Space and structure:
The interplay between proximity, unit boundaries, and supervision in shaping workplace interactions

ONLINE SUPPLEMENT

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Employee Post-Move Satisfaction Survey Results

As noted in the main text, employees who participated in the headquarters relocation completed a survey regarding their experience with the new office and ease of collaboration following the move. Each of the items was assessed on a 1-7 Likert scale, where 1 corresponded to “Strongly Disagree” and 7 corresponded to “Strongly Agree”. Supplemental Table 1 provides these items as well as their means and standard deviations.

Supplemental Table 1: Employee Survey Items Administered 3-months after the Office Move

Item	Mean	SD
I am very satisfied with the move from [old office] to [new office].	6.19	1.26
The employees in my area are very satisfied with the move from [old office] to [new office].	5.93	1.11
The staff at the corporate office of [company] is very satisfied with the move from [old office] to [new office].	5.69	1.05
The executive management team at the corporate office of [company] is very satisfied with the move from [old office] to [new office].	6.02	1.02
I feel like the hierarchical structure of my work has changed since moving from [old office] to [new office].	4.05	1.73
I feel that the structure of my area has changed since moving from [old office] to [new office].	4.33	1.64
I work harder to communicate with my direct supervisor after moving from [old office] to [new office].	3.07	1.86
I work harder to communicate with members of my unit at headquarters after moving from [old office] to [new office].	3.81	2.12
I work harder to communicate with different areas at headquarters after moving from [old office] to [new office].	3.03	1.70
I am more aware of what happens in my area after moving from [old office] to [new office].	3.61	1.70
I'm more aware of what happens in different units than mine that are also located at headquarters after moving from [old office] to [new office].	4.75	1.44
I am more aware of what is happening at headquarters after moving from [old office] to [new office].	4.71	1.51
Since moving to [new office], I now collaborate with people in my area with whom I did not collaborate with in [old office].	3.53	1.70
Since moving to [new office], I collaborate with people in different areas whom I did not collaborate with in [old office].	5.10	1.40
Since moving to [new office], I collaborate with people from [company] whom I did not collaborate with in [old office].	4.91	1.44

Note: N = 108. Items measured on a 1-7 Likert scale (1 = strongly disagree, 7 = strongly agree).

Employee-level Network Analyses

Although our primary interest in this paper was the dyadic level of analysis, the available data also enable us to examine changes in employee-level networks before and after the office move (N = 108 employees). For exploratory purposes, we compare employees' network sizes (i.e., number of same-unit and cross-unit interaction partners), their average interaction frequency with their contacts, and the stability of their networks between the old and new offices. We examine whether the changes in employee networks were significant using Wilcoxon signed-rank tests. These tests are appropriate for repeated-measures comparisons when differences are not normally distributed, as is typical for social network measures (Hollander et al. 2013; Krackhardt 1988).

Network size and interaction frequency. Overall, employees maintained a similar number of same-unit ($M_{Pre} = 12.9$, $M_{Post} = 13.0$, $\Delta = 0.11$, $p = .761$) and cross-unit interaction partners ($M_{Pre} = 24.4$ ties, $M_{Post} = 26.3$ ties, $\Delta = 0.93$, $p = .594$) before and after the office move. This would suggest that the move did not shift the comparison of employees' networks to be more externally focused. The stability in employees' total number of interaction partners is consistent with the notion that individuals can only manage a finite number of relationships (Dunbar 1992), and thus even when an exogenous shock to employees' seating arrangements affords new opportunities to interact with colleagues, employees have a limited capacity for interaction partners.

A key distinction between employees' interaction patterns in the two offices, however, was the extent to which employees interact with their same-unit and cross-unit colleagues. After the move, employees' average interaction frequency with their same-unit contacts decreased ($M_{Pre} = 3.30$, $M_{Post\text{-}Move} = 3.23$, $\Delta = -0.07$, $p = .033$), while their interaction frequency with cross-unit contacts increased ($M_{Pre} = 2.19$, $M_{Post\text{-}Move} = 2.28$, $\Delta = 0.08$, $p = .011$). Although the mixed seating arrangement did not alter the number of same-unit and cross-unit interaction partners that employee maintained, it did significantly affect the frequency of their internal interactions and boundary spanning interactions.

Network stability. The consistency in the number of same-unit and cross-unit ties employees interact with before and after the move masks important changes in the stability of these ties. Following the office move, employees maintained 89.4% of their same-unit ties (*SD* = 12.7%) but only 62.4% of their cross-unit ties (*SD* = 17.8%, $p < .001$). Thus, many of the cross-unit colleagues employees interacted with following the move were not colleagues with whom they had previously interacted. This differential rate of tie maintenance may be driven by underlying differences in the strength of employees' same-unit and cross-unit ties prior to the move. Same-unit ties were considerably stronger than cross-unit ties in the old office (*M* = 3.24 vs. 2.19 on the 1-5 interaction frequency scale, $p < .001$), and prior work demonstrates that weak ties are more vulnerable to dissolution than strong ties (e.g., Kleinbaum 2018). While strong ties (operationalized as weekly or daily interaction) persisted regardless of unit boundaries (99.4% for same-unit, 95.8% for cross-unit), cross-unit weak ties were especially susceptible to dissolution following the move. Employees maintained 84.3% of their weak same-unit ties but only 59.2% of their weak cross-unit ties ($p < .001$).

These employee-level patterns suggest that the mixed seating arrangement primarily reconfigured cross-unit networks rather than same-unit networks. While the intervention enabled employees to form new cross-unit connections, these new ties were 'offset' by equivalent losses of existing cross-unit ties. The relative resilience of same-unit relationships – particularly weak ties that might otherwise be vulnerable to disruption – suggests that organizational structure provides scaffolding that helps employees maintain relationships even when spatial proximity is removed.

Network Changes and Location in the New Office. We next examined how employees' spatial position in the new office related to their network changes. To examine which employees were located in more central versus peripheral locations, we computed the average number of steps from each employee to all other employees in the office. We used a median split to classify each employee as *central* (≤39 steps average distance to all colleagues) or *peripheral* (>39 steps) locations. We then compared pre- and post-move network measures for employees in central vs. peripheral locations using Wilcoxon signed-rank tests.

Employees in central locations in the new office maintained stable network sizes for both same-unit ties (M_{Pre} = 13.8, M_{Post} = 13.9, Δ = 0.07, p = .693) and cross-unit ties (M_{Pre} = 26.9, M_{Post} = 28.0, Δ = 1.11, p = .761). Similarly, employees in peripheral locations showed no changes in tie counts for either same-unit (M_{Pre} = 11.9, M_{Post} = 12.1, Δ = 0.15, p = 1.00) or cross-unit relationships (M_{Pre} = 23.9, M_{Post} = 24.6, Δ = 0.74, p = .622). However, changes in interaction frequency varied depending on whether employees were assigned to central or peripheral locations. Employees in central locations significantly increased their interaction frequency with cross-unit colleagues (M_{Pre} = 2.16, M_{Post} = 2.26, Δ = 0.10, p = .017) while maintaining consistent same-unit interaction frequency (M_{Pre} = 3.27, M_{Post} = 3.25, Δ = -0.02, p = .551). In contrast, employees in peripheral locations reported significantly weakened same-unit interaction frequency (M_{Pre} = 3.33, M_{Post} = 3.20, Δ = -0.13, p = .020) without a significant increase in cross-unit interaction frequency (M_{Pre} = 2.23, M_{Post} = 2.29, Δ = 0.06, p = .259). Thus, central locations appear to facilitate boundary-spanning intensity without disrupting existing unit relationships, while peripheral locations may reduce same-unit interactions without producing offsetting gains in boundary-spanning interactions.

Subfunction-level Changes in Networks Following the Office Move

As noted in the main text, employees in the old office sat in pods that typically included other members of their subfunction (N = 23 subfunctions). To gather more insight into how the move impacted collaboration at headquarters, we examined how interactions within each subfunction changed following the office relocation. To do this, we computed the interaction density – average tie strength between all dyads within the subfunction – before and after the office move. Given the limited number of subfunctions, these results are descriptive.

Overall, 13 subfunctions showed decreased interaction density following the office move, while 6 showed small increases and 4 remained stable. There were no clear patterns in each subfunction's size nor reporting structure (i.e., which executive oversaw the parent function) that appeared to relate to these changes. However, changes in proximity among subfunction members were negatively correlated with changes in interaction density ($r = -.35$), suggesting that subfunctions whose members were seated further apart in the new office were more likely to experience a decrease in their interaction density. This association aligns with prior proximity research (e.g., Allen 1977) and is consistent with our main results demonstrating that proximity effects are strongest among colleagues with existing interdependencies such as same-unit dyads. Conversely, increased physical distance between subfunction members was associated with increased email communication ($r = .15$). This pattern may suggest that subfunctions whose members were dispersed in the new office shifted their communication toward email to maintain necessary contact when spontaneous face-to-face interactions became less convenient.

Robustness Check: Replication of MR-QAP Models in Main Analysis with Directed Ties

As a robustness check of our main results (which symmetrized all dyadic ties), we examine the same set of relationships using directed models in which A's ratings of B and B's rating of A appear as separate observations. As shown in Supplemental Table 2, this approach yields identical conclusions to those reported in the main text.

Table S2. Directed MR-QAP Models Predicting Interaction Frequency (Robustness Check)

Variables	**Model A**	**Model B**	**Model C**
Intercept	1.564***	1.470***	1.280***
Controls			
Prior In-Person Interaction			0.801***
Same Gender Dyad			−0.009
One Senior Manager Dyad			0.054*
Both Senior Managers Dyad			0.287***
Tenure Difference Dyad (Abs.)			−0.006**
Main Effects			
Dyadic Proximity (A→B)	0.006***	0.005***	0.005***
Proximity to Supervisor A (A→A's Supervisor)	−0.002***	−0.003***	−0.001**
Same Unit Dyad	1.167***	1.709***	1.182***
Interactions			
Dyadic Proximity × Same Unit (Hypothesis 1)		0.009***	0.007***
Proximity to Supervisor A × Same Unit (Hypothesis 2)		0.005***	0.003***
R^2	.170	.175	.292
N (dyads)	11,436	11,436	11,436

Note. Directed MR-QAP was performed using 10,000 permutations. Two-tailed p-values reported. b = unstandardized coefficient. Models use directed (asymmetric) dyads in which each A→B pair is modeled separately rather than symmetrized. Proximity to supervisor reflects A's proximity to A's own supervisor. N reflects directed dyads (2× undirected sample). Reference category for rank: Neither employee is a senior manager.
† p < .10, * p < .05, ** p < .01, *** p < .001

Analysis of Three-way Interaction between *Dyadic Proximity, Dyadic Proximity to Supervisors, and Same Unit Dyad*

As noted in the main text, we examined a three-way interaction between *Dyadic Proximity*, *Proximity to Supervisors*, and *Same Unit Dyad* for exploratory purposes (Supplemental Table 3). Although we did not theorize that the attentional processes we propose operate interactively, it is possible that the context effects of the spatial layout are not entirely independent. In Model S2, the three-way interaction is positive and statistically significant ($\beta = 4.08 \times 10^{-4}$, $p < .001$), and this effect remains significant after including control variables in Model S3 ($\beta = 2.92 \times 10^{-4}$, $p < .001$). To interpret this three-way interaction, it is helpful to decompose the effects by same-unit versus cross-unit dyads. For cross-unit dyads (Same Unit = 0), the two-way interaction between *Dyadic Proximity* and *Proximity to Supervisors* is essentially zero ($\beta = 0.0000$, n.s. in Models S2 and S3), indicating that the relationship between dyadic proximity and interaction frequency is not meaningfully moderated by supervisory proximity for employees in different units. For same-unit dyads, however, the positive three-way coefficient indicates that the combined effect of dyadic proximity and supervisory proximity on interaction frequency is more positive than it is for cross-unit dyads. That is, among same-unit colleagues, sitting closer to supervisors strengthens the positive association between dyadic proximity and interaction frequency — consistent with the idea that supervisory visibility reinforces normatively expected within-unit interaction. By contrast, no such amplification occurs for cross-unit dyads, where supervisory proximity has a direct negative association with interaction ($\beta = –0.006$, $p < .001$ in Model S2) that does not vary with how close cross-unit colleagues sit to each other. This pattern suggests that the presence of nearby supervisors has a qualitatively different role depending on unit membership: it facilitates interaction among same-unit colleagues while suppressing interaction among cross-unit colleagues, and this distinction becomes more pronounced when dyadic proximity is high.

Supplemental Table 3. MR-QAP Models Predicting Interaction Frequency: Three-Way Interaction Models

Variables	Model S1	Model S2	Model S3
Intercept	1.503***	1.377***	1.274***
Controls			
Prior Interaction			0.797***
Same Gender Dyad			−0.007
Tenure Difference Dyad (Abs.)			−0.005*
One Senior Manager Dyad			0.051†
Both Senior Managers Dyad			0.270***
Main Effects			
Dyadic Proximity	0.008***	0.005**	0.005***
Dyadic Proximity to Supervisors	−0.002	−0.006***	−0.002
Same Unit Dyad	1.785***	2.378***	1.619***
Two-Way Interactions			
Dyadic Proximity × Same Unit	0.009***	0.024***	0.018***
Proximity to Supervisors × Same Unit	0.007***	0.023***	0.015***
Dyadic Proximity × Proximity to Supervisors	0.000*	0.000	0.000
Three-Way Interaction			
Proximity × Supervisor Proximity × Same Unit		0.0004***	0.0004***
R^2	.226	.229	.373
N (dyads)	5,718	5,718	5,718

Note. MR-QAP was performed using 10,000 permutations. Two-tailed p-values reported. b = unstandardized coefficient. The three-way interaction coefficient is positive but very small in magnitude (Model S2: $b = 4.08 \times 10^{-4}$; Model S3: $b = 2.92 \times 10^{-4}$).
Reference category for rank: Neither employee is a senior manager.
† $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$

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