Contingent bridge supervision: New evidence and cautions for network theory

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ABSTRACT

Bridge supervision occurs when manager and boss operate in separate social worlds, a condition increasingly likely as managers work more often from locations outside the office. The concept of bridge supervision was proposed using evidence from managers balkanized into product and geographic silos. Silos facilitate managers segregated from the boss. We here try to test support for bridge supervision hypotheses in a cohesive population of HR managers, where bridge supervision would be more difficult. Cohesion does limit the evidence of bridge supervision, but we nevertheless confirm the phenomenon's central hypotheses: bridge supervision is associated with role segregation between manager and boss, and manager performance is unaffected. More, by explicitly considering a broader set of network indicators of bridge supervision, we replicate Burt and Wang's (2022) focus on just two: mutual contacts, and manager-exclusive density. We close with key features of bridge supervision now replicated, cautions on how easily the phenomenon can be undetected in a cohesive study population, and implications for future research.

Forced by COVID policy to work from home, people discovered they liked remote work. Remote work eliminated time wasted in a commute, saved the related cost, allowed more flexible clothing solutions, provided more control over scheduling, and allowed for more time spent with family and friends, animal and human. Supporting infrastructure in the form of home investments and refined technology quickly emerged to encourage the new work habits. For many people, remote work is currently a preferred option (Barrero, Bloom, and Davis, 2023). With widespread employee interest in continuing to work remotely has come social science interest in its consequences. How do people adapt to isolation from the usual office colleagues? What are the consequences for innovation and achievement? Large-scale field experiments are an attractive source of answers to such questions. In a recent example conducted within Microsoft (Yang et al., 2021), data on employees already working remotely were compared to employees before and after being forced by COVID policy to work remotely. Remote work turns out to be associated with the preservation of strong ties within organization silos, while cross-silo bridge ties (so often a by-product of group project meetings) tend to dissolve. Those bridge ties are a known correlate of innovation and achievement (Brass, 2022; Burt, 2021; Kwon et al., 2020), implying a negative effect of remote work on performance (Yang et al., 2021:49).

Such studies are valuable, but require unusual access and resources, which limits exposure to the wisdom of the broad social science community. To get full value out of such projects, much can be learned by returning to familiar data on people working at variable distance from colleagues. Causal inference is limited, but we can identify predictors likely to be consequential, or likely to be irrelevant, in large-scale field experiments on remote work. We offer an illustration here regarding managers working at variable social distance from their boss. Supervision is particularly interesting because manager and boss have an obligatory connection, but that obligation can be performed in diverse ways — some managers work with their boss within a dense network of colleagues while others operate among a set of colleagues disconnected from the boss. Burt and Wang (2022) term the latter "bridge supervision" because the supervisory relationship is exercised through a bridge relationship across the structural hole between separate social worlds. They show that managers who operate under bridge supervision have more impersonal, distant relations with their boss, but their performance is no better or worse than the performance of managers connected to their boss within a dense network of colleagues.

To test for corroboration and provide an example of the kind of analysis we have in mind, we borrow data from a pre-COVID study to

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look for bridge supervision in a different kind of organization. Burt and Wang's evidence is from a management population balkanized by product and geographic silos. Organization silos make bridge supervision consistent with the organization context. In contrast, the population of HR managers studied here is relatively cohesive. Bridge supervision would be difficult. We find that cohesion does limit the evidence of bridge supervision, but we nevertheless replicate the phenomenon's two central results: Bridge supervision is associated with role segregation between manager and boss, and independent of manager performance. More, by considering a broader set of network variables relevant to bridge supervision, we increase the validity of Burt and Wang's focus on their two indicators: mutual contacts and manager-exclusive density.

We proceed in three sections. We start with a brief introduction to bridge supervision and its hypothesized associations with role segregation and performance. We then present the data and measures, followed by results. We close with key features of bridge supervision now replicated, cautions on how easily the phenomenon can be undetected in a cohesive study population, and implications for future research.

Bridge supervision

The concept of bridge supervision builds on a rich history of work in the social sciences. The core idea is that trust and cooperation in a relationship vary with the social context in which the relationship exists. That idea is often discussed in contemporary management research in terms of embedding (Granovetter, 1985, 1992) and social capital (Coleman, 1988; Putnam, 1993) — more dense networks around a relationship ensure information circulation, creating a reputation cost for bad behavior, thereby lowering the risk of trust, which increases the probability of cooperation and trust (reviewed in Burt, 2005:Chps. 3–4). It is a short step to legal research on dense networks providing flexible social order in the absence of, or despite, contracts (Bernstein, 2016, 2019; Ellickson, 1991), or psychological research on mutual friends increasing the odds of our positive relationship (Heider, 1958), or further back in economics to the theory of the firm as a social context created to manage market disadvantage or uncertainty (Coase, 1937). In the absence of the reputation cost created by dense relations embedding a relationship, opportunism is likely, with cooperation and trust inhibited. As Coleman (1988):S107-S108 summarizes: "Reputation cannot arise in an open network, and collective sanctions that would ensure trustworthiness cannot be applied. Thus, we may say that closure creates trustworthiness in a social structure." Leader-member exchange (LMX) research also focuses on the relationship between a manager and her supervisor, providing various suggestions for correlates of supervision (e.g., Gerstner and Day, 1997). In their paper at the intersection between LMX and network theory, Sparrowe and Liden (2005) for example find that "sponsorship" (i.e., structural equivalence) between manager and boss plays an important role in the manager's social influence within the organization.

Relations that bridge the structural hole between adjacent groups are an interesting special case. By definition, there are no mutual friends supporting bridge relations. The social monitoring that creates stable reputations does not occur around the relationship so much as at either end of the relationship. The denser the connections within each of two adjacent but separate groups, the more stable the reputations within group. Enduring bridge relations between the two groups mean that density within each group stabilizes reputational stereotypes about the other group. One can imagine a U-shaped distribution of reputation stability across increasing social distance: High stability within a cohesive group, low stability within a sparsely-connected group, some stability within adjacent sparsely-connected groups in reputation stereotypes about the other group, and high stability in reputations within bridge-connected cohesive groups. In short, bridge relations are subject to reputational governance by closed networks at either end of the relationship, which can have positive or negative consequences for interpersonal behavior within the bridge. On the positive side, for

example, people can prefer immigrant household staff who live in cohesive church groups. The behavior and opinions of such staff are closely monitored in the church group for conformity to attractive community norms, making such staff a safer-than-average hire to provide trustworthy custodial and childcare services. On the negative side, conflict escalation is an all-too-familiar example. Opponents recruit allies to form dense support networks on either side of the conflict (Coleman, 1957). The phenomenon of adjacent reputation mechanisms is more subtly evident in role segregation. When two people connected by a role relation are embedded in separate, dense networks, each brings to the role expectations supported by their respective social circles. This imagery is well known in network analysis from Bott's (1957) close observation of marriages (Bidart, 2021; Savage, 2008, for contemporary views). When husband and wife are embedded in separate, dense social networks, each plays their conjugal role for the approval of their respective constituencies outside the marriage, the husband displaying stereotypical male behavior to his circle of interconnected men, and the wife stereotypical female behavior to her circle of interconnected women ("there was a sharp division of labor between husband and wife in which he had his tasks and she had hers" Bott, 1957:3).

Burt and Wang adapt Bott's analysis to role segregation in supervisory relationships. They imagine a continuum ranging from "embedded supervision" at one end to "bridge supervision" at the other (Burt and Wang, 2022:1839–1840): "At the embedded end, manager and boss are peas in the same pod: a pair of people connected by a supervision relationship, jointly dealing with mutual colleagues connected with one another. At the bridge end of the continuum, manager and boss are connected by a supervision relationship that reaches across a structural hole between manager and boss; manager contacts are variably connected with one another and disconnected from boss contacts, who are variably connected with one another. The denser the connections on either side of the structural hole, the deeper the structural hole, and the more that supervision has to be exercised as a bridge across the structural hole."

The continuum from bridge to embedded supervision is illustrated in Fig. 1. In theory, bridge supervision occurs when manager (M) and boss (B) operate in separate, dense networks. At the top left in Fig. 1, the manager's colleagues (solid dots) are disconnected from the boss, and strongly connected with each other. The boss' colleagues (hollow dots) are disconnected from the manager and strongly connected with each other. An example network from the HR study population analyzed in this paper is displayed in the lower left of Fig. 1. Lines indicate frequent work discussion, with heavy lines indicating emotionally close relations. Manager and boss have one discussion contact in common (square), but most of the manager's discussion contacts are exclusive in that they are disconnected from the manager's boss and have close relations with each other (solid circles). On the other side, most of the boss' discussion partners are exclusive in that they connect with one another, but not with the manager (hollow circles).

Embedded supervision is illustrated on the right side of Fig. 1. In theory, manager and boss have strong ties with the same colleagues (squares), each with a few contacts exclusive to themselves, disconnected from the other. The example HR supervisory relationship to the lower right in Fig. 1 shows a manager whose discussion colleagues are all connected to the boss. The manager has no frequent discussion contact beyond the boss' network. For her part, the boss has a slightly broader circle of discussion partners (hollow circles).

Predicting role segregation

Presuming the generality of the role segregation in relations between separate, dense networks, Burt and Wang argue that bridge supervision should be associated with work role segregation similar to the conjugal segregation described by Bott. Indicators of the expected role segregation are (Burt and Wang, 2022:1841 [their labels in brackets]): The manager has authority in a domain separate from the boss [decisions].
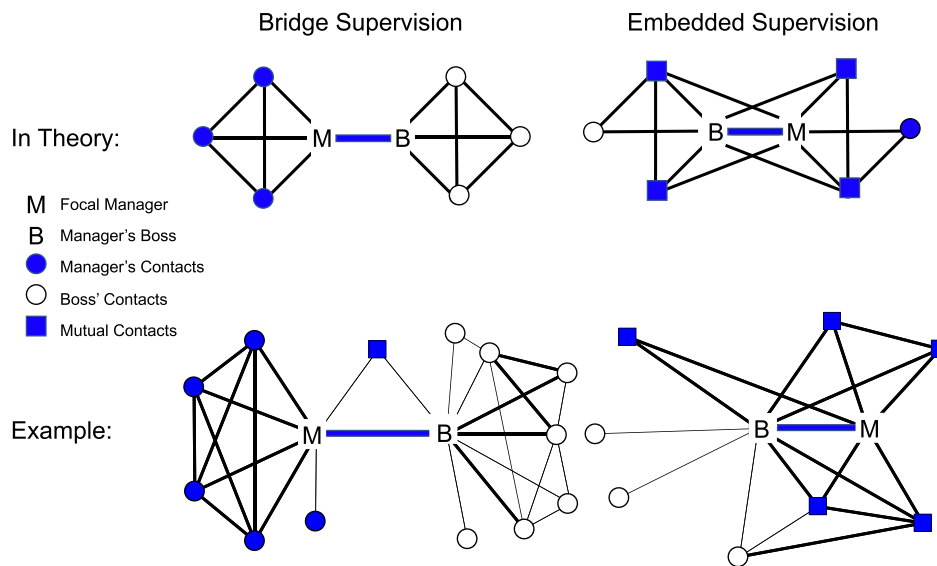
Fig. 1. Bridge versus Embedded Supervision.

Manager discussions with the boss are open to discussion with colleagues [privacy]. Manager and boss are understood to be different kinds of people with different goals and interests [homophily]. Personal compatibility is not essential to successful manager-boss cooperation [compatibility]. As Burt and Wang (2022:1842) express the compatibility issue: "Managers operating under bridge supervision are more likely to opine that it is not essential to get along personally with the boss. 'The boss does her job. I do mine. We get it done.'" In sum, managers operating under bridge supervision are expected to have an impersonal, distant relationship with the boss. Thus, we have the first two bridge-supervision hypotheses to replicate from Burt and Wang (2022:1842):

Hypothesis 1.   The probability of role segregation decreases with the number of mutual contacts shared by manager and boss.

Hypothesis 2.   The probability of role segregation increases with the density of connections between a manager's exclusive contacts,

where exclusive contacts are colleagues connected to the manager but not to the manager's boss. We control for the extent to which the manager is a network broker, since brokers are more likely to behave independent of the boss as well as any other individual contact.

There is a third hypothesis implicit in the above two that should be explicit in a replication study. Fig. 1 distinguishes three categories of contacts: contacts exclusive to the manager (solid circles), contacts exclusive to the boss (hollow circles), and contacts mutual to manager and boss (squares). Contacts in each category vary in number and network density. The three categories of contacts and two network measures together create six variables in Table 1 measuring the extent to which manager and boss are separated by a structural hole between their respective dense networks. Consider the first row of the table. Hypothesis 1 says that segregation between manager and boss decreases with the number of mutual contacts they share. But dense connections among those mutual contacts should also decrease separation by the argument that dense networks support trust and cooperation within the network. The density of connections among mutual contacts is not hypothesized as a correlate of role segregation in the Burt and Wang argument, so implicitly, the argument deems it irrelevant to role segregation once number of mutuals is held constant. Similarly, manager-exclusive contacts are consequential in their density, not their numbers. These implicit hypotheses warrant test in a replication study:

Table 1
Measuring Manager-Boss Separation In Their Respective Dense Networks.

Three Contact Categories	Two Network Measures of Contacts	
	Number	Density
Mutual Contacts (squares)	Decrease Separation? (H1)	Decrease Separation? (H3a)
Manager-Exclusive Contacts (solid circles)	Increase Separation? (H3b)	Increase Separation (H2)
Boss-Exclusive Contacts (hollow circles)	Increase Separation? (H3c)	Increase Separation? (H3c)

NOTE — Shapes in parentheses refer to Fig. 1. H1, H2, H3 refer to Hypotheses 1, 2, and 3.

Hypothesis 3a.   The density of connections among mutual contacts is irrelevant to role segregation once the number of mutuals and manager-exclusive density are held constant.

Hypothesis 3b.   The number of manager-exclusive contacts is independent of role segregation once the number of mutuals and manager-exclusive density are held constant.

Number of manager-exclusive contacts is included in a measure of density as the average strength of connection among manager-exclusive contacts, so the number-of-contacts variable is not ignored by Hypothesis 2. Hypothesis 3b merely makes explicit that number-of-contacts is independent of role segregation once manager-exclusive density is held constant.

In theory, bridge supervision is a symmetric phenomenon strengthened by network density around manager or boss. But in practice, the most relevant network is the one around the person whose perception is measured. We follow Burt and Wang in estimating effects from density around the manager, since managers are where most research provides representative data. Nevertheless, there is an open empirical question about whether density around the boss affects the manager's perception of his or her relationship with the boss. Whether intended or not, a manager could feel ostracized if she has no easy discussion relations with the cohesive circle of colleagues around her boss. Therefore, another hypothesis implicit in replicating bridge supervision is the hypothesis that network conditions around the boss are independent of role segregation once number of mutuals (Hypothesis 1) and density of

manager-exclusive contacts (Hypothesis 2) are held constant:

Hypothesis 3c. Number and density of boss-exclusive contacts are independent of manager perceptions of role segregation once the number of mutuals and manager-exclusive density are held constant.

Predicting performance

Bott (1957) describes psychological and behavioral differences in the way husbands and wives play and view their roles in the marriage, but found no differences in the "quality" with which they performed their conjugal roles. Couples adapted to the situation. By analogy, conditions of bridge supervision are expected to affect the way a manager plays his or her role, but need not affect the quality of a manager's performance. Drawing on more extensive research, performance indicators such as work evaluation, recognition as a leader, compensation, and promotion are associated with a manager's personal access to structural holes (Brass, 2022; Burt, 2021; Kwon et al., 2020), but are independent of the networks around the boss and other colleagues (Burt, 2010). After finding no association between bridge supervision and two measures of performance, Burt and Wang (2022:1856) call for replication efforts to corroborate or reject their observation that manager performance is independent of bridge supervision. Thus, we have a fourth bridge-supervision hypothesis to test regarding performance:

Hypothesis 4. Manager performance is independent of bridge supervision.

Again, we include a control for access to structural holes. Bridge supervision frees managers to develop as a network broker, which is usually associated with high performance in populations of managers who have some job autonomy. Also, note that a manager operating under bridge supervision is not alone. Loneliness is a related, but separate issue. Bridge supervision focuses on having a social constituency independent of the boss. Even under the extreme separation of COVID-induced remote work, people stayed in touch with their close colleagues (Yang et al., 2021).

Hypothesis four is a null hypothesis. We cannot prove it, but we can reject it. We are explicit about it for its practical implications. If bridge supervision does not affect performance, then adopting more-flexible, less-expensive bridge supervision is a question of management style rather than a criterion of effective management. The fact that bridge supervision affects style but not performance is a key result to be tested.

Data

We test the bridge supervision hypotheses in a study population distinct from the one used by Burt and Wang. Their supply-chain managers were scattered across company divisions separated by geography, products, and technologies. A few inputs such as office supplies and travel were managed as shared services. Otherwise, the supply-chain managers in their respective organization silos dealt with different suppliers for different products in different parts of the country. Social segregation was a familiar phenomenon — one manager's contacts often being different from a colleague's.
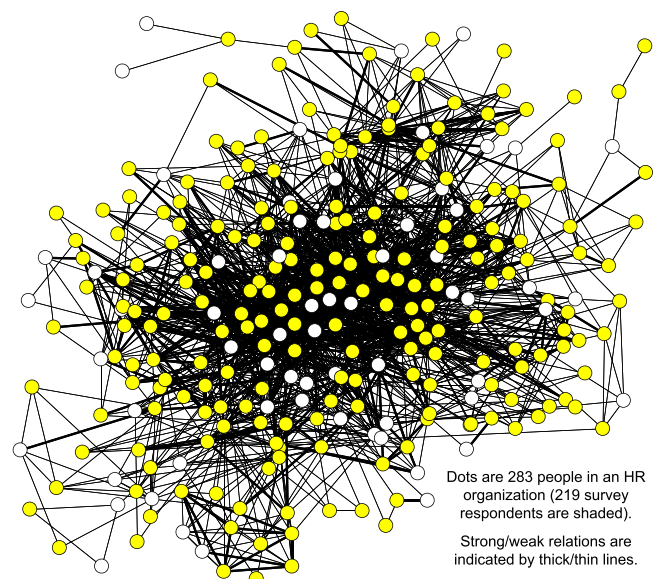
Study population

Data for this analysis come from company personnel records and a network survey of 283 HR managers in a large commercial bank. The HR study population was among the example populations in Burt's (2010) test for network spillover effects. We re-assemble the data more broadly to study bridge supervision in manager-boss dyad networks. The network survey was conducted at the beginning of the fiscal year for which we have data at the end of the year from bank personnel records. Neither source is independent of the other, so we combine the two as cross-sectional data on the managers. The HR managers are stratified

across six job ranks, as individual contributors and supervisors, up to heads of office. Two-thirds of the most senior managers work at HQ, but there are also high-rank HR managers in the back-office location and larger field offices. Most of the study population is female (71%), Caucasian (69%), and, on average, age 37 with seven years of seniority in the organization. We use female pronouns to refer to the managers since the majority are women. Age and seniority are correlated.50, but the organization is enough of an open system so that at every five years of age there are HR managers with less than a year of seniority. We include controls for job rank, annual evaluation, gender, location, and seniority.

In comparison to Burt and Wang's supply-chain managers, segregation is less usual, even rare, among the HR managers. Before turning to the data, we offer two broad reasons for saying there is more cohesion among the HR managers. The first is the work itself. These managers play a crucial role in coordinating various aspects of the enterprise, ensuring adherence to company protocols while also facilitating activities such as recruitment, talent development, and managing interpersonal relations. Breaches of company HR policies may expose the organization to significant external challenges, including lawsuits and regulatory interventions. Consequently, corporate headquarters typically maintains stringent oversight of HR processes. As essential as HR processes can be, they are usually more valuable in the long run than they are in the short run, so they are often viewed as a gratuitous burden on the daily business activities of employees outside HR. Employees have to be monitored for compliance. Resentment is to be expected. In response to these challenges, it is common for HR professionals to form a cohesive group with a distinct identity within, yet separate from, the broader organizational structure.

Second, and in keeping with the above image, the HR managers are physically and socially proximate. Fifty-two percent of the HR managers work in the bank's headquarters office, and another 29% work in a proximate facility outside the city limits. More concretely, the sociogram in Fig. 2 shows a densely-connected population of managers. There is a single center that radiates out to the periphery. There are abundant structural holes among the HR managers, but the holes are not reinforced by boundaries between organization silos. This is in contrast to Burt and Wang's supply-chain managers, who were scattered across separate organization silos (compare Fig. 2 to the supply-chain sociogram in Burt, 2010:75). Of all the relations possible among the HR managers, 60% are friends of friends or closer (path distances of one or two links). To connect the same percent of possible relations among the

Dots are 283 people in an HR organization (219 survey respondents are shaded).

Strong/weak relations are indicated by thick/thin lines.

Fig. 2. The HR Study Population.

Table 2
Sociometric Citations.

Name Generator [maximum possible]	Boss	Other HR Manager	Other Employee in Bank	Person Outside Bank	Total Citations
Citations Indicating Contact					
3 Discuss important matters [GSS, 4]	70	161	191	384	806
4 Socialize [3]	6	76	143	389	614
Citations Implying Contact					
5 Boss [1]	219	0	0	0	219
5b Dotted Line Boss [1]	0	77	18	0	95
6 Most promising subordinate [1]	1	45	35	0	81
7 Source of Essential Support [4]	93	334	299	20	746
8 Most difficult colleague [1]	16	72	85	6	179
9 Most Valuable Contact [4]	100	273	276	17	666
Citations for Hypothetical Contact					
10 Regret lack of relationship [1]	4	34	51	3	92
11 Represent Interests in a Re-Org [1]	78	91	34	0	203
12 Likely Competitor for Promotion [1]	3	77	66	0	146
13 Would Discuss Outside Offer [3]	40	104	159	277	580
14 Significant but not cited above [1]	0	109	145	36	290
Total Citations	630	1453	1502	1132	4717

NOTE — Survey respondents (219) making citations in response to row name generators. A person could be cited on multiple name generators. Brackets contain maximum number of people respondent could cite on each generator. People beyond the bank are explicitly named as outside the bank. Presumably they are vendors, friends, and family.

supply chain managers, indirect connections would have to include friends of friends of friends of friends of friends — that is to say, path distances up to five links, which would allow a manager to reach the center, then drop down into another organization silo. (This sentence is based on the path-distance graph in Burt, 2010:111.) Connectivity among the HR managers is a stress test for the bridge-supervision hypotheses because it is more difficult to be segregated from the boss when manager and boss are collocated in a cohesive social structure.

Network structure

A virtue of the bridge-supervision hypotheses is that much of what they predict can be tested with familiar data. Three categories of data are needed: (1) network structure across the management population, (2) measures of manager role segregation from the boss, and (3) measures of manager performance.

The first requirement ensures that the network around both manager and boss are in the data. This requirement limits replication to whole networks of a study population, or at least rules out samples of disconnected ego-networks around individual managers. Survey network data on the HR managers were collected by the usual method of name generators and interpreters (e.g., Marsden, Fekete and Baum, 2021; Perry, Pescosolido and Borgatti, 2018:35–127). The 219 survey respondents are representative of all 283 HR managers in that (1) there are no statistically significant differences between non-respondents and respondents in compensation, job rank, annual evaluation, gender, office location, or seniority, and (2) Fig. 2 shows respondents scattered across the network (response is independent of how often a manager is cited as a contact, −0.78 logit z-score, P ~.43).

Name generators

Three categories of name generators are used: some indicate contact, some imply contact, and some elicit names for hypothetical contact. Altogether, the 219 survey respondents make 4717 citations, in 2870 relationships, with 1699 contacts. Respondents are not limited to naming colleagues within HR, or within the bank. Table 2 shows that most of the citations are to colleagues in the bank, but a substantial minority are to contacts outside the bank (1132 of 4717, or 24%).

Beginning with actual contact, the first two rows of Table 2 show who managers cite as people with whom they discuss "important matters" (General Social Survey name generator), and the people with whom they most often get together for informal social activities (exact wording in Burt, 2010:285–286). Seventy-one bosses were named on

these contact items (65 for discussing "important matters," 1 for informal socializing, and 5 for both).

The next six rows of Table 2 show citations that imply contact, but need not indicate contact. For example, all 219 respondents name their boss when asked. One could expect managers to have contact with their boss, but contact can be routine, pro forma, and so not cited. The first row of the table shows that only a subset of managers discuss important matters with their boss. Similarly, the people named as "most valuable" contact often include the boss, but also include people well above the manager in the organization hierarchy, and some contacts outside the bank. The one manager who cited her boss as her "most promising subordinate" is not confused. She is irritated. She also cited her boss as her "most difficult colleague," and a colleague from whom she felt emotionally "distant," and did not cite the boss as someone with whom she discusses important matters.

The above eight name generators define the connections in Fig. 2. Beyond those actual or implied interactions, the final five rows of the table show citations in response to hypothetical situations. If HR were going through a re-organization, for example, 78 managers would feel comfortable with their boss representing their interests. If a manager were considering an outside offer, 40 of the managers would discuss with their boss the pros and cons of accepting the offer. The last row is a "not elsewhere cited" generator to elicit the names of people significant in other ways for the respondent's work.

Beyond the study population of HR managers, 262 other employees in the bank were cited by two or more respondents. These are important to include in the network calculations as possible mutual contacts for manager and boss. The remaining 1191 cited contacts were cited by a single respondent: 454 employees outside HR or lower in the HR organization, and 737 family and friends outside the bank. These single-citation contacts are included in the calculations as contacts who could be perceived to connect manager and boss, or as manager-exclusive contacts potentially providing a social group apart from the boss.

Name interpreters

The network survey includes name interpreters with which we can flesh out relations with each cited contact: emotional closeness, years known, contact frequency, whether the contact also works in the bank, and a matrix in which the respondent reports her perception of the relation between each pair of cited contacts as "especially close," "distant in the sense that they rarely work together or do not enjoy one another's company," or "neither distant nor especially close." We use the respondent perceptions to describe network structure among non-

respondents. Of course, a respondent can have her unique view of the relationship between two colleagues, but perceived relations are primarily within a single respondent's network, and a respondent's own view of relations between her contacts is the view most relevant to predicting that respondent's behavior (McEvily, 2014), which is why we privilege respondent reports on their own relations when defining manager-boss dyad networks (see step 3 below). With the perceived relations in hand, we can include all 1699 cited contacts in the network indices to distinguish respondents embedded in a social circle within or beyond HR that excluded their boss.

Scaling shows a large difference between "especially close" relations and all levels of less close relations. We preserve respondent distinctions using the continuous strength scores obtained from a loglinear model of relation strength (Burt, 2010:290–293): 1.00 for an especially close sociometric citation,.96 for an "especially close" perceived relationship, .33 for a "close" sociometric citation,.26 for a "neither distant nor especially close" perceived relationship,.16 for a "less close" relationship, and.00 for a "distant" relationship. Since respondents distinguish especially close relations so sharply from other relations, we refer to especially close connections as strong ties and any lesser non-zero connection as a weak tie.

Manager-boss dyad networks

We assemble the dyad network around manager and boss through the following sequence of steps: (1) Define network membership. Assemble manager, boss, and dotted-line boss (if there is one), then add anyone connected by either of the two interaction questions (first two rows of Table 2) with the manager, and anyone connected by either interaction question with the boss. (2) With network membership defined, the average perceived network data on relation strength are used to define relations between each pair of people. The relation between persons i and j, z_{ij}, varies from zero to one as the average closeness colleagues perceive in the relationship. (3) Finally, to give priority to respondent descriptions of their own relations, the original citation data on relation strength are re-read and used to replace any corresponding perceived relations. The final product is a symmetric matrix of z_{ij} defining the dyad network around each manager and her boss.

With the dyad network defined, the six predictor variables in Table 1 can be computed. The two predictors in Hypotheses 1 and 2 are mutual contacts and exclusive density. Given the prevalence of connections in this study population, we distinguished counts of strong versus weak mutual contacts. "Strong Mutuals" is the number of people especially close to manager and boss. "Total Mutuals" is the summed strength of all indirect connection between manager and boss. Compute total mutuals by summing the product z_{mk} x z_{kb}, across all contacts k who are closer than "distant" from the manager, where self relations are set to zero (z_{ii}), z_{mk} is the manager's relation with contact k, and z_{kb} is contact k's relation with the manager's boss. The sum is a continuous variable in the metric of number of strong ties. Strong mutuals are a subset of total mutuals (limit total-mutuals calculation to z_{mk} and z_{kb} both especially close relations). Across the HR managers, number of strong mutuals varies from zero to 5 around a mean of.60, and total mutuals varies from zero to 15 around a 5.40 mean.

We compute manager-exclusive density in the usual way as the average strength of connections between manager contacts disconnected from the boss (where N is the number of manager contacts disconnected from the manager's boss): $\sum_i \sum_j z_{ij} / N(N-1)$, with z_{ii} set to zero. If a manager has no exclusive contacts or only one exclusive contact, then she has no cohesive group separate from the boss, and manager-exclusive density is zero. Across the HR managers, N varies from zero to eight around a mean of 1.59 (39% of managers have no contacts exclusive from the manager's boss), and manager-exclusive density varies from zero to.96 around a.09 mean. In the same way, we define the number of boss-exclusive contacts in a manager's dyad network, boss-exclusive density in the network, and the density of connections among manager-boss mutual contacts.

Network brokers and contacts beyond the bank

We control for network brokerage since managers whose networks bridge structural holes should be more able to operate independent of their boss, as well as independent of any other one contact. For each respondent, we compute her lack of access to structural holes using a summary index, network constraint. Constraint is high to the extent that a manager's contacts are few, and directly or indirectly connected (respectively network size, density, and hierarchy/centralization, Burt, 1992, 2021). We multiply scores by 100 to discuss points of constraint.

One of the ways a manager can have a cohesive social group disconnected from the boss is by embedding herself in a group outside work. Family and friends can be a setting in which one finds sympathetic social support against what seems to be a difficult boss. Consider the example bridge-supervision network in the lower-left of Fig. 1. The manager has five exclusive contacts (solid circles). One is a colleague HR manager, but the connected set of four to the left in the sociogram is a group of manager friends outside the bank (his wife and three male friends).

More generally, outside contacts are not essential to the HR managers having an exclusive social circle, but outside contacts do facilitate it. Fig. 3 illustrates the point. Managers are distinguished on the horizontal axis by the number of outside contacts they cite as important discussion partners or informal socializing (first two rows of Table 2). Outside contacts are people not employed by the bank, presumably vendors, friends, and family. The vertical axis to the left shows manager-exclusive density. The top solid line describes density for the 60 managers who have non-zero density. These managers have their own social group separate from the boss. The line is flat, showing no statistically significant increase or decrease in density with additional outside contacts (t = 1.16, P ~.25). However, across all managers, the solid line at the bottom of Fig. 3 shows a statistically significant increase in average density with number of outside contacts (t = 3.92, P <.001). The explanation is a presence or absence of manager-exclusive density. The dashed line in Fig. 3 shows percent of managers with non-zero density. The line increases sharply for three or more outside contacts (3.64 logit z-score, P <.001). In short, outside contacts facilitate (dashed line), but are not essential (solid line), to manager-exclusive density.

The hypothesized effect of manager-exclusive density is about whether a manager has an exclusive social circle, not where it occurs. It could be a cohesive social circle within or beyond the firm, but it is to be a social circle exclusive of the boss. Our inference from Fig. 3 is that we should hold constant the volume of a manager's outside contacts to test the independent contribution to bridge supervision from manager-exclusive density.

Fig. 3. Outside Contacts Facilitate Manager-Exclusive Density.
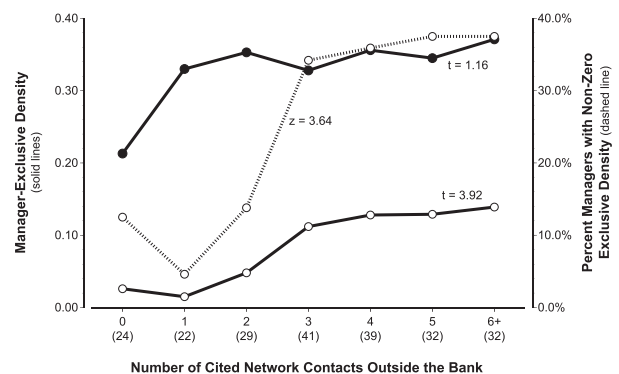
Note — Parentheses contain number of HR managers citing each level of outside contacts for socializing and discussing important matters (first two rows of Table 2). Hollow circles indicate means computed across all 219 managers. Dark circles indicate means computed across 60 managers with non-zero exclusive density. Robust test statistics are computed across individual managers, not the plotted averages.

Dependent variable: role segregation

We follow Burt and Wang (2022:1844-1845) in using "lack of discussion with the boss" as our indicator of role segregation, an indicator that they argue reflects multiple dimensions of role segregation. The lack of meaningful discussion between manager and boss also captures a major violation of one of the most common and important social norms in the workplace. This does not cast doubt on the boss's legal authority over the manager, but it represents a strong indicator of role segregation between manager and boss.

We have two variations on the measure, one binary and one ordinal. Our binary measure of role segregation equals 1 for a manager who does not cite her boss as someone with whom she often discusses important matters (first row of Table 2). We considered informal socializing as a complementary form of interacting with the boss. But only six managers cite their boss for informal socializing, five of whom also discuss important matters with their boss, so combining the two forms of interaction complicates interpretation without shifting the cut-off between high and low role segregation appreciably closer to the middle of the population. Therefore, we keep the measure clearly focused on discussing important matters. In addition, we use an ordinal version of the measure. The discussion name generator allows four citations. The boss could be cited first (27 managers), second (18), third (17), fourth (8), or not at all (149). On the presumption that bosses cited sooner are more integral to a manager's activity, the five-category citation order variable gives us additional variation in role segregation.[1]

Dependent variable: performance

We follow Burt and Wang (2022:1854) in using compensation to measure performance. We have two measures from the bank's personnel records for the year of the study: salary and bonus. Compensation is determined in the usual way: Each manager's boss makes a recommendation at the end of the year, then people higher up the chain of command go with the recommendation, cut it back, or make it a little more generous. The two measures are skewed over large compensation differences between HR managers of highest and lowest rank (1.02 skew in salary, but 9.34 skew in bonus). To decrease skew, we use log compensation. To preserve confidentiality, we transform log compensation to z-scores. The salary and bonus measures are correlated but distinguishable (.46 correlation for log scores). Salary is dependent on a manager's salary history. Bonus varies from year to year and is occasionally zero (log score of bonus is log of 1 plus bonus).

Results

Table 3 shows results for logit models predicting role segregation between manager and boss. Means and standard deviations are given in the Appendix for the variables in Table 3 and later. The first three models predict using only the two variables hypothesized to predict bridge supervision. The last two models predict adding a variety of controls. With the exception of one statistically significant association with network constraint, the control variables are independent of role segregation. Since we test for 30 associations with the control variables, we are comfortable attributing one statistically significant result to random chance.

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[1] Given the large number of uncited bosses, we considered criteria for dividing uncited bosses into more and less uncited. For example, 47 of the uncited bosses are cited later as "essential sources of support," and 50 are cited later as "most valuable contacts." Thinking that bosses cited on either name generator are less distant than bosses cited on neither, we created a fifth category of cited on either, and moved to a lower sixth category bosses cited on neither. We get the same results with the six-category ordinal variable that we get with the five-category variable, so in the interest of simplicity, we stay with the five-category ordinal variable.

Table 3

Measuring Manager-Boss Separation In Their Respective Dense Networks.

VARIABLES	M1	M2	M3	M4	M5
Strong Mutual Contacts	-0.46***	-	-0.40***	-0.49***	-0.39**
	(0.17)		(0.15)	(0.18)	(0.17)
Total Mutual Contacts	-	-0.01	-	-	-
		(0.05)			
Manager Exclusive Density	2.98**	3.07**	3.00***	2.68**	2.44**
	(1.16)	(1.19)	(1.14)	(1.23)	(1.23)
Log Network Constraint				-1.70**	-1.10
				(0.79)	(0.75)
Number Outside Partners				0.16	0.18*
				(0.11)	(0.11)
Job Rank (independent contributors)				0.00	0.11
				(0.22)	(0.22)
Job Rank (managers)				-0.22	-0.12
				(0.33)	(0.30)
Has a Secondary Boss				0.18	0.23
				(0.35)	(0.36)
Above Average Evaluation				-1.03*	-0.74
				(0.60)	(0.62)
Average Evaluation				-0.54	-0.27
				(0.57)	(0.57)
Female				0.51	0.33
				(0.43)	(0.42)
New York Office				0.26	0.34
				(0.40)	(0.38)
Field Office				0.25	0.39
				(0.54)	(0.49)
Manager and Boss in same city				-0.44	-0.27
				(0.46)	(0.44)
Job Seniority				-0.01	-0.01
				(0.03)	(0.03)
Manager Exclusive Contacts				-0.01	0.00
				(0.16)	(0.15)
Boss Exclusive Contacts				0.14*	0.15*
				(0.08)	(0.08)
Boss Exclusive Density				-0.08	-0.07
				(1.01)	(1.04)
Density Among Mutuals				1.17	0.43
				(0.88)	(0.89)
Pseudo R-squared	0.07	0.04	0.04	0.18	0.10

NOTE – M1, M2, and M4 are logit models predicting lack of citation to boss. M3 and M5 are ordinal logit models predicting order of citation to boss. Robust standard errors are presented in parentheses. Intercepts for models M1, M2 and M4 are.85,.61, and 6.66 respectively. Four level intercepts for ordinal logits are −2.09, −1.45, −1.00, and −.82 for M3; −5.39, −4.70, −4.20, and −3.98 for M5. *** p<0.01, ** p<0.05, * p<0.1

Predicting role segregation

The first two rows in the table concern the hypothesis that mutual contacts decrease role segregation. The evidence clearly supports the hypothesis at the same time showing that the support is contingent. Role segregation decreases with the number of contacts especially close to manager and boss (-2.65 logit test statistic in M1, −2.77 with the ordinal measure of role segregation in M3, P <.01), and the association persists after controls are introduced in M4 and M5. However, the support only exists for especially close contacts. When indirect connection through all mutual contacts is used as the predictor in M2, the effect disappears (-0.21 test statistic in M2). Empirical support for the mutual-contacts hypothesis is contingent on distinguishing the particularly strong connections through mutual contacts. In this cohesive study population, almost everyone has multiple indirect connections with their boss. The averages in the Appendix are 0.60 strong mutuals versus 5.40 total mutuals. Only four managers have no mutual contacts with their boss, but there are 131 who have no strong mutuals. And that is using only the

two interaction criteria in the top two rows of Table 2. If we expand the criteria to include all connections in Fig. 2 (first eight name generators in Table 2), then total mutuals increase to an average of 15.37 and the negative association with role segregation disappears (-1.46 and −1.04 test statistics corresponding to −2.64 and −2.27 for M4 and M5 in first row of Table 3).

The third row in Table 3 shows support for the second hypothesis, that role segregation is more likely for managers with a cohesive social circle separate from the boss. Test statistics in the third row all show the expected positive association with the strongest and weakest support for the ordinal measure of role segregation: −2.64 test statistic in M3 (P <.01) and 1.98 in M5 (P ~.05).

The bottom four rows of effects show support for the third hypothesis, that the network variables relevant to bridge supervision, but ignored in Burt and Wang, are in fact negligible predictors. The strongest association is for role segregation increased by the boss having numerous exclusive contacts separate from the manager (1.81 and 1.94 test statistics), but the association is not statistically significant by usual standards. Summary tests show that role segregation is independent of the four network variables ignored in Burt and Wang's argument (5.83 chi-square in M4, 4 d.f., P ~.21 and 6.55 in M5, 4 d.f., P ~.16).

Summary distinction between bridge and embedded supervision

Given the variety of relation strength measures used in network analysis, network theory is not specific about bridge supervision resulting from a specific level of manager density or a specific lack of mutual contacts. Therefore, bridge-supervision graphs such as Fig. 4 can be helpful in cumulating results across studies. The horizontal axis is the number of strong mutual contacts between manager and boss. The vertical axis is the percent of managers who do not cite their boss as a discussion partner. For managers who have no cohesive social circle disconnected from the boss (dashed line), the tendency to ignore the boss decreases as the number of strong mutual increases. When there is a social circle more than zero network dense (solid line), the boss is typically not a discussion partner regardless of mutual contacts. This is similar to the pattern reported in Burt and Wang (2022:1851), except in their study population more balkanized by organization silos, a high number of mutual contacts is able to suppress the negative effect of manager-exclusive density (an instance of "Simmelian" ties created by multiple mutuals, Tortoriello and Krackhardt, 2010).

Pulling these results together to test the performance hypothesis, we construct a dummy variable equal to one for managers in the shaded area of Fig. 4 (non-zero manager-exclusive density or no strong mutual contacts). Managers in the shaded area are operating under bridge supervision. Managers outside the area are operating under embedded

supervision. If we replace the two bridge-supervision predictors in Table 3 with the dummy variable, we see the expected strong bridge-supervision association with role segregation, both binary (3.09 test statistic in M4, P<.01) and ordinal (2.75 test statistic in M5, P<.01).[2]

Predicting manager performance

Table 4 and Table 5 concern the hypothesis that bridge supervision is independent of manager performance. The results in Table 4 predict from only a manager's network. In Table 5, the prediction is extended to include controls. The results in the bottom row of Table 4 strongly support the hypothesis. Salary and bonus compensation are independent of bridge supervision. Compensation is lower for managers in closed networks (network constraint). Salary is independent of outside discussion partners, but bonus compensation has a statistically significant association with outside contacts (t-tests of −5.03 and −5.16, both P<.001). Either managers with networks balanced toward outsiders turn in weaker performance, which earns lower bonus compensation, or managers who earn lower bonus compensation find a life in networks balanced toward outside contacts.

The broader results in Table 5 imply a stable formal organization in HR. Salary is strongly predicted by job rank, location, and seniority. For example, salary is primarily predicted in M10 by job rank (4.47 t-test for

Table 4
Predicting Compensation, Just Network.

VARIABLES	M6	M7	M8	M9
Strong Mutual Contacts	-0.06	-	0.03	-
	(0.06)		(0.07)	
Manager Exclusive Density	-0.07	-	-0.33	-
	(0.32)		(0.42)	
Bridge Supervision Dummy	-	0.19	-	-0.14
		(0.13)		(0.12)
Log Network Constraint	-1.00***	-0.99***	-1.06***	-1.07***
	(0.22)	(0.22)	(0.20)	(0.20)
Number Outside Partners	-0.04	-0.04	-0.18***	-0.18***
	(0.04)	(0.04)	(0.03)	(0.03)
Constant	3.81***	3.61***	4.45***	4.56***
	(0.85)	(0.85)	(0.77)	(0.78)
R-squared	0.08	0.08	0.17	0.17
Bridge Supervision Irrelevant	0.45 $F_{(2,214)}$ P ~.64	1.40 t-test P ~.16	0.41 $F_{(2,214)}$ P ~.67	-1.20 t-test P ~.23

NOTE — OLS regression models predicting annual salary and bonus measured as z-score log variables. Bridge-supervision predictors are (1) number of strong mutual contacts shared by manager and boss, and (2) manager-exclusive density. Bridge supervision dummy variable equals 1 for a manager who has an exclusive social circle or no strong mutual contacts with her boss (shaded area of Fig. 4). Number of outside discussion partners is a count of people outside the bank cited for discussion of important matters (presumably vendors, family, and friends; horizontal axis in Fig. 3). Robust standard errors are presented in parentheses.
*** p<0.01, ** p<0.05, * p<0.1
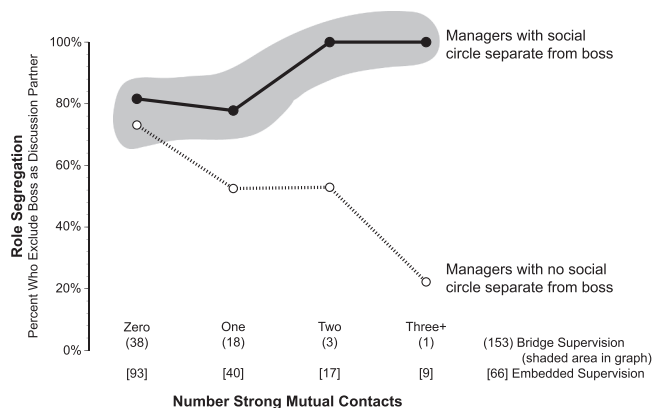
Fig. 4. Bridge-Supervised Managers More Often Exclude the Boss from Core Discussion Partners.

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[2] Routine statistical tests are inappropriate here since the bridge-supervision dummy variable is constructed by pairing in Fig. 4 the dependent variable (not citing the boss) with the independent variables (strong mutual contacts, and manager-exclusive variance). In preparation for testing the compensation hypothesis, however, we report test statistics for the dummy variable to indicate its validity as a measure of bridge supervision. By providing a bridge-supervision measure that better predicts role segregation than either of the two predictors in M1, the dummy variable can provide a stronger test of the compensation hypothesis.

Table 5
Predicting Compensation, With Controls.

VARIABLES	M10	M11	M12	M13
Strong Mutual Contacts	-0.01	-	0.04	-
	(0.03)		(0.06)	
Manager Exclusive Density	0.09	-	-0.13	-
	(0.18)		(0.33)	
Bridge Supervision Dummy	-	0.04	-	-0.13
		(0.07)		(0.10)
Log Network Constraint	-0.03	-0.03	-0.35*	-0.36*
	(0.11)	(0.11)	(0.20)	(0.20)
Number Outside Partners	0.03	0.03	-0.10***	-0.10***
	(0.02)	(0.02)	(0.03)	(0.03)
Job Rank (indipendent contributors)	0.18***	0.18***	0.17**	0.16**
	(0.04)	(0.04)	(0.06)	(0.07)
Job Rank (managers)	0.97***	0.97***	0.51***	0.51***
	(0.06)	(0.06)	(0.10)	(0.10)
Has a Secondary Boss	-0.12*	-0.12*	-0.06	-0.06
	(0.06)	(0.07)	(0.11)	(0.11)
Adove Average Evaluation	0.32***	0.32***	0.16	0.16
	(0.11)	(0.11)	(0.19)	(0.19)
Average Evaluation	0.04	0.04	0.19	0.19
	(0.11)	(0.11)	(0.18)	(0.17)
Female	0.02	0.02	0.24*	0.24*
	(0.09)	(0.09)	(0.15)	(0.15)
New York Office	0.19**	0.19**	0.13	0.14
	(0.07)	(0.07)	(0.13)	(0.13)
Field Office	0.31***	0.31***	-0.05	-0.04
	(0.10)	(0.10)	(0.19)	(0.19)
Manager and Boss in same city	-0.13	-0.13	-0.12	-0.12
	(0.09)	(0.08)	(0.13)	(0.13)
Job Seniority	0.02***	0.02***	0.04***	0.04***
	(0.01)	(0.01)	(0.01)	(0.01)
Constant	-2.22***	-2.25***	-0.07	0.06
	(0.50)	(0.50)	(0.91)	(0.93)
R-squared	0.81	0.81	0.42	0.42
Bridge Supervision Irrelevant	0.18 $F_{(2,204)}$	0.66 t-test	0.25 $F_{(2,204)}$	-1.34 t-test
	P ~.84	P ~.51	P ~.78	P ~.18

NOTE — OLS regression models predicting annual salary and bonus measured as z-score log variables. Bridge-supervision predictors are (1) number of strong mutual contacts shared by manager and boss, and (2) manager-exclusive density. Bridge supervision dummy variable equals 1 for a manager who has an exclusive social circle or no strong mutual contacts with her boss (shaded area of Fig. 4). Robust standard errors are presented in parentheses.
*** $p<0.01$, ** $p<0.05$, * $p<0.1$

the ranks of independent contributors, 17.01 for the ranks of managers with subordinates, both P<.001), location (2.59 and 3.15 t-tests for managers working in headquarters or field offices, both P<.01), and seniority (3.06 t-test, P<.01). Job rank is again the strongest predictor of bonus compensation in M12, though bonus varies around job rank more than does salary (4.47 and 17.01 t-tests in M10 are respectively 2.58 and 5.18 in M12). The negative association between bonus compensation and outside contacts continues in Table 5, but manager networks are otherwise irrelevant to compensation. This is a population in which compensation closely follows job rank and seniority. Regardless, the key evidence for this paper is not what predicts compensation, but whether bridge supervision is one of the predictors. It is not. Across Table 5's bottom row, compensation is independent of bridge supervision.

Conclusions and cautions

Our summary conclusion is that the replication worked well. All four bridge-supervision hypotheses are supported. Our first two hypotheses concern the network conditions defining bridge supervision: Viewed from the manager's perspective, bridge supervision is decreased by the number of strong mutual contacts shared by manager and boss (dashed line in Fig. 4), and arises from the density of connections among a manager's exclusive contacts (any non-zero density among manager-exclusive contacts, solid line in Fig. 4). Our third hypothesis concerns the network variables potentially relevant to bridge supervision that Burt and Wang put aside. As further replication, we find no evidence of the neglected variables being significant predictors of bridge supervision: Bridge supervision arises from the density of connections among manager-exclusive contacts, not their number (H3a). Bridge supervision arises from the number of mutual connections between manager and boss, not the density of connections among them (H3b). And bridge supervision seen from the manager's perspective is independent of the manager's boss having many, or densely-connected boss-exclusive contacts (H3c).

At the same time, the replication extends the earlier analysis by revealing sensitivity to what constitutes a mutual connection. In this cohesive study population of HR managers, we only found support for bridge supervision when mutual contacts were defined by maximum strength relations ("especially close"). Allowing any level of interaction (second row in Table 3) or expanding actual interaction to implied interaction (in text), eliminated the evidence of mutual contacts suppressing bridge supervision. Therefore, to assure detection of bridge supervision in future research, we recommend a process of gradually weakening the criterion for mutual contacts. Begin with the strongest connections ("especially close" in this study population), then relax the criterion relation strength category by category (in this study population, "especially close" would be followed by "close," then "less than close"). Stop at the level before the evidence of mutual contacts becomes statistically negligible. We expect that in populations of well-connected managers — such as the HR managers studied here — only the strongest relations will qualify as mutual contacts suppressing bridge supervision. Failure to perform this triage increases the probability of missing statistically significant evidence of bridge supervision.

A related issue is contacts outside the firm. One way to create a manager-exclusive social circle is by creating it among friends and family outside the firm. This circle of outsiders can serve as a source of sympathetic support in response to frustrations at work. Outsiders were not discussed by Burt and Wang because sociometric citations by their supply-chain managers were limited to contacts within the firm. The HR managers were allowed to cite contacts outside the bank, and they did (Table 2). Outsiders are particularly attractive for the HR managers

because of the dense connections among colleagues. It would be difficult to create an exclusive social circle disconnected from the boss (not impossible, but difficult, certainly more difficult than for the balkanized supply-chain managers studied by Burt and Wang). Our results show that outsiders are not essential to bridge supervision, but they do facilitate it (Fig. 4). Of course, we make no causal inference from the cross-sectional association. Either managers with networks balanced toward outsiders turn in weaker performance, which earns lower bonus compensation, or managers who earn lower bonus compensation find a life in networks balanced toward outside contacts. Regardless, the strong negative association between relative bonus compensation and number of outsiders cited as discussion partners promises fruitful returns to closer study of outsiders as a source of bridge supervision.

Returning to the remote-work issue with which we began, we replicate the result that bridge supervision is independent of manager performance (Table 4 and Table 5). This is now two out of two studies supporting the hypothesis that bridge supervision affects the style, but not the quality of supervised work. Given the practical importance of this hypothesis for the continuing demand for remote work, we hope for recurrent replications in manager populations different by industry and kind of work.

Drawing on previous work at the intersection between LMX and network theory, additional insights for the lack of correlation between bridge supervision and performance could be found in how well connected the boss is (Sparrowe and Liden, 2005). While our data did not allow us to fully represent bosses' networks as well, future research might profitably explore whether the boss being central and influential could affect the relationship between bridge supervision and manager performance.

Futher scholarly work could also benefit from research on other normative and cultural dimensions correlating with bridge supervision, which are largely missing from this study but could lead to interesting discoveries with access to rich new data.

CRediT authorship contribution statement

Diego Jannace: Writing – review & editing, Writing – original draft, Visualization, Validation, Supervision, Software, Resources, Project administration, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Ronald Stuart Burt:** Writing – review & editing, Writing – original draft, Visualization, Validation, Supervision, Software, Resources, Project administration, Methodology, Investigation, Formal analysis, Data curation, Conceptualization.

Appendix

Summary Statistics and Correlations

Variables	Mean	S.D.	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)
(1) Annual Salary (z-score log)	0	1	1																							
(2) Annual Bonus (z-score log)	0	1	0.46*	1																						
(3) No Discussion With Boss	0.68	0.47	-0.14*	-0.10	1																					
(4) No Discussion (Ordinal)	4.07	1.48	-0.16*	-0.15*	0.92*	1																				
(5) Strong Mutual Contacts	0.60	0.91	-0.02	0.08	-0.21*	-0.20*	1																			
(6) Total Mutual Contacts	5.40	2.91	0.17*	0.22*	-0.08	-0.14*	0.22*	1																		
(7) Manager Exclusive Density	0.09	0.20	-0.01	-0.12	0.19*	0.19*	-0.08	-0.33*	1																	
(8) Bridge Supervision Dummy	0.70	0.46	0.08	-0.12	0.28*	0.25*	-0.72*	-0.20*	0.31*	1																
(9) Log Network Constraint	3.64	0.29	-0.27*	-0.22*	-0.16*	-0.11	-0.07	-0.51*	-0.06	-0.04	1															
(10) Number Outside Partners	3.25	1.89	0	-0.27*	0.25*	0.27*	-0.09	-0.03	0.21*	0.19*	-0.25*	1														
(11) Job Rank (independent contributors)	0.88	1.13	-0.53*	-0.23*	0.07	0.08	-0.02	-0.06	-0.01	-0.11	0.16*	0.02	1													
(12) Job Rank (managers)	1.90	0.96	0.86*	0.45*	-0.11	-0.12	0	0.19*	-0.03	0.07	-0.27*	-0.02	-0.73*	1												
(13) Has a Secondary Boss	0.43	0.50	-0.15*	-0.10	0.07	0.10	0.01	0	-0.06	-0.07	0.04	0	0.07	-0.1	1											
(14) Above Average Evaluation	0.30	0.46	0.26*	0.12	-0.13*	-0.13	-0.03	0.18*	-0.02	0.01	-0.08	-0.10	-0.03	0.14*	-0.08	1										
(15) Average Evaluation	0.54	0.50	-0.08	0.05	0.07	0.08	0.04	-0.08	0.04	-0.01	-0.06	0.08	0	-0.01	0.03	-0.70*	1									
(16) Female	0.74	0.44	-0.26*	0	0.11	0.08	0.02	0.04	-0.05	-0.04	-0.07	-0.03	0.21*	-0.33*	-0.04	-0.01	0	1								
(17) New York Office	0.53	0.50	0.13	0.19*	-0.04	-0.05	0.15*	0.14*	-0.06	-0.04	-0.11	-0.13	-0.17*	0.13	-0.21*	0.05	0.03	0.1	1							
(18) Field Office	0.18	0.39	0.1	-0.14*	0.07	0.13	-0.18*	-0.19*	0.07	0.16*	0.11	0.14*	-0.03	0.05	0.16*	-0.02	-0.04	-0.08	-0.50*	1						
(19) Manager and Boss in same city	0.81	0.39	-0.17*	-0.1	-0.04	-0.03	0.03	0.05	0.06	0.03	0.02	-0.02	0.04	-0.13*	-0.14*	-0.04	0.01	0.11	0.26*	-0.13	1					
(20) Job Seniority	6.47	6.27	0.34*	0.48*	-0.11	-0.13	0.05	0.20*	-0.13	-0.11	-0.14*	-0.29*	-0.14*	0.29*	-0.08	0.06	0.08	0.01	0.12	-0.17*	-0.12	1				
(21) Manager Exclusive Contacts	1.59	1.83	0.22*	0.11	0.18*	0.17*	-0.12	-0.30*	0.55*	0.27*	-0.48*	0.26*	-0.16*	0.24*	-0.07	-0.06	0.08	-0.01	-0.02	0.09	-0.03	0.02	1			
(22) Boss Exclusive Contacts	3.21	2.86	-0.1	-0.08	0.18*	0.21*	-0.11	-0.27*	-0.04	0.04	0.02	0.14*	0.05	-0.07	0.16*	-0.06	0.11	-0.01	-0.09	0.04	-0.12	-0.06	0.01	1		
(23) Boss Exclusive Density	0.14	0.19	-0.14*	-0.01	0.12	0.14*	-0.02	-0.05	-0.05	-0.05	-0.05	0.10	0.09	-0.11	0.03	-0.07	0.09	0.12	-0.10	-0.05	-0.02	0.04	-0.03	0.56*	1	
(24) Density Among Mutuals	0.27	0.21	-0.12	-0.04	0.04	0.01	-0.05	0.12	-0.21*	0	0.22*	-0.02	0.13*	-0.10	0.07	-0.09	0.10	0.15*	0.06	-0.11	0.14*	-0.02	-0.35*	-0.03	0.05	1

*p<.05

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