedded process of social engagement" through which individuals act and interact in organizations (Emirbayer & Mische, 1998: 962–963). This attention to the locus of action entails the balance between actors and social contexts in the development of action. Relevant research has investigated how individual (e.g., Sasovova, Mehra, Borgatti, & Schippers, 2010), team (e.g., Schulte, Cohen, & Klein, 2012), and organizational (e.g., Clement et al., 2018) actions either affect or are affected by network structures (e.g., Gulati & Srivastava, 2014; Vedres & Stark, 2010) and by the nature and strength of the ties (e.g., McFayden, Semadeni, & Cannella, 2009; Ryan, 2016); and how these patterns influence important work-related outcomes including creativity (e.g., Perry-Smith & Mannucci, 2017), innovation (e.g., Obstfeld, 2005),

trust (e.g., Levin & Cross, 2004), performance (e.g., Fang et al., 2015), and opportunity recognition (e.g., Landis et al., 2018).

Despite its relevance, the concept of agency has often "maintained an elusive, albeit resonant, vagueness" in social network research (Emirbayer & Mische, 1998: 962). Part of this vagueness results from the emphasis of most network research on the composition, functioning, and consequences of structured patterns of interactions at the expense of any consideration of individual attributes, motives, or dispositions (Kilduff & Tsai, 2003). However, the understanding of agency in organizational social networks cannot be limited to the analysis of structural properties of the network. The definition of agency as the locus of action includes two interwoven dimensions: the *locus* (i.e., the level of analysis in which networking activity is located) and the *nature of agency* (i.e., the nature of the interplay between subjects and structure from which action is generated). Agency requires a framework that strikes a balance between individual and network loci (Emirbayer & Goodwin, 1994).

In reviewing the corpus of research on network agency, we surfaced consistent distinctions with respect to *ontology*; that is, the nature of the relationship between actors and network structure; and with respect to *analytical level*, distinguishing between the individual (i.e., ego) level and the network level. These distinctions build on early work in the realm of sociometry (Moreno, 1937), in which the distinction was drawn between people and networks as mutually evolving systems, and people and networks as ontologically distinct realms; and in which there was also a parallel phenomenological emphasis on whether ego or the network is the locus of analysis.

Thus, we distinguish an ontology of *dualism*, which treats actors and social relations as separate domains, from an ontology of *duality*, which considers actors and social relations as mutually constituted systems (e.g., Sonenshein, 2016). The emergent organizing framework incorporates four perspectives on network agency at two levels of analysis (ego, social network) crossed with two levels of ontology (dualism, duality), as shown in Figure 1. In Appendix A, we classify all reviewed articles into the four perspectives, and we highlight the main relevance of each article for network agency.

Network ontologies investigate the relation between actors and social structures. The first two perspectives that we review (individual advantage and embeddedness views of agency) both feature an ontology of dualism. The network is seen not as an intrinsic component of individual identity and action, but as a structural arena that helps people gain and maintain advantage (e.g., Quintane & Carnabuci, 2016), or that enables and constrains individual action (e.g., Tortoriello, McEvily, & Krackhardt, 2014). Dualism is evident regardless of whether structural positions are occupied by individuals pursuing individual advantage (as suggested by structural-hole theory [Burt, 1992]), or whether individuals benefit from serendipitous embeddedness (as in the case of weak ties bridging between community structures [Granovetter, 1973]).

In contrast, micro-foundational and structuration perspectives conceive actors and networks as a duality, such that the social network is both "structuring and being structured" by actors who are "suffused" within social contexts (Michel, 2014: 1097). Recalling the ontological distinction established by Moreno (1941) concerning the "pull of the situation"

FIGURE 1
Contrasting Perspectives on Network Agency

		Ontology of Agency	
		Dualism	Duality
Level of Agency	Individual	I. Individual Advantage (e.g., Burt, 1992)	III. Micro-Foundations (e.g., Tasselli, 2015)
	Network	II. Embeddedness (e.g., Granovetter, 1985)	IV. Structuration (e.g., Barley, 1986)

and the "push of individuality," these two forces are conceptually separate according to dualism perspectives, whereas they mutually influence each other according to duality perspectives.

In our organizing framework, the emphasis on ontology is balanced by a parallel emphasis on the level of analysis, the locus of action. Both individual advantage and micro-foundational views of agency are phenomenologically *ego-oriented*. From an individual advantage perspective, the focus is on the extent to which ego leverages network position in search of advantage (e.g., Burt, 1992). By contrast, embeddedness and structuration perspectives are *network-oriented*, such that the locus of action is mainly at the level of network components and dynamics, rather than at the level of individual members.

Four Perspectives on Network Agency

We conducted a comprehensive and systematic review of the social network literature, classifying each item of source material as dealing with agency in at least one of the four different ways summarized in Figure 1 (see also Appendix A). Thus, articles were classified as treating agency in terms of (I) individual advantage, (II) network embeddedness, (III) micro-foundations, or (IV) structuration process. For each perspective on agency, we review and discuss the results of our analysis of the literature.

I. Agency as Individual Advantage

From this perspective on agency the locus of action is at the individual level, whereas the network, in its components, is the structural platform in which localized action is formed (Simmel, 1908/1950). Opportunity and motivation are "one and the same" (Burt, 1992: 36): People manage networking opportunities that are structurally provided by the social and organizational context, such that they can build and extract value from their social connections (Burt, 1992: 34). Individuals are propelled into network positions because of anticipated beneficial outcomes, such that "actions are 'caused' by their (anticipated) consequences" (Coleman, 1986: 1312). In turn, people's actions coalesce in higher network-level configurations through individual processes that cannot simply be captured by analyzing structural properties of the network (e.g., Stevenson & Greenberg, 2000).

The foundations of this research tradition date back to Simmel (1908/1950), with his emphasis on the micro-dynamics of strategic interaction among individuals who know each other well and who interact in close proximity. From this view, individuals forge, shape, and arrange networking interactions in order to achieve personal and organizational advantage (e.g., Burt et al., 2013). This view, which occupies a prominent role in organizational social network research, characterizes leading approaches to social interaction, including theory and research on structural holes (e.g., Burt, 2004, 2007), individual centrality (e.g., Barsness, Diekmann, & Seidel, 2005; Mehra et al., 2006), and strategic action in networks (e.g., Battilana & Casciaro, 2012; Stevenson & Greenberg, 2000).

Advantage as spanning structural holes. Structural-hole theory and research have evolved markedly since the theory's earlier articulation (Burt, 1982). In the earlier work the emphasis (borrowing from Simmel, 1955) was on the extent to which actors achieved autonomy by occupying positions that had many conflicting group affiliations. Prefiguring the later emphasis on how diverse contacts reduced constraint, the autonomy argument emphasized how "the pattern of relations defining the network position 'frees' occupants of the position from constraint by others" (Burt, 1982: 922). In the later development of this argument, as it affected the interpersonal relations that form the opportunity for agency, the emphasis changed from structural positions (occupied by structurally equivalent actors [Burt, 1982]) to individual persons; and from freedom from constraint to the contrast between constraint on the one hand and control on the other (Burt, 1992). More recently, the micro–macro dynamic has, following empirical results (Burt, 2007), encompassed ego within the restricted focus of the individual's direct contacts, thereby eschewing implications concerning the much wider community (Burt, 2010).

With respect to how agency is considered within structural-hole theory, there has been a developing emphasis on differences among individuals' ability to recognize and take advantage of structural-hole positioning (Burt, 2005: 23). People display consistency across situations in whether they build closed or open social networks, and this consistency in networking style is strongly suggestive of individual agency in network construction. Achievement is determined by the individual's role experience and the individual's role-specific network (Burt, 2012). Network brokers, who span across the gaps in social structure, are "highly mobile relative to the bureaucracy" in providing faster and better solutions to organizational problems (Burt, 1992: 116).

The agentic potential to gain advantages by spanning network holes may provide incentives for people to relate to others for personal gain rather than on the basis of liking. Thus, strategic social networking emerges as an important explanatory mechanism of changes in the social fabric and cohesion of organizations and societies (Buskens & Van de Rijt, 2008). However, we should recall Simmel's (1955) warning that a triad tends to resolve itself into a coalition of two against one (see also Tasselli & Kilduff, 2018; Tortoriello & Krackhardt, 2010)—a warning that lends emphasis to research on triads that has highlighted the extent to which the broker acts not as an exploiter but as a matchmaker. The matchmaker, or *tertius iungens*, brings parties together for mutual gain and for the good of the organization (e.g., Obstfeld, 2005), thereby establishing a networking pattern that leads to advancement for the broker (Kleinbaum, Stuart, & Tushman, 2013).

Brokers connect individuals not only within but also across organizational units and communities (Fernandez & Gould, 1994), with generally positive results: A study of all telephone calls for a given month (Eagle, Macy, & Claxton, 2010) across the United Kingdom showed that socioeconomic opportunities within a community increase with the number of structural holes in the ego networks of members. Further, to the extent that brokers connect people across (rather than within) organizational boundaries, their spanning of structural holes relates positively to creativity and quality of their decision making (Zou & Ingram, 2013).

The organizational landscape changes quickly in terms of structural-hole opportunities that appear and disappear (Burt, 2002). In the Italian television production industry, structural holes spanned by production-team members in the past had no significant effects on current performance (Soda, Usai, & Zaheer, 2004). The benefits to the individual of spanning across structural holes need to be balanced, therefore, against the costs of a continual search for new opportunities. If opportunities change quickly, there are benefits to being connected within a cohesive group, given that cohesion speeds up the transfer of timely information and resources (Aral & Van Alstyne, 2011). Further research is needed to understand the extent to which opportunities arising from spanning structural holes are short-lived (e.g., Burt, 2002) and thus need to be quickly regenerated in order to maintain structural advantage (e.g., Burt & Merluzzi, 2016; Zaheer & Soda, 2009).

Advantage as network centrality. Keeping the focus on individual advantage and extending the range of individual activity beyond the ego network, the individual can be evaluated with respect to how central they are in larger network structures (e.g., Mehra, Kilduff, & Brass, 2001). Some individuals are more popular than others in terms of having more connections (i.e., degree centrality), whereas other individuals are more central in terms of acting as hubs for information or resource exchange, or as go-betweens for people lacking direct connections with each other (i.e., betweenness centrality [Freeman, 1977]).

The specific social network positions individuals occupy can have major consequences for the macro-environment of which they are part. For example, an individual can wield influence over the whole network with even a few connections if these connections are to well-connected people; that is, if the individual's eigenvector centrality is high (Bonacich, 1987). Some individuals are influential through their official positions as leaders (e.g., Tasselli, 2015), but the question remains as to whether leadership is boosted via the occupation of advantageous network positions. The evidence suggests that teams perform better to the extent that team leaders are central in instrumental networks (Balkundi & Harrison, 2006). In addition, such team-leader centrality boosts performance of the team in part because central team leaders are seen by team members as charismatic (Balkundi, Kilduff, & Harrison, 2011). Recent research on leader centrality has been interested in connecting the micro-layer of ego's interaction with the macro-layer of organizational performance. A study conducted on 600 of the Forbes list of the largest U.S. industrial and service firms showed that CEOs' advice networks mediate the effects of governance factors on firm performance (McDonald, Khanna, & Westphal, 2008). Future research can investigate whether and how leader centrality coevolves with social structure, thereby contributing to the firm's centrality in the surrounding business environment (e.g., Tasselli et al., 2015).

Advantage as taking strategic action. A focus on agency as individual advantage implies tracing action and interaction back to individuals, and then tracing interpersonal advantage from the individual level to progressively higher levels of structural interaction. Recent work has shown that being connected to other well-connected people has little benefit for ego (e.g., Burt, 2007), such that network advantage mainly lies in ego's direct network (Burt, 2010). There has been growing emphasis on people "who can speak to your virtues" (Burt, 1992: 15), and

thus on benefits that flow from the immediate set of contacts around the individual rather than from secondary and more distant contacts. Network advantage would seem to depend more on ego's ability to activate personal contacts rather than on ego's placement within structures that involve indirect and less controllable connections. Activated networks have been defined as subsets of ego's networks that are "continuously reconstructed depending on the situation" (Perry-Smith & Mannucci, 2017: 67). Interestingly, in this activation process individuals can rely not only on ties that are already present and available but also on latent (Mariotti & Delbridge, 2012) and dormant ties (Levin, Walter, & Murnighan, 2011), opening up reflection on the nuanced interplay between "activity" and "memory" as the key drivers of individual (e.g., Levin & Walter, 2018) and organizational (e.g., Tasselli, 2019) network advantage.

Recent research has given attention to the strategies that people employ when networking, focusing on the underlying agency mechanisms involved. Using a grounded theory approach, a qualitative network study on a sample of service professionals revealed different types of strategic players. These included devoted players who were actively engaged in pursuing network advantage, purists who disliked and tended to avoid networking, and players who were selective in their networking activities. These networking strategies seemed to be independent of the networking positions that people occupied (Bensaou, Galunic, & Jonczyk-Sédès, 2014).

II. Agency as Network Embeddedness

From this second perspective, the emphasis is on networks as entities that enable and constrain "social behavior and social change" (Wellman, 1983: 157). This view emphasizes how individuals' personal and organizational decisions can be explained by these individuals' embeddedness in social and societal contexts (e.g., Granovetter, 1985; Vedres & Stark, 2010). The foundations of this research tradition date back to Durkheim's (1897/1951) work, which focused on the structural, distant influences that affect the outcomes not just of individuals but also of local networks and larger social communities. People in Durkheim's account were portrayed as fortunate or unlucky recipients of social and cultural influence. In this perspective the locus of action resides at the network level, such that networks exert effects on individuals beyond the reach of their propensities or wills (for a review of network embeddedness at different levels of analysis, see Brass et al., 2004; for how individuals' network embeddedness affects how much others trust them, see Chua, Ingram, & Morris, 2008). As in the individual advantage view, individuals and networks are treated as separate ontological domains.

As evidenced in the second quote at the beginning of this paper, the celebrated account of how Cosimo de' Medici managed social networks to the advantage of his family in fifteenth-century Florence attributes apparently strategic action to network positioning rather than to the actions or strategies of individuals. Cosimo's location in "contradictory networks" induced what Padgett and Ansell (1993) referred to as his "robust action." From an embeddedness perspective, "others' locked-in interactions generate a flow of collective behavior that just happens to serve one's interests" (Padgett & Ansell, 1993: 1260).

The embeddedness argument is central to research on weak ties (Granovetter, 1973), with its emphasis on serendipitous interactions surprising individuals with unsought for opportunities. More recently, research has emphasized structural properties of networks including network cohesion (e.g., Tortoriello, Reagans, & McEvily, 2012), homophily (e.g., Ertug, Gargiulo, Galunic, & Zou, 2018), clustering properties (e.g., Kilduff, Crossland, Tsai, & Krackhardt, 2008), transitivity (e.g., Tasselli & Caimo, 2019), core–periphery structures (e.g., Cattani & Ferriani, 2008), and density (e.g., Gargiulo, Ertug, & Galunic, 2009). Here, we focus on embeddedness as the influence of structures at the community and local network levels on individual action.

Community structures influencing the individual. From an embeddedness view of agency, distant structural influences affect the individual's experience of the network, such that individuals' distinctive social identities emerge from participation in community structures (Warner & Lunt, 1941). Thus, from a weak-tie perspective, "the personal experience of individuals is closely bound up with large-scale aspects of social structure, well beyond the purview or control of particular individuals" (Granovetter, 1973: 1377). Novel opportunities and resources become available not through the local, close-knit relationships of friendship and kinship, but through ties that bridge to distant communities (Granovetter, 1973, 1983) or parts of the organization (Tasselli, Zappa, & Lomi, 2020).

Local processes, such as the creation or deletion of weak ties, contribute indirectly to opportunities for individuals through the formation of small worlds

(e.g., Watts, 2004)—i.e., clustered groups connected by short path-lengths (Robins, Pattison, & Woolcock, 2005)—and other global network structures. Changes in local networks shape individuals' opportunities by altering global network connectivity. Thus, with respect to agency, a view of community embeddedness has a double focus: a micro-focus on the *strength of the direct tie* between the individual and that individual's contacts within and beyond the workplace, as well as a more macro-focus on the *structure of ties* across the whole community of interests that constitutes the modern firm.

Local structures influencing the individual. From an embeddedness perspective, local network structures exert influence on individual action and interaction (e.g., Burt, 2010). These local structures feature dyadic, triadic, and extra-triadic relationships.

The dyad is the smallest relationship unit, and it is from dyadic relationships that larger network structures are formed. A first question of interest for agency is: How are dyads formed? Are they created through the action of purposeful individuals, or through the action of interindividual social forces? Research has shown that dyadic relationships form when people who share values, personalities (Duck & Spencer, 1972), or salient demographic characteristics (Mehra, Kilduff, & Brass, 1998) meet each other either through social activities (Feld, 1981) or through geographic proximity (Festinger, Schachter, & Back, 1950). Thus, within organizations, dyadic relationships form when individuals share common interests, when they interact in the same places, and when they are placed in the same organizational units (Kleinbaum et al., 2013). The emphasis in this research is less on the importance of individual agency and more on the happenstance of shared similarity among people who find themselves proximate.

Further, among those who are proximate, the tendency is for individuals to form relations with others who share attributes that happen to be rare in that social context (Mehra, Kilduff, & Brass, 1998). Thus, two "African Americans in a crowd of whites will tend to notice and identify with each other because of their common race; however, when in a group of other African Americans, the same two people are unlikely to notice or identify with each other" (Mehra et al., 1998: 442). The homophily tendency drives people together in ways that are less about personal agency and more about social context. Even when people try to be agentic in pursuit of meeting diverse others, they tend to find themselves falling back on existing dyadic relationships rather than making new connections (Ingram & Morris, 2007). In addition, powerful people, who experience themselves as agentic, tend to misperceive the social world of influence relationships (Simpson, Markovsky, & Steketee, 2011), leading powerful people to "fill in the blanks" (Freeman, 1992) by perceiving connections not present in reality. A paradox of power is that the powerful are agentic in the pursuit of opportunity but are unable to perceive the network opportunities that are available (Landis et al., 2018).

Moving to the extra-dyadic level, sociologists have long been fascinated by the triad because it incorporates richer possibilities of micro–macro extension than the dyad (e.g., Caplow, 1956). The basic distinction is between open and closed triads. An open triad offers the opportunity for the connected member to play the role of *tertius gaudens*: the third party who draws advantage from the quarrel of two disconnected others (Simmel, 1955). This constitutes the structural premise of structural-hole theory and research, as discussed above. By contrast, the embeddedness perspective on agency emphasizes the closed triad—i.e., a three-person clique (a Simmelian triad) that tends to suppress individual interests, reduce individual power, and moderate conflict between the three individuals (Krackhardt, 1998). Closed triads promote accountability because individuals who behave badly toward each other are monitored by third parties (Simmel, 1955). Closed triads also promote community-level social capital through the establishment of collaborative group norms (Coleman, 1988). As the prevalence of such closed triads increases in an organization, it has been hypothesized that unethical behavior decreases (Brass, Butterfield, & Skaggs, 1998). In addition, when closed triads are cyclic—i.e., each actor gives resources to the second actor and receives resources from the third actor—they can facilitate knowledge transfer and cooperation in organizations (e.g., Tasselli & Caimo, 2019).

An emerging stream of research that is of interest from an embeddedness view of agency builds on the work of Simmel and further theoretical elaboration by Krackhardt (1998, 1999) to investigate Simmelian ties—that is, ties between two people who are both linked to a common third person—and Simmelian brokers, who occupy positions in two or more cliques. Strong Simmelian ties facilitate cooperation across departmental boundaries and lead to innovation (Tortoriello & Krackhardt, 2010). Simmelian brokers are known as "multiple insiders" because of their activities connecting across otherwise closed social groups (Vedres & Stark, 2010). This burgeoning interest in the constraints and opportunities

associated with Simmelian ties and brokers brings the triad into the forefront of network research.

The social interactions of individuals, and the subsequent formation of dyads and triads, contribute to the emergence, at the network level, of structural forms that, in turn, have consequences for individual agency. Basic network-level concepts include density and centralization. The density of social ties refers to the proportion of possible ties within the social network that are completed (Kilduff & Tsai, 2003). High levels of network density within an organizational network facilitate structures of cooperation (Coleman, 1990), whereas low levels of network density facilitate structural opportunities for brokerage (Burt, 2005).

With respect to agency, the density of ties within an ego network affects the individual's ease of knowledge transfer (Reagans & McEvily, 2003) and the individual's task mastery (Morrison, 2002). Teams that exhibit dense friendship networks or dense instrumental networks tend to perform strongly (Balkundi & Harrison, 2006). Network density also relates to other aspects of performance: A study of 300 groups across 100 organizations showed that workgroup friendship density predicted interpersonal citizenship behavior (Chung, Park, Moon, & Oh, 2011). However, teams that exhibit high density of hindrance relationships (i.e., relationships that hinder people from doing their work) tend to perform poorly (Sparrowe, Liden, Wayne, & Kraimer, 2001). Further, average tie strength interacts with network density in explaining knowledge creation, such that individuals who maintain mostly strong ties with coworkers who themselves have a sparse network are more likely to create new knowledge (McFayden, Semadeni, & Cannella, 2009).

Another aspect of network structure that influences the agency of interacting individuals is the extent to which the network is centralized around one or a few people. Greater network centrality negatively affects work group performance (Grund, 2012; Sparrowe et al., 2001). An alternative way of assessing centrality of the network involves measuring the extent to which the network exhibits a dense, cohesive core and a sparse, unconnected periphery (Borgatti & Everett, 2000). A study of awards in the creative world of Hollywood movies found that that individuals who constructed teams that combined peripheral and core members benefited from unusual ideas from the periphery combined with legitimacy and influence from the core (Cattani & Ferriani, 2008).

In a similar fashion, teams who produce Broadway musicals are affected by the system-level extent of clustering and connectivity (i.e., small worldedness) among creative artists: Team performance increases up to a threshold of industry-wide small worldedness, after which the positive effects decline (Uzzi & Spiro, 2005). The small-world pattern of informal communication (dense islands of close relations joined by sparse ties) is associated, within organizations, with the mechanistic mode of organizing that segments and channels transactions through structural differentiation, hierarchical decision making and formalized rules (Shrader, Lincoln, & Hoffman, 1989). Note, however, that, if we take the team itself as the unit of analysis, then centrality within the wider network of teams or business units relates positively to team (Balkundi & Harrison, 2006) and business unit (Tsai, 2001) performance.

III. Agency as Micro-Foundations

A third, micro-foundational view of agency emphasizes the extent to which differences in networking behaviors and in the resulting structural configurations can be traced to differences in interacting individuals (Kilduff & Lee, 2020). From a micro-foundational view, people and networks represent a duality: There is a reciprocal influence between the actors and the situations they structurally occupy in the network. The foundations of this relatively recent research tradition can be found in the move to go beyond the anti-categorical imperative of sociologically informed structural approaches (e.g., Wellman, 1988) and to bring individuals back in to social network research (e.g., Kilduff & Krackhardt, 1994). The success of this burgeoning research perspective is shown by the increasing number of special issues (e.g., Casciaro, Barsade, Edmondson, Gibson, Krackhardt, & Labianca, 2015), symposia at major conferences (e.g., Tasselli et al., 2016; Tasselli, Brands, Burt, Levin, Mehra, & Kleinbaum, 2020), review articles (e.g., Landis, 2016; Tasselli et al., 2015), and meta-analyses (e.g., Fang et al., 2015). Key research questions from this perspective concern the extent to which network positions (e.g., centrality, brokerage) and network properties (e.g., homophily, open and closed triads) that constitute the micro-components of larger network structures are explained by individual differences. The locus of action, from this perspective, resides at the individual level, such that individuals, in their idiosyncratic differences, form the analytical sources of action (Burt et al., 2013).

A characteristic that explains the recent development of this micro-foundational perspective is the consistent interest in how psychological traits affect

important outcomes that include performance (e.g., Fang et al., 2015), charisma (e.g., Brands, Menges, & Kilduff, 2015), and trust (e.g., Tasselli & Kilduff, 2018). Relevant individual differences include demography (e.g., Belliveau, 2005), personality (e.g., Fang et al., 2015; Klein, Lim, Saltz, & Mayer, 2004; Kleinbaum, Jordan, & Audia, 2015; Sasovova et al., 2010), motivation (e.g., Reinholt, Pedersen, & Foss, 2011), cognition (e.g., Brands & Kilduff, 2013), and genetics (e.g., Burt, 2008, 2009). Because the microfoundations of social networks have been extensively reviewed (e.g., Kilduff & Lee, 2020; Tasselli et al., 2015), in this section we provide a streamlined account of recent developments in relation to agency.

Networks in the mind. How the individual perceives the network (e.g., Janicik & Larrick, 2005) and how others use networks to appraise individuals (e.g., Kilduff & Krackhardt, 1994) are two central questions for research on network agency. With respect to perceptions of networks, a recent review examined systematic biases in individuals' perceptions (Brands, 2013). Because social networks are complex phenomena, the individual tends to simplify cognitive representations of social network relationships by, for example, assuming that two friends of the same person will themselves be friends (Krackhardt & Kilduff, 1999); and by misperceiving a complex network as a small world in which people are cognitively classified into clusters that are interconnected through the interactions of prominent people across the clusters (Kilduff, Crossland, Tsai, & Krackhardt, 2008). Linking with others distant from ourselves may require greater agency, in terms of time and effort, than our cognitive representations lead us to believe.

Related to the individual's tendency to cognitively fill in the blanks in social networks (Freeman, 1992), research (Flynn, Reagans, & Guillory, 2010) has shown that people with strong need for closure tend to assume their own social contacts are connected to each other even when this is not the case; these high-need-for-closure people are also inclined to misperceive friendships among others of the same racial category. So, individual perceptions of social networks tend to be more structured than is the case in actuality. To the extent that perceptions become reality (Thomas & Thomas, 1928), social network perceptual biases may therefore contribute to greater connectivity.

We discussed above the importance of structural-hole spanning for individuals in organizations. Recent network research has suggested that some individuals are disadvantaged by biased perceptions of their network roles. Women, relative to men, are systematically underperceived in their occupation of brokerage roles in organizations (Brands & Kilduff, 2013). Biased perceptions of network structures, from an agentic perspective, are not innocent mistakes; they have consequences for people's careers, whether the bias is directed against the individual's ego network or against the network surrounding an alter. Indeed, under threat of losing employment, low-status people (relative to those of high status) disadvantage their search for information and resources by activating smaller and tighter subsections of their networks (thereby restricting potential job opportunities) (Granovetter, 1973; Smith, Menon, & Thompson, 2012).

Recent research has shown the connection between network perceptions and the emergence of informal leadership in groups and organizations. At the individual level, people tend to use a linear ordering schema—that is, a pecking order (De Soto, 1960)—to process information about leadership interaction in the workplace. And when they experience leadership attributions to be inconsistent with that schema, individuals reduce the associated cognitive inconsistency by changing leadership attributions (Carnabuci, Emery, & Brinberg, 2018). At the group level, perceptions of competence and warmth among members explain patterns of leadership formation, such as the extent to which emergent leadership structure is centralized or shared (DeRue, Nahrgang, & Ashford, 2015). These studies have examined the extent to which agency, in terms of the dynamic interplay between individual cognition and interpersonal structure, affects leadership emergence.

Personality and agency. Despite the occasional voice lamenting the possible contamination of structural research through consideration of the attributes of individuals (e.g., Mayhew, 1980), the social network tradition has incorporated individuals' personalities into its analyses from the beginning. One of the pioneers of network research—Theodore Newcomb—discovered that authoritarians (distinguished by their negative views toward foreigners, their acceptance of the attitudes of those in power, and their beliefs against gender equality [Adorno, Frenkel-Brenswik, Levinson, & Sanford, 1950]) tend to overestimate the extent to which others to whom they are attracted share their views and reciprocate their liking (Newcomb, 1961). Ronald Breiger, besides contributing to the structural revolution in network research (Breiger, 1974; White, Boorman, & Breiger, 1976), also initiated innovative research on

personality from the structural perspective. The research investigated whether there was a match between people identified on the basis of structural analysis (who tended to have ties to the same other people) and people identified on the basis of personality orientation (identified on the basis of reports from trained observers) (Breiger & Ennis, 1979). The results demonstrated the duality of social life in that individuals' identities incorporated both dispositional and relational aspects.

Drawing from sociological traditions, social network analysis has often conflated individuality with the notion of social personality—a concept that finds its roots in the work of Simmel (1971) and concerns the ways in which an individual's participation in social activities differentiates that person from others. The assumption is that the dispositions of individuals reflect the structural positions that they occupy—a notion inspiring a view of "network-related personality," according to which "a person's social environment elicits a specific personality" (Burt, 1992: 262).

There have been, therefore, two quite different approaches to personality and networks of interest for agency—one involving *inherent* traits (the tradition of personality psychology) and the other involving *socially ascribed* traits (the tradition of sociology [e.g., Gordon, 1947]). Recent personality approaches have emphasized the importance of self-monitoring (Fang et al., 2015; Kilduff & Buengeler, 2019). Self-monitoring refers to the extent to which individuals shape their attitudes and behaviors to the requirements of different social situations (Snyder, 1979). High self-monitors tend to occupy and move into brokerage positions (e.g., Mehra et al., 2001; Oh & Kilduff, 2008; Sasovova et al., 2010) and gain career and performance advantages (Kilduff & Day, 1994).

The Big Five personality traits have less influence on social network outcomes than does self-monitoring (Fang et al., 2015). For example, all five traits together explain less than 2% of the extent to which people occupy central positions in instrumental and liking networks (Klein et al., 2004). It seems that individual differences that help explain social network outcomes are most effective when they specifically have a network implication. Thus, recent work has shown that blirtatiousness—the extent to which people tend to blurt out whatever is on their minds—helps to explain why Simmelian brokers, especially if they are high self-monitors who are low in blirtatiousness, are trusted by their work colleagues (Tasselli & Kilduff, 2018). Another paper extended our understanding of the effects of self-monitoring on brokerage by positing and showing that the effects are amplified in those high self-monitoring individuals who are perceived by others as empathic (Kleinbaum et al., 2015).

A question of interest for further research on the micro-foundations of network agency concerns whether occupation of structural positions affects individuals' personality orientations, as anticipated in the social personality tradition. Previous research has shown that leaders' charisma (a personality dimension evaluated by the reports of subordinates) is socially attributed by followers, such that leaders who are more central within their team advice networks tend to be seen as charismatic by subordinates (Balkundi et al., 2011). There is growing evidence that personality changes over time and in reaction to events (Tasselli, Kilduff, & Landis, 2018). Does the experience of specific social network positions foster patterns of personality change that can eventually affect organizational outcomes? This speculation has not been supported so far by empirical research.

IV. Agency as Structuration

A structuration view of agency conceives organizations as networks of relations that are in permanent states of flux and transformation. From this view, individual agency and network agency mutually constitute each other, such that "the structural properties of social systems are both the medium and the outcome of the practices that constitute those systems" (Giddens, 1979: 69). The locus of action resides at the level of those macro-structures that capture both structural and individual properties. This vision of agency has inspired post-structuralist approaches, including structuration theory (e.g., Barley, 1986; Berends, van Burg, & van Raaij, 2011) and actor–network theory (Latour, 1999). These varying approaches are similar in arguing that elements in the social world, including structure and action, exist in constantly shifting networks of relationships, and that organizations are systems of interdependences that are in permanent states of transformation (e.g., Alcadipani & Hassard, 2010). The emphasis is on *mutual constitution* (networks and individuals mutually structuring each other's identities and meanings [e.g., White, 2008]) to interpret the dynamic interplay of people and networks.

Although this research perspective is underrepresented in organizational network literature, relative to the other three perspectives discussed above, it has recently gained scholarly attention (see

Appendix A). Notably, this perspective has inspired work on multiplexity that starts from three assumptions: (a) organizations are embedded in different kinds of relationships, (b) these relationships are interdependent, and (c) this interdependence influences organizations (Shipilov, 2012). Relatedly, research on relational pluralism has examined "the extent to which a focal entity (a person, a team, or an organization) derives its meaning and its potential for action from relations of multiple kinds with other entities" (see Shipilov, Gulati, Kilduff, Li, & Tsai, 2014: 449).

Topics of interest within the structuration perspective include the nuanced relationships between human and nonhuman actors (such as robots or technological devices) in modern organizations. Agency from this perspective involves formalized or emergent structures of negotiated interaction with technologies that both enable and constrain individual choices (e.g., Sayes, 2014). Further research is needed on narrative networks (e.g., Padgett, 2018) and, more broadly, on cultures (e.g., Srivastava & Banaji, 2011), as collective semantic repositories of identities and meanings upon which individualized and collective interactions are forged (e.g., Lomi, Tasselli, & Zappa, 2017). There is also potential for further work examining how lay people, relying on implicit theories, construe different components of networks (e.g., Kuwabara, Hildebrand, & Zou, 2018).

Relational structuration. From a structuration perspective (Giddens, 1984), people create the structures that enable and constrain their actions. Thus, there is a clear link between the micro-activities of individuals and the macro social structures that achieve an apparently objective facticity. This insight has rarely been applied to organizational social networks (however, for an exception see Barley, 1986). Future research, therefore, is needed concerning how individuals' actions help form and reform the structural features of social networks that have energized much research activity on phenomena as diverse as small worlds, core–periphery structures, and centralization. We need to know more about how people are complicit in the creation of network arrangements within which their actions become embedded.

A structurationist study of how interorganizational networks and interpersonal networks interacted over time, for example, showed that structures were both the medium and the outcome of action (Berends et al., 2011). Given the current interest in the dynamics of social networks (e.g., Burt & Merluzzi, 2016), future research can help to examine how the social network activities of individuals contribute to macro-level network change, which, in turn, affects individuals' outcomes (e.g., Lomi & Stadtfeld, 2014).

Cultural structuration. This emerging stream of research has examined the processes by which interacting individuals "shape shared meaning systems out of 'heterogeneous bits of culture'" (Weber & Dacin, 2011: 289), including "local practices, discourse, repertoires, and norms" (Pachucki & Breiger, 2010: 206) that are initially created by independent actors (Van Wijk, Stam, Elfring, Zietsma, & Den Hond, 2013). This work has built on earlier recognitions that "a social network is a network of meanings" (White, 1992: 67) and that discursive "narratives" and "stories" are among the key elements of social life (Emirbayer & Goodwin, 1994: 1437).

According to this approach, cultural elements, including discourse and language, interweave with structural elements in shaping patterns of intersubjective interaction. Relevant research has examined conversations (Castilla, 2005), narrative networks (Pentland & Feldman, 2007), and organizational vocabularies (Loewenstein, Ocasio, & Jones, 2012; Tasselli, Zappa, & Lomi, 2020) as instruments for understanding the meta-cognitive flux behind the formation and maintenance of structural patterns.

We still lack a full integration of these cultural elements in the analysis of organizational social networks. However, the analysis of vocabularies promises to increase our understanding of coordination and cultural alignment within and across organizations (Basov, 2020). For example, a recent study of managers within a multi-unit organization investigated whether interpersonal interaction drives cultural similarity in the vocabularies that managers use, or whether the causal arrow is from vocabulary use to interpersonal interaction. The results showed that the relations between networks and vocabularies were contingent on the formal structure of the organization, such that, within subunits, interpersonal interaction led to higher vocabulary similarity over time, whereas, between subunits, the sharing of similar vocabularies made managers more likely to interact (Tasselli et al., 2020). Future work is needed to incorporate the "study of meaning [as a] significant foundation for a networked theory of social life" (Kirchner & Mohr, 2010: 556).

Agency Revisited

The social network research program is a site of contention between different approaches. From one perspective, social network analysis constitutes a

paradigm shift away from conventional social science (Hummon & Carley, 1993), whereas others see the social network approach as a set of methods in the absence of distinctive theory (Granovetter, 1979; Salancik, 1995). For some, network research means rejecting consideration of individuals completely in favor of group-level metrics (Mayhew, 1980). Ranged against these tendencies have been efforts to connect network research to organizational theory and behavior so as to expand, rather than seal off, the social network research program (e.g., Burt, 1992). In addition, it is argued, the exclusion of individuals from the social network research program has never made sense in organizational theory and research at either the level of persons or the level of firms (Kilduff & Brass, 2010; Tasselli et al., 2015).

At the heart of these different claims about social network research is the question of agency. To make sense of the trajectory of contestations about social network analysis, we introduced in this paper a sense-making framework that distinguishes two ways of thinking about the nature of social network effects across two levels of analysis. For each research endeavor, we ask whether the effects of action involve actors and their networks as separate entities or as mutually constituting each other. In addition, we question whether the locus of action is at the individual level or at the level of network structure. The four perspectives outlined in Figure 1 capture distinctive approaches within the history of network research in organizational studies. These approaches include those that focus on individual advantage, embeddedness, micro-foundations, and structuration.

Our review shows that dualism, the treatment of actors and networks as separate ontological domains, is dominant in the social network research program. Much less evident are duality approaches that treat actors and networks as mutually constituted. Why does the left-hand side of Figure 1 dominate the approaches on the right of the figure? The dominance of the individual advantage and embeddedness perspectives is perhaps unsurprising if we take into account the origins of these two perspectives in sociological research traditions that exert continuing influence. Individual advantage, featuring purposeful social interactions with closely knit others, dates back to the influential work of Georg Simmel (1908/1950), which emphasized the micro-dynamics of strategic interaction among people working in close proximity. The embeddedness perspective dates back to one of the founders of sociology as a distinctive discipline—Emile Durkheim (1897/1951)—and emphasizes the network structures and distant influences that inhibit and facilitate the outcomes not just of individuals but also of communities. The other two perspectives (micro-foundational and structuration), although less evident in our review overall, have gained popularity recently. The micro-foundational view emphasizes the individual correlates of social interaction, whereas the structuration view focuses on networks as collective entities in states of flux and transformation. Both approaches, in addressing agency in new ways, expand the menu of opportunities for social network research.

In our review, we identified a number of papers informed by more than one perspective. Combined approaches are possible because organizational social network research, across the different perspectives, derives from shared assumptions underlying a fertile and evolving research program (e.g., Kilduff et al., 2006). In terms of areas that require further research, we point, in our discussion below, to questions concerning where the impetus for network activity comes from (i.e., the source of action), and to questions concerning where individual identity derives from (i.e., the locus of identity).

CURRENT DEBATES AND FUTURE DIRECTIONS

What is the Source of Action?

Understanding agency implies investigating the *source of action*—the impetus behind patterns of social action and interaction. The individual advantage perspective (quadrant I in Figure 1) emphasizes purposeful individuals striving for achievement. By contrast, the embeddedness view (quadrant II in Figure 1) focuses on social structure as enabling and constraining action. Those views compete on whether people or networks drive action. The tension between the two leading perspectives is intrinsic to social network theory and provides opportunities for new research directions. Specifically, there is emerging research interest on the source of action as dependent on relational versus behavioral components of interpersonal interaction (e.g., Burt, 1982), and on action as deriving from networks rich in structural holes versus embedded social networks.

Networking behavior versus structural position. The upsurge in research on agency as individual advantage includes renewed attention to brokerage *behavior* in contrast to brokerage *position* (e.g., Halevy et al., 2019). Brokerage behavior involves agentic activities such as bridging behavior (e.g., spanning across structural holes) and connecting behavior (e.g., bringing people together) (e.g., Quintane & Carnabuci,

2016). Successful brokers tend to engage in these different types of brokerage depending on the requirements of the task (e.g., Long Lingo & O'Mahony, 2010) and depending on their strategic orientation toward brokering (e.g., Soda, Tortoriello, & Iorio, 2018).

Emphasis on behavior rather than position entails considering the contingencies that reduce individual advantage (e.g., Soda, Stea, & Pedersen, 2019). For example, women and men differ in how they construe brokerage in friendship networks, and this difference helps to account for gender differences in the performance of network brokers (Brands & Mehra, 2019). Future research can build on the growing interest in the downsides of brokers' behaviors (e.g., Xiao & Tsui, 2007) to examine whether brokerage causes collateral damage to exploited colleagues; and the ways in which open and closed networks function to control such deviations from expected brokerage behavior (Burt et al., 2019).

Holeyness versus embeddedness. A related debate straddles the individual advantage and embeddedness approaches to agency. This debate concerns the extent to which open or closed networks—that is, networks rich in structural holes versus networks constraining the individual (e.g., Burt, 2005)—provide structural opportunities for action. Structural-hole theory has found wide applicability in organizational network research in part because of its depiction of brokerage as an agentic activity in which people negotiate between the "pulsing swirl of mixed, conflicting demands" for personal advantage (Burt, 1992: 33). Brokers are people with entrepreneurial personalities who thrive on advocacy and change (Burt, Jannotta, & Mahoney, 1998). At the same time, structural-hole theory attributes motivation and outcomes not to individuals but to embeddedness in structural positions. It is structural holes that generate opportunities, benefits, and information, not the people who happen to temporarily occupy the structural-hole positions (Burt, 1992: 30). Thus, the question is raised, from the perspective of the source of action: How much do individuals matter relative to social structure in affecting networking outcomes (Burt, 2010)?

The answer is not straightforward. Despite the appearance of agentic individuals in structural-hole theory, for example, the emphasis is mainly on structural holes as strong situations that "force" occupants to develop the cognitive and emotional skills required for communication between colleagues who disagree with each other (Burt, 2010: 224). Thus, there is clear rejection of a purely individual view of agency. Individuals are modeled as responding cognitively and emotionally to the social contexts in which they find themselves. Another reading of structural-hole theory is that people with the appropriate cognitive and emotional skills (e.g., self-monitoring [Kilduff & Buengeler, 2019]) sort themselves into brokerage positions that, in turn, help them to benefit from these positions (see the discussion in Smith, Brands, Brashears, & Kleinbaum, 2020), a position aligned, perhaps, with a structuration approach (quadrant IV in Figure 1). In this account, individuals who occupy network positions, spanning across structural holes, for example, are matched to coordination-focused jobs for which their skills and their networks prepare them, and in which their skills and networks are likely to flourish (Kleinbaum & Stuart, 2014).

One question for future research concerns how much network "holeyness" is optimal. If there are too many structural holes across the network, network members have difficulty coordinating; however, if there are too few structural holes, network members are at low risk for new ideas (e.g., Burt, 2004). An empirical investigation of 19 teams in a wood products company found that a moderate level of structural holes in teams was positively associated with team performance (Balkundi, Kilduff, Barsness, & Michael, 2007). However, further research in a pharmaceutical company (19 teams) and a videogame company (27 teams) showed that the group mean of structural holes was negatively and significantly related to job satisfaction and job performance despite structural-hole spanning by individuals relating positively to performance by those individuals (Bizzi, 2013). Thus, the debate concerning the micro- versus the macro-level outcomes of structural holes continues (Ibarra, Kilduff, & Tsai, 2005).

Building on the possibility that agency derives from a mix of openness and closure in a person's network (e.g., Burt, 2005), recent longitudinal evidence has suggested that, within rapidly changing environments, advantage accrues to individuals who pursue "punctuated brokerage," a network oscillation pattern characterized by intermittent brokering with periods in between when brokers retreat within cohesive networks (Burt & Merluzzi, 2016). Instead of imagining certain people as engaged in the nonstop pursuit of individual advantage, this new research has pictured effective brokers intermittently rebuilding reputation and trust. This dynamic revision to the individual advantage perspective on brokerage requires further research to understand whether brokers themselves modify the network structures within which they pursue opportunity, or

whether the network changes that they foster push these brokers to modify their behaviors—a perspective aligned with a structuration perspective.

What is the Locus of Identity?

We began the paper with questions related to the two perspectives on the left side of Figure 1: whether agency resides in individual distinctiveness or in the network properties and structures that shape personalities and cognitions. Shifting the research emphasis from the left to the right side of the figure, these questions open opportunities for understanding how individual attributes affect the positions that people occupy in social networks (e.g., Klein et al., 2004; Mehra et al., 2001; Sasovova et al., 2010), and how relationships affect the development of personality (e.g., Mund & Neyer, 2014; Neyer, Mund, Zimmermann, & Wrzus, 2014). Human personality, according to accumulating research, cannot be relegated to the immutable role of an independent variable (Tasselli et al., 2018). Rather, personality—and, therefore, a person's identity—are antecedents of network embeddedness; however, personality and identity are also likely to change as individuals experience the tensions and opportunities of network positions such as brokerage. From a micro-foundational perspective, future work is needed to understand how network structures and individual dispositions influence each other in a dynamic interplay of structural and individual adjustment (Schulte et al., 2012).

Recent research along these lines has examined how the embeddedness of individuals in social relations explain outcomes such as loneliness (Cacioppo, Fowler, and Christakis, 2009), happiness (Fowler et al., 2009), and identity change (White, 2008). A separate stream of research has emphasized that the network properties that give organizations their distinctiveness derive, in part, from the psychological processes and traits of those people who compose the network (e.g., Burt et al., 2013). Future research could examine further how the interaction between person and context shapes individuals' identities and network properties. Emphasis on the locus of identity requires bridging the tension between ego and alters in analyzing egos' agencies; investigating the topological dualities of individual identity, including the tensions between cognitive and real networks, and between past and present relationships; and, in general, addressing issues of network endogeneity.

Ego versus alters. Traditionally, agency has been attributed to individuals, as captured in the perspectives in the top row of Figure 1. However, the network perspective alerts us to social structures that restrict and facilitate the individual's interests, as depicted in the perspectives in the bottom row of Figure 1. There has been growing interest in the interplay between the psychology of ego (the focal actor at the center of the network) and alters (those connected to ego in the network) in understanding (a) network formation (e.g., Kleinbaum, et al., 2015) and (b) outcomes, including creative behavior and innovation (e.g., Grosser, Venkataramani, & Labianca, 2017). The assumption of this research is that, because the network is intrinsically a relational construct (e.g., Borgatti, Mehra, Brass, & Labianca, 2009), network opportunities are conferred by the actions of others as much as by the agency of the focal individual. People benefit or suffer from the connections they attract from others who bring with them their own network configurations. The organizational consequences of connections are often beyond the local reach of individuals (e.g., Oh & Kilduff, 2008).

An altercentric approach to the study of social networks (e.g., Kleinbaum et al., 2015) can help balance the role and identities of both egos and alters in influencing network functioning by investigating, for example, whether the personalities of others play a significant role in the formation of ego's social world (e.g., Mund & Neyer, 2014). This debate also raises further questions concerning how much agency idiosyncratic individuals exert in network formation and change. If trust is conferred on people as a result of how well their personalities match the networks they occupy (e.g., Tasselli & Kilduff, 2018), then the individual's agency is likely to be less than might otherwise be expected. Further work is needed to understand the circumstances under which network patterns reflect network emergence in the absence of agency (e.g., Mark, 1998) versus network patterns reflecting purposeful individual agency (e.g., Stevenson & Greenberg, 2000).

Perceived versus actual networks. Network accuracy is often seen as helping individuals notice opportunities (e.g., Krackhardt, 1990). This accuracy perspective is aligned with the individual advantage quadrant of Figure 1. Neglected in this research, however, is the possibility, aligned with the structuration perspective (quadrant IV of Figure 1), that network perceptions, accurate or not, create the realities that they prefigure. This possibility was suggested in the Thomas theorem (if people define situations as real, these situations are real in their consequences [Thomas & Thomas, 1928; see also Merton, 1995]), and is related to research on the self-fulfilling prophecy (Merton, 1948). As applied to

network research, there is an opportunity to investigate misalignments in network perceptions as leading indicators of network change. Rather than seeking to correct individuals' mistaken network perceptions, therefore, as prescribed in prior research and advice to practitioners (e.g., Krackhardt & Hanson, 1993), individuals can be made aware of the possibility that environments can be enacted through purposeful efforts (e.g., Weick, 1979) so that actual relationships can catch up with perceptions. Network misalignment, therefore, could be recategorized as a form of cognitive social capital that has the potential to be converted into actual social capital.

Past versus present ties. We also envisage research aimed at analyzing whether time represents a network catalyst that affects our understanding of the agency relationships summarized in Figure 1. People establish network contacts at time 1 that have varying effects at time 2. Some of these effects may promote individual advantage, whereas others may contribute to reinforcing systems of domination, as theorized in the structuration perspective (Giddens, 1984). People who behave agentically in the present, enjoying the freedom to forge and terminate ties, might, in fact, be embedded in networks of past ties that constrain or facilitate action. Such a view would combine individual advantage with embeddedness perspectives on action.

Relevant research has focused on the functioning and importance of dormant ties—both strong and weak—on knowledge and social capital (Levin et al., 2011; Walter, Levin, & Murnighan, 2015). This research has suggested that reconnecting with "former ties, now out of touch," is useful in providing agentic individuals with diverse knowledge (Levin et al., 2011: 923). But to what extent do these dormant ties represent embedded sources of constraint? Future research is needed to investigate the often hidden but self-perpetuating influence of ghost ties from the past on opportunities in the present (Kilduff et al., 2006). In addition, expanding the menu of research options to the right part of Figure 1, more research is needed to understand whether psychological characteristics of individual actors can help explain the extent to which those actors succeed in leveraging in the present networking opportunities reemerging from the past.

Person versus context. More generally, the tensions between ego and others, between actual and cognitive networks, and between present and past ties, imply a broader and more general tension between individual and social context in defining the locus of identity. An example of this tension between structural embeddedness and micro-foundational agency is provided by the example of Cosimo de' Medici (Padgett & Ansell, 1993). Cosimo can be said to have lacked agency because his behaviors and pronouncements derived from the wishes and actions of others. Cosimo had no grand plan in place for the rise of the Medicis. The success of the family resulted from the combination of his particular obliging personality and the network activities of others.

This example calls for future research examining the coevolution of individuals and social networks (see bottom right quadrant of Figure 1). We need to know more about how the social structures that constrain and enable action emerge from actors' individual characteristics and behaviors (e.g., Tasselli et al., 2015). Relevant research has explored whether network structures and actors' behavior influence each other in a dynamic interplay of structural and individual adjustment (e.g., Schulte et al., 2012). Given the current interest in the dynamics of social networks, future research can help examine how the social network activities of individuals contribute to macro-level network change that affects individuals' outcomes (Kossinets & Watts, 2009).

Network endogeneity. This has been described as a "massive" problem for social network research but also one that, despite the use of fixed effects and instrumental variables, is unlikely to be solved in any field of human inquiry (Borgatti, Brass, & Halgin, 2014: 20). Endogeneity arises in social network research because "actors are not randomly assigned to positions" (Borgatti et al., 2014: 20). Actors' individual characteristics, behaviors, and actions affect the occupation of positions that, in turn, exert influence on personal identities and opportunities for action. Structural research (represented by the left part of Figure 1) has tended to neglect the endogeneity issue. By treating social networks as given, the focus is on the benefits (individual advantage quadrant) and constraints (embeddedness quadrant) that result from the occupation of given positions. The question of why certain individuals, and not others, occupy network positions has simply not been considered. Moving to the right part of Figure 1, the micro-foundational perspective (quadrant III in Figure 1) partly addresses the endogeneity issue, recognizing that "network structure is not a given in the sense of an exogenous variable" (Borgatti & Halgin., 2011: 1178) but is explained by the attributes of interacting individuals (e.g., Fang et al., 2015; Tasselli et al., 2015). New theory from this micro-perspective opens up discussion of endogeneity by,

for example, suggesting that psychological attributes that are traditionally treated as stable, such as personality, can change over time as social network positions change (e.g., Tasselli et al., 2018). The structuration perspective fully engages with endogeneity (quadrant IV in Figure 1) by treating purposive action as "embedded in concrete, ongoing systems of social relations" (Granovetter, 1985: 487), and treating social structure as emerging from localized actions, relationships, and identities (e.g., Padgett & Ansell, 1993). New statistical approaches (e.g., Snijders, Van de Bunt, & Steglich, 2010) allow for simultaneous modeling of network and attribute change, whereas the use of wearable tags allows for the real-time tracking of interaction data, controlling for prior network positions and individual attributes (e.g., Ingram & Morris, 2007). These developments aside, the question remains as to whether a structuration perspective requires researchers who long have known that *X* causes *Y* to revisit this; or whether they can focus (as recommended by Borgatti et al., 2014) on the neglected, and therefore more interesting, question of whether *Y* causes *X*.

CONCLUSION

Organizational social network research is burgeoning in our journals and professional meetings, drawing upon advances in network theory, network methods, and empirical research (e.g., Kilduff & Brass, 2010). This social network program in organizational contexts faces challenges that are different from social network research in other contexts. There is strong interest in locating the nexus of action, and in identifying the ways in which outcomes are achieved (e.g., Tasselli et al., 2015). Thus, in terms of network research, the issue of agency is paramount in ways that have not been the case in traditional sociological network studies, nor in the network approaches championed by physicists (e.g., Dorogovtsev & Mendes, 2003). As we have shown, the agency questions for network researchers are as follows: Who or what is constructing the social networks within which actions are structured? How are the benefits of network structure derived, given that some people benefit more from occupation of network positions than others? How is purposive action different in open networks relative to closed networks? Does agency inhere in the actions that the social network enables? Or does it inhere in the formation of the network itself? Answers to these questions have generally been implicit in current research and theory, if they have been addressed at all. Our purpose in this paper is to bring issues of agency to the forefront of research attention for everyone interested in organizational network research. For too long, network research has operated as though social network structures are a given, and benefits flow to those lucky enough to be in advantageous positions. Such a picture of passivity falls short of the expectation that social network research addresses questions of how network change relates to the outcomes of networking. We look forward to new research initiatives that address these agency issues.

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APPENDIX A

TABLE 1
Articles Selected for the Review, Categorization in the Conceptual Perspectives, and Implications for Network Agency

		Perspectives on network agency					
Year	Authors	Individual advantage	Embeddedness	Micro-foundations	Structuration	Journal	Implications for network agency
2004	McFadyen & Cannella		X			AMJ	Effects of number and strength of ties on outcomes (knowledge creation)
2004	Brass et al.		X			AMJ	Study of network embeddedness at different levels of analysis
2004	Soda, Usai, & Zaheer	X	X			AMJ	Temporal effects of structural holes and closure on performance
2004	Cross & Cummings		X			AMJ	Properties of both networks and ties affect performance
2004	Klein et al.			X		AMJ	Effects of demography, values and personality on centrality
2004	Reagans, Zuckerman, & McEvily		X			ASQ	Social networks versus demography effects on team performance
2004	Gibbons		X			ASQ	Effects of advice versus friendship networks in influencing and changing professional values
2004	Perlow, Gittell, & Katz				X	Org. Sci	Nested theory of structuration through the ethnographic study of the interaction patterns among three groups
2004	Rodan & Galunic		X			SMJ	Role of network structure and access to heterogeneous knowledge on innovative performance
2004	McLean & Hassard				X	JMS	Critical notes on issues related to the production of actor-network theory accounts
2004	Totterdell et al.			X		JAP	Analysis of the relationship between organizational networks and employees' affect
2004	Levin & Cross		X			Man Sci	Role of tie strength and trust in knowledge transfer among individuals in organizations
2004	Chow & Ng		X			Org. Stu	Analysis of the characteristics and role of guanxi (or Chinese personal connections)
2004	Peng		X			AJS	Analysis of the economic payoff of kinship networks in the context of China's rural industrialization
2004	Burt, R.S.	X				AJS	Effects of spanning structural holes on generation of new ideas
2005	Milton & Westphal		X			AMJ	Patterns of association between identity confirmation–based networks and cooperation and performance in groups
2005	Barsness, Diekmann, & Seidel	X				AMJ	Individual's centrality in the network enhanced the positive association between impression management and performance
2005	Hanses, Mors, & Løvås		X			AMJ	Multiple networks at the within-team and inter-unit level affect various phases of knowledge sharing
2005	Obstfeld	X				ASQ	Role of *tertius iungens* brokerage orientation for innovation
2005	Sparrowe & Liden	X	X			ASQ	Relationships between dyadic leader member exchange and individual centrality in the advice network and influence
2005	Belliveau		X	X		Org. Sci	Effects of social networks and institutional sex composition on the job search of women graduates
2005	Ibarra, Kilduff, & Tsai	X	X			Org. Sci	Connecting individuals and collectivities at the frontiers of organizational network research
2005	Inkpen & Tsang		X			AMR	Study of how social capital dimensions of networks affect the transfer of knowledge between network members
2005	Tsui-Auch		X			Org. Stu	Strength of the ties reflecting the degree of intra-community homogeneity and inter-community heterogeneity for ethnic entrepreneurs
2005	Jack	X	X			JMS	Qualitative analysis of the role, use and activation of strong and weak network ties
2005	Bono & Anderson	X				JAP	Analysis of the social networks of managers who exhibit transformational leadership behaviors
2005	Nekar & Paruchuri	X	X			Man Sci	Effects of the characteristics of individual network positions on the utilization of created knowledge
2005	Castilla		X			AJS	Role of referral contacts on workers' performance
2005	Gibson		X		X	AJS	Conversational analysis of the effects of hierarchical and horizontal networks on "participation shifts" that occur from one speaking turn to the next in meetings

TABLE 1
(Continued)

Year	Authors	Perspectives on network agency: Individual advantage	Embeddedness	Micro-foundations	Structuration	Journal	Implications for network agency
2005	Robins, Pattison, & Woolcock		X			AJS	Analysis of locally specified social processes that produce small world properties
2005	Yakubovich		X			ASR	Role of weak ties, information and influence in finding a job
2005	Janicik & Larrick			X		OTJ	Analysis of social network schemas and the learning of incomplete networks
2006	Balkundi & Harrison	X	X			AMJ	Leader and team centrality contribute to performance
2006	Perry-Smith	X	X			AMJ	Individuals' social relationships, in terms of network position and tie strength, facilitate creativity
2006	Mehra et al.	X				Org. Sci	Leader's centrality in external and internal networks was related to group performance and reputation
2006	Labianca & Brass		X			AMR	Study of the role of negative relationships in the context of social networks in work organizations
2006	Kilduff, Tsai, & Hanke		X			AMR	Dynamic stability reconsideration of the social network research program
2006	Westphal, Boivie, & Chng	X	X			SMJ	Analysis of the benefits from the maintenance of friendship ties between top executives
2006	Lamertz		X			Org. Stu	Analysis of how the how the performance of organizational citizenship behavior may be associated with an individual's occupation of social network positions
2006	Bowler & Brass		X			JAP	Analysis of the network correlates, such as tie strength and third party influence, of interpersonal citizenship behavior
2006	Ferrin, Dirks, & Shah		X			JAP	Study of the ways in which a trustor and trustee may be linked to each other via third parties
2006	Fernandez-Mateo		X			ASR	Analysis of the network mechanisms by which minorities can be isolated from good job opportunities
2006	Lizardo		X		X	ASR	Relationship between different forms of cultural taste and the density of social contacts across alternative types of network relations in terms of tie strenght
2006	Flynn et al.			X		OTJ	Analysis of self-monitoring personality, status implications of social exchange and effectiveness in managing relations
2006	Battilana	X	X			OTJ	Analysis of individual social network positions in explaining the link between agency and institutions
2007	Burt, R.S.	X				AMJ	Effects of direct and indirect brokerage on outcomes
2007	Xiao & Tsui	X				ASQ	Effects of bridging structural holes in collectivistic environments
2007	Ingram & Morris		X			ASQ	Associative homophily effects on the socializing dynamics of business men
2007	Pentland & Feldman				X	Org. Sci	Introduction of the narrative network as an instrument for representing patterns of "technology in use"
2007	Li & Zhang		X			SMJ	Role of managers' political networking and functional experience on new venture performance
2007	Kijkuit & van den Ende	X	X			JMS	Network characteristics and behaviors behind creativity
2007	Pappas & Wooldridge	X				JMS	Analysis of the relationship between measures of network centrality and managers' divergent strategic activity
2007	Hanaki et al.	X	X			Man Sci	Problems of cooperative behavior in contexts where individual behaviors and interaction structures coevolve
2007	Entwisle et al.		X		X	AJS	Analysis of covariation of network structure and context
2007	Fernandez-Mateo	X	X			ASR	Analysis of how a broker's ability to affect prices and extract superior value from its position has economic consequences for the actors tied to it
2007	Donath		X			OTJ	Analysis of how the costs associated with adding friends affect the publicly-displayed social network aids the establishment of trust, identity, and cooperation

TABLE 1
(Continued)

Year	Authors	Perspectives on network agency				Journal	Implications for network agency
		Individual advantage	Embeddedness	Micro-foundations	Structuration		
2007	Balkundi et al.	X		X		OTJ	Analysis of demographic antecedents and performance consequences of structural holes in work teams
2008	Chua, Ingram, & Morris		X			AMJ	Effects of embeddedness in a network of positive and negative ties on trust
2008	McDonald, Khanna, & Westphal	X				AMJ	Effects of CEO's network advice behaviors on firm performance
2008	Jarvenpaa & Majchrzak			X		Org. Sci	Role of transactive memories in ego-centered knowledge networks among professionals
2008	Cattani & Ferriani		X			Org. Sci	Role of social networks, in terms of core-periphery structure, in shaping individuals' ability to generate a creative outcome
2008	Whittle & Spicer				X	Org. Stu	Critical analysis of Actor Network Theory
2008	Oliver & Montgomery			X		JMS	Cognitive network approach on events' sense making
2008	Zohar & Tenne-Gazit	X	X			JAP	Analysis of transformational leadership and social interaction as antecedents of climate strength
2008	Oh & Kilduff			X		JAP	Role of self-monitoring personality on direct and indirect brokerage in a sample of entrepreneurs
2008	Buskens & van de Rijt	X	X			AJS	Analysis of the returns associated with brokerage if everyone in the network spans across structural holes
2008	Burt, S.A.			X		OTJ	Analysis combining molecular genetics and social psychology experiments explaining genetic influences on popularity
2008	Christakis & Fowler		X			OTJ	Analysis of the collective dynamics of smoking in a large social network
2008	Kilduff et al.		X	X		OTJ	Analysis of perceived networks small world and clustering properties versus properties of actual friendship networks
2009	Zaheer & Soda	X				ASQ	Study of the origin and evolution of structural holes in teams
2009	Gargiulo, Ertug, & Galunic		X			ASQ	Effect of dense social ties, or network closure, on individual performance as dependent on the individual's role
2009	McFayden, Semadeni, & Cannella		X			Org. Sci	Role of average tie strength and ego network density on knowledge creation
2009	Goodwin, Bowler, & Whittington	X	X			JoM	Social network perspective, in terms of leader's and followers' centrality, on LMX relationships
2009	Scott & Judge	X		X		JAP	Analysis of personality in the form of core self-evaluations and situational position in the form of communication network centrality as antecedents of popularity
2009	Zhou et al.		X			JAP	Analysis of the influence of social networks and conformity value on employees' creativity
2009	Kossinets & Watts		X	X		AJS	Analysis of the origins of homophily in a large university community
2009	Burt, S.A.			X		OTJ	Analysis of rule breaking as partially mediating the genetic effect on popularity
2009	Cacioppo, Fowler, & Christakis		X			OTJ	Analysis of structure and spread of loneliness in a large social network
2010	Wong & Boh		X			AMJ	Effects of social exchange and others' ties on trustworthiness
2010	Tortoriello & Krackhardt	X				AMJ	The effects of people's bridging ties are contingent upon the nature of the ties that people form to bridge across others
2010	Long Lingo & O'Mahony	X				ASQ	Analysis of how brokers on creative projects integrate the ideas of others
2010	Sasovova et al.			X		ASQ	Self-monitoring personality effects on the opening of structural holes
2010	Paruchuri	X	X			Org. Sci	Moderated effects of an individual's and a firm's centrality on innovation
2010	Rank, Robins, & Pattison		X			Org. Sci	Analysis of the structural logic underlying complex intraorganizational networks
2010	Lee	X				Org. Sci	Analysis of how performance history largely drives the asymmetry in brokerage
2010	Kijkuit & van den Ende		X			Org. Stu	Effects of network structure and network content on innovation
2010	Stam	X				JMS	Analysis of how participation in industry events, entrepreneurs' brokerage and performance
2010	Baer		X			JAP	Analysis of the effects of the size and strength of actors' idea networks

TABLE 1
(Continued)

Year	Authors	Perspectives on network agency				Journal	Implications for network agency
		Individual advantage	Embeddedness	Micro-foundations	Structuration		
2010	Venkataramani, Green, & Schleicher	X	X			JAP	Impact of leaders' social network ties (quality of the relationship and centrality) on LMX and members' work attitudes
2010	Bothner, Smith, & White		X			AJS	Network model that pictures occupants of robust positions as recipients of diversified support from durably located others
2010	Vedres & Stark		X			AJS	Analysis of the impact of structural folds (overlap between groups) in recognizing and implementing new ideas
2010	Flynn, Reagans, & Guillory		X	X		OTJ	Analysis of transitivity, homophily, and the need for (network) closure
2010	Alcadipani & Hassard				X	OTJ	Analysis of Actor-Network Theory and organizations as a politics of organizing
2010	Eagle, Macy, & Claxton	X				OTJ	Nation-wide investigation of the relation between ego-network structural holes and access to socioeconomic opportunity.
2010	Olk & Gibbons		X			OTJ	Gregariousness and popularity influence development and persistence of unequally reciprocated friendships
2010	Kirchner & Mohr				X	OTJ	A research agenda on language, discourse and networks
2011	Cotton, Shen, & Livne-Tarandach		X			AMJ	Content and structure of the developmental networks (greater multiplexity and more single-function ties) of Hall of Famers
2011	Reinholt, Pedersen, & Foss	X		X		AMJ	Interplay between centrality, motivation and ability in explaining knowledge sharing
2011	Sosa		X			Org. Sci	Role of tie content and social networks, in terms of tie strength, on creativity
2011	Mizruchi, Brewster Stearns, & Fleischer	X	X			Org. Sci	Effects of job performance, network tie strength, and network structures on bankers' bonuses
2011	Reagans		X			Org. Sci	Effects of social similarity and propinquity on strong network connections
2011	Berends, van Burg, & van Raaij		X		X	Org. Sci	Investigation from a structuration perspective of how inter-organizational networks and interpersonal networks interact over time
2011	Borgatti & Halgin		X			Org. Sci	Theoretical analysis of the idiosyncrasies of network theory versus theory of networks
2011	Levin, Walter, & Murnighan	X	X			Org. Sci	Effects of dormant relationships—strong and weak— on knowledge and social capital
2011	Moliterno & Mahony		X			JoM	Analysis of the broad theoretical domain of a multilevel network theory of organization
2011	Zhang & Peterson		X			JAP	Analysis of the team-level factors promoting advice exchange networks in teams
2011	Balkundi, Kilduff, & Harrison	X		X		JAP	Analysis of links between leader's charisma and network centrality in organizations
2011	Srivastava & Banaji			X	X	ASR	Analysis of the interplay of culture, cognition, and social networks in organizations
2011	Aral & Van Alstyne	X	X			AJS	Analysis of the novelty offered by bridging ties, suggesting that the strength of weak ties and structural holes depend on brokers' information environments
2011	Chung et al.		X			OTJ	Presence of a possible trade-off between structural positions in local and global networks in facilitating individuals interpersonal citizenship behavior
2011	Simspon, Markovsky, & Steketee	X		X		OTJ	Relationship between power and perceptions of social networks
2012	Battilana & Casciaro	X				AMJ	Change agent's network role on the initiation and adoption of changes divergent from the institutional status quo
2012	Galunic, Ertug, & Gargiulo	X	X			AMJ	Second-order social capital from connection to senior brokers
2012	Kleinbaum	X	X			ASQ	Origins of brokerage as dependent on links with former coworkers and with friends of friends and role of "organizational misfits" on brokerage opportunities

TABLE 1
(Continued)

		Perspectives on network agency					
Year	**Authors**	**Individual advantage**	**Embeddedness**	**Micro-foundations**	**Structuration**	**Journal**	**Implications for network agency**
2012	Smith, Menon, & Thompson	X		X		Org. Sci	Cognitive model of network activation tested for people at different status levels
2012	Vissa	X				Org. Sci	Effects of entrepreneurs' interpersonal networking style on the initiation of inter-organizational exchange ties
2012	McEvily, Jaffee, & Tortoriello		X			Org. Sci	Analysis of the conditions under which bridging ties from the past affect current organizational outcome
2012	Schulte, Cohen, & Klein		X	X		Org. Sci	Co-evolution of social network ties and team members' climate perceptions over time
2012	Varella, Javidal, & Waldman	X	X			Org. Sci	Relationships between socialized charismatic leadership and its consequences in terms of cooperative and sanctioning group behavior.
2012	Tortoriello, Reagans, & McEvily		X			Org. Sci	Effects of strong ties, network cohesion, and network range on knowledge transfer
2012	Grossman, Yli-Renko, & Janakiraman		X			JoM	Study of the instrumental and interpersonal mechanisms driving nascent entrepreneurs' value attributions
2012	Currie & White	X	X			Org. Stu	Analysis of brokering of situated knowledge within an organizational context characterized by formalized hierarchy
2012	Wei, Chiang, & Wu	X				JMS	Role of political skill in the development and utilization of network resources at the individual level
2012	Burt, R.S.	X		X		AJS	Analysis of network related personality and consistency in network role
2012	Vissa & Bhagavatula		X			OTJ	Analysis of the causes and consequences of churn in entrepreneurs' personal networks
2012	Shipilov		X		X	OTJ	Multiplex analysis of how multiple kinds of relationships could simultaneously affect network dynamics and network outcomes
2012	Dunbar		X	X		OTJ	Women can maintain relationships through electronic communication; men, instead, are more likely to require time-heavy social activities that involve co-presence
2012	Apicella et al.		X			OTJ	Social networks may have contributed to the emergence of cooperation in human history
2012	Grund		X			OTJ	Centralization around one or a few players negatively affects performance, in terms of goals scored by the team
2013	van Wijk et al.	X			X	AMJ	Interplay of Agency, Culture, and Networks in Field Evolution
2013	Batjargal et al.	X	X			AMJ	Effects of structural holes and institutional network polycentrism on entrepreneurs' venture growth
2013	Dahlander & McFarland		X			ASQ	Effects of intra-organizational tie formation and persistence on collaboration
2013	Kleinbaum, Stuart, & Tushman		X			Org. Sci	Test for the presence of homophilous interactions within and across subunit boundaries
2013	Godart, Shipilov, & Claes		X			Org. Sci	Effects of key personnel's mobility networks on their former employers' creative performance.
2013	Bridwell-Mitchell & Lant	X				Org. Sci	Analysis of the role of agency and choice in how individuals use social networks
2013	Lomi et al.	X		X		Org. Sci	Analysis of advice relationship formation based on the strength of organizational members' identification with social foci
2013	Brands & Kilduff	X		X		Org. Sci	Effects of gender-biased perceptions of friendship network brokerage on attributions and performance
2013	Chung & Jackson		X			JoM	Study of the relationships between qualities of team internal and external networks and team performance and moderating impact of task routineness
2013	Bizzi	X	X			JoM	Analysis of the negative effects of structural holes on group functioning and group climate
2013	Venkataramani, Labianca, & Grosser	X				JAP	Effect of centrality in positive and negative networks on employees' organizational attachment

TABLE 1
(Continued)

Year	Authors	Perspectives on network agency				Journal	Implications for network agency
		Individual advantage	Embeddedness	Micro-foundations	Structuration		
2013	Zou & Ingram	X				OTJ	Analysis of the impact of the number (high or low) of structural holes across organizational boundary on creativity, decision-making, task execution and teamwork
2013	Miritello et al.		X			OTJ	People use electronic media mainly to communicate with a small number of strong ties
2014	Shipilov et al.		X		X	AMJ	The importance of relational pluralism within and between organizations
2014	Rogan		X			AMJ	Role of multiplex ties in exchange partner retention
2014	Casciaro, Gino, & Kouchaki			X		ASQ	Consequences of instrumental social networking for an individual's morality, in terms of how individuals feel
2014	Bensaou, Galunic, & Jonczyk-Sédès	X		X		Org. Sci	Analysis of the individual strategies and underlying agency behind social networking
2014	Perry-Smith & Shalley		X	X		Org. Sci	Analysis of member informal social network ties outside of the team as a way to achieve cognitive variation within the team and thus affect creativity
2014	Rogan & Mors		X			Org. Sci	Network effects on individual level ambidexterity in organizations
2014	Casciaro & Lobo			X		Org. Sci	Effect of cognitive and motivational affective primacy on tie perceived instrumental value
2014	Ren, Gray, & Harrison		X			Org. Sci	Analysis of informal networks as triggers and dampeners of faultline effects on performance
2014	Tortoriello, McEvily, & Krackhardt		X			Org. Sci	Closed network enables individuals to act as innovation catalysts
2014	Sterlng	X				Org. Sci	Individuals with an initial advantage in social ties form more extensive networks post entry
2014	Kleinbaum & Stuart	X	X			SMJ	Focus on structure as a means to achieve coordination and on selection process in which individuals with broad networks match to coordination-focused jobs.
2014	Wong & Boh	X	X			JMS	Analysis of centrality and actions needed to actualize potential resources embedded in social networks
2014	Ho & Pollack	X		X		JMS	Test of the links between entrepreneurs' passion, network centrality, and financial performance
2014	Van den Brink & Benschop	X		X		JMS	Effect of gender networking practices and gatekeeping on inequality in organizations
2014	Venkataramani, Richter, & Clarke	X				JAP	Analysis of leaders' brokerage positions as facilitators of employee radical creativity.
2014	Perry-Smith		X			JAP	Effect of knowledge content and tie strength on creativity
2014	Lönnqvist et al.			X		OTJ	Analysis of the five-factor model of personality and degree and transitivity
2014	Mund & Neyer		X	X		OTJ	Analysis of personality-relationship transaction with focus on effects of relationship experiences on personality development
2014	Neyer et al.		X	X		OTJ	Contingent analysis of mutual personality-relationship transactions
2014	Lomi & Stadtfeld		X		X	OTJ	Co-evolutionary analysis of social networks and social settings
2014	Sayes					OTJ	Actor-Network theory interpretation and critique of the relations between human and non-human agency
2014	Gulati & Srivastava	X	X			OTJ	Conceptualization of agency as the interplay between constraint and action
2015	Aven		X			Org. Sci	Effects of corruption on communication behavior and interaction patterns among managers
2015	Sosa, Gargiulo, & Rowles		X			Org. Sci	Effects of the structure of the informal communication network and task interdependence on inter-team communication
2015	Casciaro et al.			X		Org. Sci	Introduction to an interdisciplinary perspective that considers network phenomena and psychological phenomena as intertwined in organizational life.

TABLE 1
(Continued)

Year	Authors	Perspectives on network agency				Journal	Implications for network agency
		Individual advantage	Embeddedness	Micro-foundations	Structuration		
2015	Vardaman et al.	X		X		Org. Sci	Psychological factors and individuals' network centrality jointly impact employee turnover
2015	DeRue, Nahrgang, & Ashford			X		Org. Sci	Analysis of interpersonal perceptions as an explanation for why emergent, informal leadership structures vary across teams
2015	Brands, Menges, & Kilduff			X		Org. Sci	Analysis of how attributions of charismatic leadership depend on the match between the gender of the leader and the perceived structure of the network
2015	Kleinbaum, Jordan, & Audia			X		Org. Sci	Analysis of how empathy moderates the effect of self-monitoring on brokerage
2015	Fang et al.			X		Org. Sci	Meta-analysis on the links between personality, social networks and work outcomes
2015	Srivastava		X			Org. Sci	Analysis of intra-organizational networks' transitory shifts when organizational change produces high levels of ambiguity for employees
2015	Walter, Levin, & Murnighan	X	X			Org. Sci	Analysis of critical biases and consequences of executives' reconnection preferences of dormant ties
2015	Tortoriello	X				SMJ	Effects of external knowledge on individuals' innovativeness contingent upon individuals' spanning of structural holes in the internal social structure.
2015	Porter & Woo			X		JoM	A dynamic psychological perspective on how and why people network
2015	Caimo & Lomi		X			JoM	Analysis of the role of reciprocity and formal structure on knowledge sharing
2015	Sgourev	X				Org. Stu	Analysis of brokerage as catalysis in the case of the Ballets Russes
2015	Tasselli	X		X		Org. Stu	Analysis of ego-centered network positions and organizational individual differences on knowledge transfer
2015	Fang et al.	X				JMS	Analysis of the processes through which entrepreneurs first build social networks and then use the network resources for enhancing venture performance
2015	Hirst et al.		X			JAP	Effects of reach efficiency of indirect network on individual creativity
2015	Porath, Gerbasi, & Schorch		X	X		JAP	Analysis of the effects of perceived civility on advice, leadership, and performance
2015	Kalish et al.			X		JAP	Actor-based analysis for the coevolution of communication network ties and actor attributes, in terms of perceived stress
2015	Lutter		X	X		ASR	Effect of social capital on gender inequality in a project-based labor market
2015	Burt, R.S.	X	X			OTJ	Analysis of the benefits of dyadic versus reinforced structural holes
2015	Feiler & Kleinbaum			X		OTJ	Analysis of the network popularity effects of extraversion
2015	Stadtfeld & Pentland		X			OTJ	Dynamic study of partnership ties shape friendship networks
2016	Kilduff et al.		X			AMJ	Acolyte effect (subordinates with work connections to high-reputation industry leaders) on careers
2016	Quintane & Carnabuci	X		X		Org. Sci	Analysis of information-brokerage strategies of brokers relative to those of actors embedded in denser network positions
2016	Cannella & McFayden	X	X			JoM	Analysis of knowledge worker ego networks and change over time
2016	Parker, Halgin, & Borgatti		X			Org. Stu	Test of a theory of social capital dynamics
2016	Foulk, Woolum, & Erez		X	X		JAP	Analysis of the cognitive and semantic mechanisms behind rudeness contagion
2016	Jones & Shah		X			JAP	Temporal analysis of trustor, trustee, and dyadic influences on perceived trustworthiness
2016	Ballinger, Cross, & Holtom	X	X			JAP	Analysis of centrality and structural holes on voluntary turnover for different levels of employees
2016	Goldberg et al.		X		X	ASR	Theory of how structural and cultural embeddedness jointly relate to individual attainment within organizations
2016	Burt, R.S., & Merluzzi	X	X			OTJ	Temporal analysis of the oscillation benefits of brokerage and closure

TABLE 1
(Continued)

Year	Authors	Perspectives on network agency				Journal	Implications for network agency
		Individual advantage	Embeddedness	Micro-foundations	Structuration		
2016	Ryan		X			OTJ	Analysis of what types of social ties are useful in contexts of deskilling and finding jobs commensurate with qualifications
2017	Merluzzi			X		Org. Sci	Social network approach toward understanding gender and negative work relationships
2017	Perry-Smith & Mannucci	X	X			AMR	Analysis of the social network drivers of the phases of the creative idea journey and focus on network activation
2017	Paruchuri & Awate	X	X			SMJ	Effects of the reach of inventors in the intra-firm network and their span of structural holes on search behavior
2017	Jiang et al.		X			SMJ	Role of network-based indicators on executive decisions
2017	Seibert et al.		X			JoM	Effects of having strong ties and a dense network of professional colleagues on research citations
2017	Rogan & Mors	X	X			Org. Stu	Effects of relationships built using predominately individual rather than firm resources on exploration for new business
2017	Annosi et al.		X			Org. Stu	Effects of stakeholder network density in shaping the identities of self-managed teams
2017	Grosser, Venkatramani, & Labianca		X	X		JAP	Effects of alters' creative self-efficacy in an employee's problem solving network on that employee's innovation behavior
2017	Clement & Puranam		X			Man Sci	Analysis of formal organization design as a guide to network evolution
2017	Kleinbaum	X	X	X		Man Sci	Analysis of network opportunity structure, personality, and individual choices in tie decay
2017	Lomi, Tasselli, & Zappa		X		X	OTJ	Analysis of the network structure of organizational vocabularies
2017	Stea, Pedersen, & Foss	X	X			OTJ	Inverted U-shaped relation effect between quantity and quality i.e. between the size of an ego's social network and engagement in helping behavior
2018	Tasselli & Kilduff		X	X		AMJ	Personality-network fit perspective and effects on trust
2018	Soda, Tortoriello, & Iorio	X				AMJ	Effects of an individual's strategic orientation in harvesting value from structural holes in terms of performance
2018	Li et al.	X				AMJ	Effects of advice giving brokerage on team creativity
2018	Clement, Shipilov, & Galunic	X	X				Analysis of positive and negative externalities, in terms of inter-organizational networks, of specific kinds of brokers: the hubs
2018	Carnabuci, Emery, & Brinberg			X		Org. Sci	Cognitively informed network model of leadership emergence in social groups
2018	Grosser et al.		X			Org. Sci	Effects of employee's political skill and social network structure to relate on innovation involvement and job performance
2018	Ertug et al.		X			Org. Sci	Analysis of the relationship between choice homophily in instrumental relationships and individual performance
2018	Kuwabara, Hildebrand, & Zou			X	X	AMR	Effects of how laypeople construe different components of networks
2018	Kauppila, Bizzi, & Obstfeld	X				SMJ	Analysis of strategic network decision characteristics shape the creative process at the organizational micro-level
2018	Chua		X			JoM	Analysis of how the multicultural social networks promote idea flow and creativity
2018	Cullen, Gerbasi, & Chrobot-Mason	X		X		JoM	Indirect cost of communication centrality, moderated by individual differences in political skills, on workplace thriving through role overload and role ambiguity
2018	Landis et al.	X		X		JAP	Effect of the experience of power on the under-perception of brokerage opportunities for which sense of agency is suited
2018	Padgett				X	ASJ	Analysis of narrative networks in time as the assembly of memories through history
2019	Tröster et al.			X		AMJ	Analysis of the coevolution between the creation (dissolution) of both friendship ties and advice ties and thoughts of quitting
2019	Brands & Mehra	X		X		AMJ	Analysis of the performance of men and women friendship network brokers

TABLE 1
(Continued)

Year	Authors	Perspectives on network agency				Journal	Implications for network agency
		Individual advantage	Embeddedness	Micro-foundations	Structuration		
2019	Soda, Stea, & Pedersen	X	X			JoM	The level of collaboration in a network moderates the effects of closed and brokering network positions on the acquisition of knowledge that supports creativity
2019	Levy et al.	X			X	JoM	Analysis of the role of cosmopolitans in bridging structural and cultural holes
2019	Erdogan et al.		X	X		JoM	Relationships between perceived overqualification, perceptions of fit, and advice network centrality
2019	Dunn		X			JoM	Analysis of novices' knowledge creation benefits from both closed and open structures in developmental networks
2019	Benton	X	X			Org. Stu	Effects of brokerage and closure in corporate control
2019	Sage, Vitry, & Dainty			X	X	Org. Stu	Affective encounters between human and non-human bodies from the perspective of actor-network theory
2019	Porter et al.		X			JAP	Meta-analysis of how instrumental and expressive network positions relate to turnover
2019	McCarthy & Levin	X		X		JAP	Effects of social network ties that can be activated in people's minds on employees' organizational commitment
2019	Tasselli & Caimo		X			OTJ	Effects of triadic transitive and cyclic closure on knowledge sharing as contingent on formal organizational structure
In press	Tasselli, Zappa, & Lomi		X		X	Org. Sci	Analysis of the patterns between social networks and organizational vocabularies as contingent on the formal structure of organizational subunits
In press	Gómez-Solórzano, Tortoriello, & Soda		X			SMJ	Analysis of how a specific structural arrangement (i.e., belonging to a clique) affects inventors' innovative productivity depending on the kind of ties (instrumental or affective)
In press	Basov				X	OTJ	Socio-semantic network analysis to examine how cultural homophily works when field logic meets practice

Note: AMJ, *Academy of Management Journal*, *ASQ*, *Administrative Science Quarterly*, Org. Sci, *Organization Science*, AMR, *Academy of Management Review*, SMJ, *Strategic Management Journal*, Man. Sci, *Management Science*, JoM, *Journal of Management*, JMS, *Journal of Management Studies*, Org. Stu, *Organization Studies*, JAP, *Journal of Applied Psychology*, AJS, *American Journal of Sociology*, ASR, *American Sociological Review*, OTJ, other journal.

Appendix. Complete references of the articles selected for the review and included in Table 1.

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