

Where are Managers Needed? How Culture and Coordinative Complexity Predict the Evolution of Reporting Relationships in Organizations*

Danyang Li, University of California, Berkeley

Julien Clement, Stanford University

Sameer B. Srivastava, University of California, Berkeley

October 16, 2025

Abstract

Organization redesign often raises a central question: Where are managers needed? A potential *substitute* for formal supervision by managers is interpersonal cultural alignment, which can ease coordination between colleagues. Yet prior research suggests cultural alignment may also *complement* formal structure. We theorize that the balance depends on coordinative complexity: Whether culturally aligned individuals benefit from common supervision hinges on how broadly they depend on others to get work done. Cultural alignment substitutes for formal structure when coordinative complexity is low and complements it when coordinative complexity is high. Focusing on one of the most tangible and consequential forms of cultural alignment—the degree to which individuals are linguistically aligned with their peers in everyday communications—we make predictions about which pairs of colleagues will be brought together under, versus pulled apart from, a shared supervisor. Using archival data from a design firm, we find support for our theory, with effects especially strong when colleagues are highly visible to their senior managers.

Keywords: Culture, Linguistic Alignment, Organizational Structure, Coordinative Complexity, Communication, Organizational Design

*We thank Marlo Raveendran and AOM symposium participants for helpful feedback on prior drafts. The usual disclaimer applies. Direct all correspondence to Danyang Li: danyangli@berkeley.edu

Introduction

Organizations continually redraw their reporting lines, not only in large-scale reorganizations, but also in the everyday course of adapting to shifting work demands and changes in personnel. Each such adjustment raises a fundamental question: Where are managers needed? Implicit in this question is the assumption that formal supervision can, in some cases, be substituted for by other organizational features. Identifying the conditions under which managerial oversight is needed is central to understanding the evolution of formal structure in organizations.

In organizational theory, the search for where managerial capacity is needed has been enmeshed in the broader study of how formal structure evolves. Tracing back to the arrival of open-systems and contingency perspectives (Thompson 1967; Lawrence and Lorsch 1967), research has focused on how different structural configurations address the uncertainties and constraints imposed by an organization's external environment. This stream of work highlights the influence of external factors such as market competition (Hannan and Freeman 1984; Guadalupe and Wulf 2010), resource munificence (Aldrich 1979), technological change (Mohr 1971), and isomorphic pressures (DiMaggio and Powell 1983). It conceptualizes formal structure as an organization-level characteristic, measuring its evolution in different environments through variables such as decision-making centralization (Mohr 1971; Raveendran 2020), spans of control (Guadalupe and Wulf 2010), and the complexity of grouping and linking structures (Mintzberg 1989).

More recent work has challenged two assumptions in this line of work. First, some studies have argued and shown that formal structure can be shaped by internal factors independent of external ones (Nickerson and Zenger 2002; Gulati and Puranam 2009; Raveendran 2020). This work focuses on how the efficacy of formal structure is influenced by elements of the “informal” organization—the emergent pattern of interactions and understandings among organizational members (McEvily et al. 2014). Second, recent theory has adopted a “microstructural” lens that conceptualizes formal structure not only as an organization-level characteristic but also as instantiated through a variety of micro-level processes within or-

ganizations (Puranam 2018)—for example, how unit and team boundaries are set (Clement and Puranam 2018), how local coordination procedures are defined (Stan and Puranam 2017), and how pairs of individuals are brought together structurally through a shared formal reporting relationship (Soda and Zaheer 2012). Together, these conceptual developments open the door to understanding changes in formal structure through a more granular and time-varying lens and to more fully embracing the reality that structure does not only evolve through discontinuous and all-encompassing “reorganizations” between archetypal forms (Nickerson and Zenger 2002; Gulati and Puranam 2009; Srivastava 2015; Raveendran 2020) but also through myriad, continuous shifts in local structure.

Building on this shift, we focus on how one of the most emergent and fluid properties of an organization’s internal workings—the degree of cultural alignment that develops between a given pair of colleagues as they interact with each other and with others around them—predicts micro-level choices made by organizational designers about where to add or remove formal structure in the form of a shared supervisor between the two colleagues. Cultural alignment encompasses a variety of dimensions—for example, shared values, beliefs, and assumptions or even similar ways of dressing—that can be difficult to observe. Following past literature, we focus on one of its most tangible, observable, and consequential manifestations: the degree of linguistic alignment in employees’ everyday communications (e.g., internal emails, Slack, text messages, and videoconferencing chats) (Goldberg et al. 2016; Srivastava et al. 2018; Kovacs and Kleinbaum 2020; Lu et al. 2023).

We begin with the premise that organizational designers, the set of managers who—perhaps in consultation with human resources staff and external advisors—make ongoing choices about who should report to whom as they respond to evolving task demands, employee arrivals and departures, and shifts in employee skills and working styles. Although such decisions also get made in the context of a large-scale restructuring, our focus is on the everyday evolution of the reporting structure. We assume that, although organizational designers’ choices about the reporting structure can be influenced by political factors, they are primarily driven by a desire to improve operating performance (Albert 2018). Thus, we

anticipate that organizational designers will tend to separate two colleagues from a common supervisor when the interpersonal linguistic alignment between them can effectively substitute for the supervisor's functions. Conversely, they will tend to insert a shared supervisor between colleagues when linguistic alignment is unlikely to substitute for, or might even complement, a shared supervisor's functions.¹

Prior research points to competing expectations about whether interpersonal linguistic alignment will substitute for or instead complement formal supervision. The prevailing perspective suggests that they are *substitutes*: Because shared values, beliefs, and norms enable people to better coordinate with one another (Sørensen 2002; Weber and Camerer 2003; Van den Steen 2010; Koçak and Puranam 2022), two linguistically aligned individuals—whose alignment stems in part from values, beliefs, and norms they have in common—can coordinate efficiently even without the help of a common supervisor. But some prior work also suggests that culture, including that which manifests in the form of language, and structure can function as *complements*. For example, while linguistic alignment may allow two individuals to coordinate efficiently, their ability to successfully do so may depend on their ability to resolve potential ambiguities and competing interpretations about their required tasks and handoffs. Formal structure in the form of a supervisor who can adjudicate such differences and manage interfaces with external actors whose inputs are needed for task completion could then prove to be critical in unlocking the potential of linguistic alignment (Lounamaa and March 1987; Knudsen and Srikanth 2014; Lix et al. 2022).

We reconcile this tension by considering the role of *coordinative complexity*—a dyad-level construct that encapsulates the degree to which the tasks of two employees are interdependent with those of other employees. We focus on dyad-level coordinative complexity because it corresponds to micro-level choices about where to erect or dismantle formal structure in the form of a shared supervisor. When coordinative complexity is low, we argue that interpersonal linguistic alignment can effectively substitute for a shared supervisor. When coor-

¹In our data, we are unable to observe the extent to which linguistic alignment actually functions as an effective complement to or substitute for formal supervision. Our theoretical argument focuses on the *perceptions* and *beliefs* of organizational designers and how they might influence their choices of where to add or remove supervisors in the reporting structure.

dinative complexity is high, however, linguistic alignment functions more as a complement: Although linguistically aligned colleagues can coordinate effectively with each other, such alignment does little to resolve bottlenecks or conflicts involving third parties. In these cases, a supervisor plays a critical role in mitigating cross-cutting demands. Moreover, alignment between subordinates can enhance the value of supervision by freeing managers to devote attention to higher-order tasks—for example, prioritization and boundary spanning—that become especially salient as interdependencies become more complex. Building on this reasoning, we predict that the likelihood of linguistically aligned colleagues being placed under a shared supervisor increases with the coordinative complexity of their tasks.

We evaluate our theory using archival data on the evolving reporting structure and intraorganizational employee communications of a design firm. These data reveal considerable flux in reporting relationships: We observe 6,229 instances of change (i.e., formation or dissolution) in supervisory units over the six years of our observation period. The past several years have seen an explosion of research that uses language as a window into culture and how it evolves over time (Askin and Mauskapf 2017; Garg et al. 2018; Bail et al. 2019; Lix et al. 2022; Burt and Reagans 2022; Gouvard et al. 2023; Banerjee et al. 2023; Aceves and Evans 2024). Building on this burgeoning literature, we adapt the Interactional Language Use Model (Goldberg et al. 2016; Srivastava et al. 2018; Lu et al. 2023)—which has been used in prior research to assess individual-level cultural fit—to measure the degree of linguistic alignment at the dyadic level. We report results from models that predict which pairs of colleagues will be brought together under, versus pulled apart from, a shared supervisor based on the subordinates' degree of linguistic alignment and the coordinative complexity of the tasks they are engaged in. Although we cannot observe whether these shifts in supervisory capacity are actually performance enhancing or diluting, our results are consistent with our theorized mechanisms. Supplemental analyses show that the joint effects of coordinative complexity and interpersonal linguistic alignment are especially predictive of the evolution of reporting relationships when two colleagues are highly visible to the senior managers who are most likely to make these specific organizational redesign choices. We discuss the im-

plications of our findings for research on organizational design, organizational culture, and the interrelationships between the two.

THEORY

From Macro- to Microfoundational Perspectives on Structure

Research on the determinants of formal structure—the component of structure rooted in the mandates of formal authority—has a long history in organizational theory, tracing back to classical accounts of the rise of industrialization (Weber 1978). Some of the most influential work on organizational design, which investigates the antecedents and consequences of formal structure, emerged from the open-systems perspective (Thompson 1967; Lawrence and Lorsch 1967) and structural contingency theory (Galbraith 1973; Drazin and Van de Ven 1985). These approaches envisioned formal structure as an organization's primary means of confronting environmental uncertainties and identified how different configurations of formal structure not only fit with each other but also match the external environment (Donaldson 2001; Siggelkow 2003). Given this emphasis on organization-environment fit, the prevailing conception of formal structure in this literature is as an organizational-level construct that can be characterized along such dimensions as size, degree of formalization, and centralization (Miles and Snow 1978). This approach can help explain heterogeneity and change in many of an organization's most readily observed structural features—for example, whether it is organized by function or instead by division (Mintzberg 1989).

More recent years have seen the development of a complementary “microstructural” approach that focuses attention on the less visible features of an organization. With intellectual roots in the behavioral theory of the firm (Simon 1947; Cyert and March 1963) and complex adaptive systems (e.g., Herbert et al. 1962; Miller and Page 2009), this alternative approach is based on the principle of disaggregation and reaggregation (Puranam 2018, 3): It conceptualizes large, complex organizations as collections of smaller entities such as dyads or subgroups that have simple recurring patterns, which are both affected by and shape organization-level phenomena. The emphasis is less on how formal structure helps

organizations adapt to external pressures and more on its role in facilitating an effective division of labor and integration of effort inside organizations (e.g., Puranam et al. 2012). This line of work covers the spectrum from studies of organizational redesign to punctuated, large-scale “reorganizations” (Raveendran 2020) to analyses of more frequent, local design changes that affect an organization’s functioning without upending its overall design architecture (Alexy et al. 2021).

Research in the “microstructural” tradition encompasses both qualitative and quantitative studies. Examples of the former include ethnographic accounts of the interplay between technology and structure (Barley 1986, 1990; Galunic and Eisenhardt 1996; Brown and Eisenhardt 1997) and the design of teams and multi-team systems (Okhuysen and Bechky 2009; Valentine and Edmondson 2015; Retelny et al. 2014). The latter include formal and agent-based models that distill core principles of effective organizational design (Rivkin and Siggelkow 2003; Mihm et al. 2003; Christensen and Knudsen 2010; Koçak et al. 2023). Related work based on archival administrative records in organizations has conceptualized interactions within organizations as a “multiplex” network encompassing formal, semiformal, and informal relationships and evaluated their interplay by analyzing administrative records and communications data from real-world organizations (Kleinbaum 2012; Dahlander and McFarland 2013; McEvily et al. 2014; Biancani et al. 2014; Srivastava 2015). Thus, just as social relationships can be mapped between any pair of individuals, so can their connections to each other within formal structure—for example, through common incentives (Puranam et al. 2012), co-location (Lee 2019), or, as in our conceptualization, by having a common supervisor (Soda and Zaheer 2012).

In all of these disparate research traditions, a fundamental imperative for organizational design is to facilitate the coordination of tasks between individuals. For example, the so-called “mirroring hypothesis” posits that the interdependencies among tasks inside an organization should be reflected in the means through which they are coordinated (Henderson and Clark 1990; Baldwin and Clark 2000). This literature has conceptualized mirroring as alignment between networks of interdependencies and networks of coordinating influences—

both formal and informal (Gokpinar et al. 2010; Soda and Zaheer 2012; Sosa et al. 2015; Clement and Puranam 2018).

Coordination Through Structure and Culture

Embracing this microstructural view, we investigate how a micro-level aspect of informal organization—the degree of cultural alignment between two individuals—affects the evolution of an elemental manifestation of formal structure—the placement of two individuals under the supervision of a common superior. These two disparate constructs have some common features: They are both micro-level constructs that prior research has shown to be related to higher-level organizational processes and outcomes. For example, prior research has linked interpersonal cultural alignment, as it manifests in language, to such individual-level outcomes as promotion, retention, and performance rewards (Goldberg et al. 2016; Srivastava et al. 2018; Lu et al. 2023). Meanwhile, reporting relationships are the basis for most representations of hierarchical decision-making inside organizations and underlie much of their ability to help resolve conflicts and facilitate coordination (Puranam 2018; Albert 2024).

Our argument is rooted in the notion that organizational designers, the set of managers who—perhaps in consultation with human resources professionals or other advisors—are responsible for determining who should report to whom, do so with the goal of facilitating effective interpersonal coordination (Ethiraj and Levinthal 2004; Clement and Puranam 2018). The factors that lead organizational designers to rewire reporting relationships include proactive planning (e.g., putting two individuals under the same supervisor based on the expectation that it will facilitate coordination) and trial-and-error learning (e.g., removing two individuals from common supervision after one or both receives negative performance feedback). Although planning and learning processes are often imperfect, we assume that—on average and holding constant extraneous factors²—these processes allow

²Choices about formal structure are sometimes made for non-economic reasons such as individual status enhancement or the management of personality conflicts. Nevertheless, we assume that organizational designers are generally aiming to improve organizational effectiveness and will tend to do so either through forward-looking planning or through trial-and-error learning.

designers to progressively discover new ways of deploying formal supervision that benefit their organization.

In other words, we assume that, all else equal, organizational designers will assign a common supervisor to culturally aligned individuals when doing so will improve their ability to coordinate with each other. Yet prior research provides conflicting expectations as to whether organizations will benefit from placing culturally similar members under a shared supervisor. To identify the conditions under which the benefits will tend to outweigh the costs, we first describe the various mechanisms through which supervisors affect the coordination of their subordinates, then discuss how cultural similarity may substitute for some but not all of these roles, and then derive a hypothesis about how coordinative complexity moderates the effect of interpersonal cultural similarity on the likelihood that organizational designers will place two colleagues under a shared supervisor.

Although supervisors engage in a variety of coordinating activities (Galbraith 1973), these activities broadly fall into three categories. First, supervisors support interpersonal coordination between their subordinates by facilitating information sharing. This enables subordinates to better anticipate and predict each other's task requirements and actions (Mintzberg 1989; Edmondson et al. 2001; Valentine 2018). It also reduces the impact of interpersonal conflicts, which can be better anticipated before they occur or more quickly resolved when they do erupt (Puranam and Swamy 2016; Keum and See 2017). Second, supervisors help prioritize and sequence the work of their subordinates, thereby helping individuals focus their effort on where it will be most valuable (Raveendran et al. 2022; Ketkar and Workiewicz 2022). Third, supervisors help subordinates align their goals and activities with those of stakeholders elsewhere in the organization or outside the organization by serving as a bridge between the internal unit and external actors (Zhang 2023).

Whether or not two individuals are connected via a shared supervisor, their likelihood of collaborating effectively with one another also depends on the extent to which they are culturally aligned. By culture, we mean the taken-for-granted, shared understandings that exist among organizational members—including their deeply rooted beliefs and assumptions

about the world, as well as the norms that guide their behavior (Pettigrew 1979; DiMaggio 1997; Schein 2010; Patterson 2014). Culture manifests at multiple levels in organizations—for example, one can characterize the values, beliefs, and norms that prevail in the organization as a whole or across departments and geographies (Chatman and O'Reilly 2016). Here we focus on a more elemental form of culture—that which emerges between individuals as they interact with one another or others around them. Consistent with our microfoundational lens on formal structure, we similarly focus on cultural alignment at the interpersonal level. Two colleagues are culturally aligned insofar as there have significant overlap in such assumptions, beliefs, and norms. Although interpersonal cultural alignment might be influenced by the strength of the overall organizational culture or its various subunits, prior work suggests that it can nevertheless vary substantially between individuals, dyads, and teams (Lix et al. 2022; Lu et al. 2023).

Across multiple disciplinary perspectives, organizational theorists have theorized and empirically demonstrated that interpersonal cultural alignment can facilitate coordination through such mechanisms as heightened motivation and shared commitment to joint goals (O'Reilly III et al. 1991; Schein 2010; Van den Steen 2010), compatible linguistic “codes” that limit the risk of misunderstanding and confusion (Lazear 1999; Weber and Camerer 2003; Goldberg et al. 2016; Koçak and Puranam 2022), and the ability to tacitly agree on and commit to the appropriate course of action in the face of uncertain contingencies (Kreps 1990; Camerer and Vepsäläinen 1988; Gibbons and Henderson 2012; Gibbons et al. 2021). Whereas earlier work in this tradition implicitly assumed that cultural alignment is a relatively stable property, more recent work has shown that it can vary considerably over time given that people have to not only accurately decipher subtle shifts in norms and linguistic codes but also invest the effort to stay aligned with these changes (Srivastava et al. 2018; Lu et al. 2023). As a consequence, the degree of cultural alignment between individuals can be expected to vary significantly not only across dyads but also within the same dyads over time.

How Interpersonal Cultural Alignment Relates to Formal Supervision

Interpersonal Cultural Alignment and Formal Supervision as Substitutes.

Given that interpersonal cultural alignment and formal structure both ease coordination frictions, several prior studies have proposed—either directly or indirectly—that they can serve as substitutes for one another. For example, Camerer and Vespalainen (1988), as well as Kreps (1990), propose that culture operates as an alternative to a written contract, thereby allowing employees to anticipate unknown contingencies and making their interactions more efficient by reducing the need for oversight. More recent work in organizational economics has formalized this notion as “relational contracts,” informal agreements and unwritten codes of conduct that exist within and between firms and facilitate interpersonal coordination (Baker et al. 2002; Gibbons and Henderson 2012; Gibbons et al. 2021). Separately, strategy researchers have proposed that “informal organization,” which includes various facets of organizational culture, can effectively stand in for formal structure given that the former is characterized by inertia and the latter can only be episodically adjusted to meet changing environmental demands (Nickerson and Zenger 2002; Gulati and Puranam 2009; Puranam 2018).

These general arguments about the substitutability of structure and culture apply similarly at the micro-level with respect to the relationship between cultural similarity and formal supervision. For example, the first role of supervisors—the resolution of coordination problems and interpersonal dyadic conflict—is required to a much lesser extent when subordinates can rely on cultural similarity to better understand each other and share common values, reducing the likelihood of conflict and coordination failures in the first place (Marchetti and Puranam 2023). Moreover, supervisors are a scarce resource that organizational designers must allocate across the many individuals whose work must be coordinated. Supervisory capacity is in part constrained because of cognitive constraints that limit managerial spans of control, or the number of subordinates who can be effectively managed by a single supervisor (Mintzberg 1989; Gittell 2001). It is also limited by the time supervisors must allocate to activities other than facilitating information-processing among

subordinates.

Given these natural limits on supervisory capacity in an organization, we posit that organizational designers will be apt to withhold this capacity from interfaces at which individuals can simply mutually adjust to one other by virtue of their cultural compatibility. For example, consider one dimension along which people may be culturally similar or dissimilar: their tendency to be task- and results-oriented versus relationship- and process-oriented when collaborating with peers. Two individuals with the same orientation (i.e., both are task- and results-oriented) are less likely to experience conflict when they have to coordinate their activities, thereby obviating the need for a supervisor. At such interfaces, culture will therefore substitute for formal structure.

Interpersonal Cultural Alignment and Formal Supervision as Complements.

Whereas the arguments about culture and structure functioning as substitutes have been explicitly made in prior studies, the ones suggesting that they are complements have been hinted at in two distinct literatures but mostly left implicit. First, some studies suggest that shared understandings among individuals can generate more value when a supervisor helps them direct their efforts towards clear goals or priorities (and vice versa). For example, theoretical work by Knudsen and Srikanth (2014) highlight two interrelated challenges that arise when specialist searchers have to coordinate their choices: mutual confusion and joint myopia. Sharing knowledge can reduce mutual confusion by creating greater cultural alignment between individuals but comes at the cost of joint myopia, as they get channeled into a narrower search space. The authors suggest that hierarchy may resolve this tension by sequencing actions or assigning people with different skills to different facets of the problem.

Recent empirical studies report evidence that is consistent with this intuition. Based on observational data on the electronic communications of software development teams, Lix et al. (2022) find that effective teams are ones with the capacity to modulate their levels of discursive diversity—that is, the degree to which the meanings expressed by team members diverge from each other in a given period—to match shifting task requirements. They highlight the role of team leaders, who play a pivotal role in guiding the team to make

such adjustments. Similarly, Clement (2023) empirically demonstrates that supervisors are especially valuable in promoting collective adaptation in situations likely to be interpreted similarly by all their members. The coordinating power of cultural similarity is most likely to deliver value if it is deployed coherently toward a common goal; conversely, a coherent plan is especially valuable when it is implemented efficiently by members who can efficiently arrive at a common understanding of it (Lee and Puranam 2016). Together, these studies suggest that, when work prioritization and sequencing are especially important, cultural alignment and formal supervision may function as complements.

A related research stream further suggests that cultural similarity is especially valuable among individuals working on the recombination of outputs from a variety of sources. For example, although they focus on informal, rather than formal, structure, Goldberg et al. (2016) find that the benefits of cultural similarity between an individual and her peer group are amplified for individuals whose networks reach across unconnected parts of a network. This suggests that access to external interfaces—which hierarchical superiors can unlock through referrals (Galunic et al. 2012)—may be especially beneficial to individuals who are culturally similar to their contacts. One reason for this may be that, while advantaged network positions provide access to a variety of contacts, individuals need to be able to effectively process the information they receive from these contacts in order to make the most of it (Tortoriello et al. 2015; Clement et al. 2018).

Although the aforementioned studies focus on the role of informal, rather than formal, structure in providing network access, their results are nevertheless relevant to our theory. Providing access to interfaces and referrals to stakeholders outside of the units is, as noted above, a core supervisory function. A supervisor’s referrals to other units are especially likely to yield value if their subordinates can build on a common understanding to help them integrate the inputs from different units. Conversely, culturally similar individuals may be especially successfully at recombining outputs from external sources when they can rely on a supervisor to facilitate access to such sources. This, again, suggests that another role of formal supervisors—coordinating outside their unit—generates complementarity rather

than substitution between cultural alignment and formal supervision.

The Moderating Role of Coordinative Complexity

The arguments above suggest that, at a given interface, cultural alignment and formal supervision may sometimes be redundant and, in other cases, may instead be synergistic. Overall, their relationship likely depends on a host of supply-side factors—for example, how many supervisors exist or can be hired at a given hierarchical level and the span of control they can effectively manage, as well as demand-side variables such as how much time must be allocated to coordinating externally, prioritizing and sequencing the department’s tasks, and coordinating internally. Yet, holding such factors constant, the arguments above suggest that this relationship should be driven by the relative importance of supervisors’ three main roles at a given interface. Cultural similarity between employees should substitute for formal supervision in preventing or resolving conflicts and coordination failures. At the same time, cultural similarity should complement, rather than substitute for, a formal supervisor’s role in prioritizing subordinates’ work and coordinating with stakeholders outside their unit.

We argue that coordinative complexity affects the relative importance of these supervisory roles, thereby shaping whether cultural similarity complements or substitutes for formal supervision on the whole. We define coordinative complexity as the degree to which two individuals must interact with a wide variety of colleagues to accomplish their individual or joint tasks. Our conceptualization is at the dyad-level because this is the relevant unit of analysis for micro-level choices about where to erect or dismantle a supervisory unit between pairs of colleagues. When supervising employees engage in tasks that are high in coordinative complexity, supervisors must shift their activities in three key ways. First, the more interdependent a task is, the harder it is to determine the optimal manner in which its component parts should be tackled. Indeed, the interdependencies characterizing these tasks give rise to “local peaks:” different approaches to fulfilling requirements that can lead workers to either converge toward a suboptimal solution too quickly or explore too many possible solutions (Rivkin and Siggelkow 2003; Fang et al. 2010). Supervisors can address this problem by either prioritizing some aspects of a task at the expense of others

or by better dividing the labor among subordinates based on their own knowledge of a task (Levinthal and Warglien 1999; Ethiraj and Levinthal 2004; Keum and See 2017). Neither of these roles is likely to be filled by cultural similarity alone.

Second, highly interdependent tasks demand inputs from actors in various parts of an organization, which may in turn require supervisors to play a bridging role even when their subordinates are highly skilled and culturally compatible (Shi et al. 2009; Galunic et al. 2012). As coordinative complexity increases, there is often a concomitant expansion in the requirements for such external coordination. In such cases, a shared supervisor can then become essential to realizing the value of interpersonal cultural alignment.³

Finally, tasks that depend on a multiplicity of actors and factors to be completed create more opportunities for misinterpretation and misunderstanding among the individuals carrying them out. This may trigger conflicts and coordination failures at a higher rate than even culturally similar individuals can solve them, requiring the involvement of a supervisor to resolve them. Overall, these arguments suggest that, when working on highly interdependent tasks, culturally aligned peers will benefit more from being placed into a supervisory unit than will culturally misaligned colleagues. All else equal, we therefore expect organizational designers to adjust formal structure in a way that takes this value into account. Focusing on cultural alignment that manifests in the language employees use when communicating with each other, we propose:

Main Hypothesis: *The likelihood that linguistically aligned colleagues will become connected to each other in a supervisory unit increases with coordinative complexity.*

³Note that our arguments center on colleagues who are culturally aligned. When two individuals are culturally misaligned, it is conceptually ambiguous whether organizational designers would place them under a common supervisor or instead rely on various control systems to ensure that they coordinate effectively. On one hand, bringing them together under a shared supervisor might be beneficial if the supervisor can force them to align in their ways of working together—for example, by requiring one to adopt the working style of the other or negotiating a compromise between the two styles. On the other, such an investment is costly and may require the supervisor’s ongoing attention and involvement to adjudicate what might be deeply rooted differences in their preferences. Moreover, any conflicts that arise between these individuals have the potential to spillover to others in the supervisory unit. In such cases, it may be better to leave them structurally separated and instead rely on rules, standard operating procedures, output standards, and so on to align their respective activities (Daft and Lengel 1986).

METHOD

Empirical Settings and Data

We conducted our analysis using data from a design services firm. The firm provides creative and technical design services, with both functional and location-based departments (e.g., design, operations, warehouse, sales, installation, marketing). Employees span a wide range of job titles, from client-facing roles (e.g., account managers) to creative (e.g., designers) and operational staff (e.g., installers, warehouse specialists). Work combines ongoing functional responsibilities with project-based collaboration, and formal reporting relationships often cut across departments and roles. We obtained a corpus of email messages exchanged among all full-time employees from 2013 to 2018 and monthly personnel records that matched the period of the communication data and included the following information for each individual: employee ID, demographic characteristics such as gender and race / ethnicity, start and exit date, department affiliation, job title, and—crucial for our purposes—supervisor ID. Importantly, all identifying information, as well as raw message content, were hashed (i.e., converted into an unrecognizable code) or otherwise transformed (e.g., into linguistic categories) before they were shared with us to protect employee privacy and company confidentiality. Table 1 provides descriptive statistics about the organization.

Insert Table 1 about here

Dependent Variable

Presence of Formal Tie. We began by transforming the individual-level personnel records into a dyad-level data set. Given that our personnel records included a field for supervisor ID in every month, we defined an indicator variable, *Presence of Formal Tie*, which was set to 1 in every month that two individuals had the same supervisor. From this information, we could derive the changing hierarchical structure of the organization over time. Figure 1 depicts the hierarchical tree structure of the organization during the middle month in our observation period. Although there are many shifts in reporting relationships,

the overall hierarchical structure remains relatively stable in our observation window and typically includes eight levels. Our sample includes all possible employee pairs—including those who share a supervisor and those who do not—at the same hierarchical level. There are three distinct ways in which a pair of employees can experience a change in the presence of a formal tie: (a) if one or both experience a lateral move (i.e., to the same supervisor or to different ones within the same hierarchical level); (b) if both get promoted (or, less likely, demoted) to the same supervisor or to different ones at a different hierarchical level (assuming they remain at the same level following their promotion and demotion); and (c) if the organization either adds or removes a hierarchical level such that they experience a change in supervisor assignment. In supplemental analyses reported below, we disentangle these pathways by focusing on the subset of dyads who remain at the same hierarchical level throughout the observation period.

Insert Figure 1 about here

Independent Variables

Interpersonal Linguistic Alignment. Culture and cultural alignment are multifaceted constructs that have been defined somewhat differently across disciplines and research traditions. These different conceptions broadly fit into two categories: cognitive and behavioral (Pinker 2007; Schein 2010; Chatman and O'Reilly 2016; Mobasseri et al. 2019). The former focuses on beliefs, assumptions, and values. Two individuals are cognitively culturally aligned insofar as they have overlapping beliefs, assumptions, and values. Yet individuals rarely have direct access to each other's inner thoughts and feelings. Rather, they draw (sometimes noisy) inferences about others' cognition by observing their behavior. For example, noticing that a colleague reliably arrives to a meeting room a few minutes before the scheduled start time might lead one to conclude that this colleague values the principle of punctuality and may harshly judge those who are perennial late arrivals. Two individuals are behaviorally culturally aligned insofar as they act in accordance to the same

set of behavioral norms—for example, both tending to arrive on time for meetings.

Cultural alignment can manifest across a wide range of behaviors, ranging from how people dress, how orderly or cluttered their workspaces are, or how intensely they work. Here we focus on one facet of behavioral cultural alignment: that which emerges in the natural language of employee-to-employee communications. Two individuals are linguistically culturally aligned insofar as they exhibit similar *styles* when communicating with each other. Note that this is not about using the same words, which could simply indicate that two colleagues are working on the same project or assignment. Rather, organizations typically have strong norms about appropriate styles of communicating—for example, whether it is okay to swear in a workplace setting or the degree of formality or politeness or directness one should maintain when communicating with colleagues. Linguistic alignment has, in turn, been tied to various indicators of individual and group success (Goldberg et al. 2016; Srivastava et al. 2018; Lu et al. 2023).

Drawing upon this intuition, we adapt the Interactional Language Use Model, which has been used in prior research to assess cultural alignment based on the similarity of linguistic styles exhibited by individuals or groups (Goldberg et al. 2016; Srivastava et al. 2018). As these prior studies have done, we focus on linguistic styles as defined by the Linguistic Inquiry and Word Count (LIWC) lexicon (Pennebaker et al. 2007). LIWC maps words into 64 higher-order categories of language—for example, positive emotion, negative emotion, time, and money. Prior work on linguistic cultural alignment has compared the distribution of a focal actor’s language use across these categories to the distribution of language use by *all* her interlocutors in a given period. The less the divergence between these two distributions, the more the individual fits in linguistically with her peer group.

Departing from prior work in this vein, which focuses on *individual-level* cultural fit, we instead adapt the technique to develop a *dyad-level* measure. Specifically, we first obtain the distribution of all outgoing email messages by a given individual in a given month over the LIWC categories. For each dyad-month, we then define *Linguistic Alignment* as the negative log of the Jensen-Shannon divergence statistic between these distributions (Lin

1991).

Moderators

Coordinative Complexity. Our measure of coordinative complexity is based on the range of peers that individuals coordinate with to accomplish their work. For each member of a dyad, we first measure how concentrated—based on the Herfindahl index—her outgoing communication is across the different job titles that exist in the organization. An individual exhibits greater coordinative complexity insofar as her communications are dispersed across a broad range of job titles rather than concentrated in just a few. We define the variable as follows:

$$D_{ut} = 1 - \sum_{i \in C_{ut}} p_{iut}^2$$

where C_{ut} denotes the set of job title categories of the focal individual u’s email contacts in month t, and p_{iut} is the proportion of emails sent to each job title category i for the focal individual u in each month t.

Because our analyses are at the dyadic level, we define this measure for each dyad by taking the mean of the two members’ values. Higher values indicate that the pair’s communications are, on average, spread out across a wider range of job titles.

Control Variables

Because the likelihood of tie presence might be influenced by hierarchical levels, we include a control variable, *Hierarchy*, which varies from one to eight (Zhou 2013). Higher values represent more senior hierarchical ranks. Given that the likelihood of a tie forming or dissolving between two individuals, as well as their linguistic alignment or misalignment, could in principle be influenced by the volume of their communication exchange, we include *Communication Intensity*—measured by the percentage of monthly message exchanges between each dyadic pair in the total number of messages sent by that specific pair—as a control variable in our analyses. Because the likelihood of a formal tie may be affected by the supervisory capacity of the managers to whom dyad members report, we also control for *Span*

of Control—measured by the average number of subordinates managed by the two supervisors of the dyad members. We separately estimated models that focus on between- versus within-dyad comparisons by excluding or including dyad fixed effects in our specifications. In models without dyad fixed effects, we include the following indicator variables that are otherwise subsumed by dyad fixed effects: *Same Gender*, *Same Ethnicity*, *Same Department*, and *Same Location*. To account for possibly confounding and unobserved external events, all models include *Month* fixed effects.

Additional Variable for Mechanism Analysis

In supplemental analyses described below, we sought to test a core mechanism underpinning our theory: that organization designers will make changes to reporting relationships based in part on their understanding of the degree of interpersonal alignment between colleagues and the coordinative complexity of their work. This argument rests on the assumption that the degree of cultural alignment between colleagues and their coordinative complexity can be observed by organizational designers. To test this idea, we developed a measure of *Visibility* to organizational designers: the logarithm of the total number of email messages sent by a focal individual to her direct supervisor and skip-level supervisors along the hierarchical chain in a focal month, averaged between the two members of a dyad.

Analytical Strategy

We estimated ordinary least squares (OLS) models of *Presence of Formal Tie* on the independent and control variables described above for the between-dyad sample (models without dyad fixed effects)⁴ and conditional logit models for the within-dyad sample (models with dyad fixed effects). The use of dyad fixed effects addresses unobserved heterogeneity at both the individual level—for example, personality traits or prior educational background and work experiences that might influence the kind of supervisor a person is assigned to—and

⁴We use OLS as a linear probability model for binary outcomes, a widely used approach in applied research, because its coefficients are directly interpretable as changes in probability and the model accommodates clustered standard errors (Wooldridge 2010). While OLS can in principle produce predictions outside the [0,1] range, our predicted probabilities fall within reasonable bounds (2–20%). Results are also robust to logit specifications.

the dyad level—for example, whether two people are of the same gender or have similar personality traits. Unlike linear fixed-effects models, conditional logit models retain only dyads that exhibit variation in the dependent variable, dropping those with no change over time. This feature of the model avoids the bias toward zero in coefficient estimates, which can arise in linear fixed effect models (Beck 2020). All independent variables are lagged by one month to account for temporal ordering of their relationship to our dependent variable. To account for the non-independence of observations in dyad-level data, we use two-way clustered standard errors (Kleinbaum et al. 2013). For ease of interpretation, the variables used in our regression analyses and marginal effects in the main results plots are based on standardized variables.

RESULTS

Main Results

Tables 1 and 2 provide descriptive statistics and a correlation matrix for the main variables of interest in the between- and within-dyad samples of the organization. Table 3 reports the main results. Note that the baseline probability of a shared supervisor existing between dyads differs significantly between the two samples: It is .09 in the between-dyad sample and .50 in the within-dyad sample in Table 1 (based on dyads that experienced a change in whether they shared a common supervisor). This also explains the generally higher magnitudes of coefficients in the within-dyad samples.

Insert Table 2 about here

In Table 3, Models 1 and 5 are baselines that include only control variables. Models 2 and 6 add *Linguistic Alignment*. Models 3 and 7 test the moderating effect of *Coordinative Complexity* on the relationship between linguistic alignment and the presence of formal tie.

Insert Table 3 about here

The coefficient for *Hierarchy* is significant and positive in Models 1 through 3 but not significant in Models 5 through 7. The coefficients for *Communication Intensity* and *Span of Control* are both significant and positive in Models 1 through 3 and Models 5 through 7. In the three between-dyad models (Models 1 through 3), *Same Gender*, *Same Ethnicity*, and *Same Department* are all significant and positively related to the likelihood of a formal tie existing in the next period, while *Same Location* is not.

Linguistic Alignment is significant and positively associated with formal tie presence in all the models, suggesting that linguistic alignment and formal structure function as complements in this setting on average. The interaction term of *Linguistic Alignment* and *Coordinative Complexity* is positive and significant in Models 3 and 7, suggesting that the positive association between linguistic alignment and the presence of formal tie is stronger for two individuals as the breadth of colleagues they have to coordinate with increases. Together, these findings support our main hypothesis.

We next investigate the magnitude of these effects. Figure 2 plots the effects of linguistic alignment on formal tie presence for higher (90th percentile), median, and lower (10th percentile) levels of coordinative complexity. Panels (a) and (b) show the interaction effects of coordinative complexity in the within- and between-dyad samples. In both settings, linguistically aligned individuals are more likely to work under the same supervisor when these individuals work on tasks involving complex coordination, and this moderation effect is quite substantial. The baseline predicted probability of a supervisory tie existing between dyads at the mean level of linguistic alignment and the mean level of coordinative complexity is 0.283 in the within-dyad sample. A one standard deviation increase in linguistic alignment is associated with a 0.022 change in the predicted probability of a supervisory tie existing in the next period for dyads with low coordinative complexity but a 0.052 change for dyads with high coordinative complexity in the within-dyads sample.

The comparable baseline predicted probability in the between-dyad sample is 0.084, and the comparable change of the predicted probability in the between-dyad sample are 0.005 and 0.024, which amount to a 6% and 29% increase in the baseline predicted probability,

respectively.

Insert Figure 2 about here

Suggestive Evidence of Mechanisms

Our results thus far provide micro-level evidence of how linguistic alignment and formal supervision co-evolve in our sample. Our theory assumes that organizational designers take into account linguistic alignment among the set of individuals whose work they oversee or could potentially oversee as they shift reporting relationships over time. These choices can arise either through proactive planning (i.e., observing linguistic alignment and taking it into account when assigning employees to supervisors) or trial-and-error learning (i.e., redesigning formal structure as a response to performance feedback).

To design formal structure in a way that conforms with their expectations about the value of placing culturally aligned individuals under the same supervisor, organizational designers must be able to observe whether two individuals are culturally aligned and whether their work entails complex coordination. Yet these factors—especially the degree of cultural alignment between two people—can be difficult to observe by others in the absence of direct interaction. Hence, if our theory is correct, one may expect our effect of interest to be especially strong for dyads whose cultural alignment can be observed by organizational designers. Our data allow us to provide evidence of this in two ways.

First, subordinates often vary significantly in the extent to which they interact with superiors (Sparrowe and Liden 2005; Galunic et al. 2012). This may affect both whether superiors are able to assess cultural alignment between specific subordinates and how much attention they allocate to them in the first place (Rhee and Leonardi 2024). Hence, we investigate whether the combined effect of cultural alignment and coordinative complexity on the design of formal structure is especially strong for dyads of individuals who have many interactions with their supervisors. Our data include all emails sent between members of the organizations and hence allow us to measure the extent to which each person communicates

with the individuals susceptible of influencing their assignment to a new formal supervisor. Measuring these interactions requires us to formally operationalize the set of possible organizational designers who may affect the placement of each specific dyad in the formal structure. We define it as the set of hierarchical superiors to whom each member of a dyad is reporting either directly or indirectly, consistent with the notion that unit assignment decisions can be influenced by top managers, middle managers, or a combination of the two (Ethiraj and Levinthal 2004). Hence, *Visibility* measures to what extent a dyad is visible to the set of relevant organizational designers.

Models 4 and 8 in Table 3 show a triple interaction between this variable and our two main variables of interest; we plot the results in Figures 3 and 4 for the between-dyad and within-dyad samples, respectively. Consistent with our reasoning, the positive moderating effect of coordinative complexity on the relationship between linguistic alignment and formal tie presence is stronger for dyads with a higher level of visibility to their hierarchical superiors.

Insert Figure 3 about here

Insert Figure 4 about here

Second, cultural alignment within a dyad is much easier for superiors to observe *after* the dyad has been assigned a common supervisor. This suggests that our effects of interest may be driven by trial-and-error learning (i.e., removing common supervisorship from dyads that do not seem to need it, including for reasons consistent with our theory) more than by proactive planning (i.e., assigning dyads to supervisors based on superiors' *a priori* expectations about the complementarity or substitution between cultural alignment and formal supervision). This suggests that the interaction between cultural alignment and coordinative complexity should predict the dissolution of common supervisorship ties more than their formation.

While our main analyses predict the presence of a common supervisorhip tie and hence

do not separate tie formation from tie dissolution, our data allow us to do so. Table 4 shows our regression results when predicting separately the formation and dissolution of common supervisorship. For these analyses, we shift to Cox proportional hazard models (Cox 1972) that separately considered: (a) dyads that do not have a shared supervisor at the start of the observation period; and (b) dyads that have a shared supervisor at the start of the observation period. In the former case, we estimate time to the establishment of a supervisory tie, and in the latter we estimate time to the ending of it.⁵ Models of tie formation take the following form:

$$R_{dt} = H_t \cdot \exp [\alpha + \beta_1 \cdot \text{LinguisticAlignment}_{dt} + \beta_2 \cdot \text{CoordinativeComplexity}_{dt} \\ + \gamma_1 \cdot \text{LinguisticAlignment}_{dt} \cdot \text{CoordinativeComplexity}_{dt} + \delta X_d + \epsilon]$$

where R_{dt} is the rate of formal tie formation for dyad d and at time t and H_t is an unspecified function of time between the formations. X_d are control variables. Models of formal tie dissolution take a comparable form, with the coefficients of the variables of interest interpreted in the opposite direction.

Models 3 and 7 in Table 4 show that the moderating effect of coordinative complexity is strong for both tie formation and dissolution. Models 4 and 8 further show that the triple interaction between visibility and our two main variables of interest is more pronounced in the formal tie dissolution sample; we plot these results in Figures A1 and A2 in the Appendix. These figures suggest that high visibility makes forward planning possible and substantially enhances the effectiveness of trial-error-learning. Taken together, these findings provide suggestive evidence that the interplay between linguistic alignment and coordinative complexity influences supervisory decisions about both bringing individuals together and separating them within the formal structure, with visibility playing a particularly critical role in facilitating trial-and-error learning relative

⁵The standardized variables in the Cox proportional hazard models were very slow to converge; hence, we do not standardize the variables in these models

to proactive planning.

Insert Table 4 about here

Additional Analyses and Robustness Checks

We also conducted a portfolio of robustness checks, the details of which are provided in the Appendix, to address potential alternative explanations for our findings. Here we summarize these analyses and their conclusions. First, to account for the possibility that our observed effects merely reflect known or anticipated transitions—for example, a person becoming more culturally aligned with a peer in anticipation of moving into the same department—we estimated models with longer lags of the independent variables. The pattern of results is similar, although some of the coefficients of interest become marginally significant due to the drop in number of observations as we increase the lag period. These analyses and results are presented in the Appendix, Table A1.

In the Appendix, Table A2, we seek to unpack whether the effects we theorize might differ for horizontal moves—that is, two peers either come into the same supervisory unit or move to different ones while both remaining at the same hierarchical level—versus for vertical moves—that is, two peers experience a change in shared supervisory status by virtue of one getting promoted or, much less commonly, demoted. The pattern of results remains mostly consistent when we restrict the sample to dyads that remain at the same horizontal level throughout the observation period.

DISCUSSION

Building on research that uncovers the microfoundations of organizational structure and how it evolves over time, we advance a theory that can explain where in an organization one of the most elemental forms of structure—the assignment of two employees to a common supervisor—is likely to emerge or dissolve. In doing so, we engage with and help to reconcile a theoretical tension in the literature: Some prior studies have proposed that

culture functions as a substitute for formal structure, while others have implied that the two are instead complements. Highlighting the role of coordinative complexity in shaping the dynamic interplay between culture and structure, we advance a simple and generalizable proposition: The tendency for linguistic similarity to complement, rather than substitute for, formal structure increases with coordinative complexity.

Using granular administrative records on routine shifts in supervisory reporting relationships, as well as a language-based measure of cultural similarity derived from employees' email communications, we first demonstrate that culture (in the form of language) and structure can indeed operate as substitutes in some setting and as complements in others. The positive main effect of linguistic similarity on the likelihood of subsequent formal tie presence suggests that culture and structure operate, on average, as complements in this setting. We also find, consistent with our theory, a positive interaction between linguistic similarity and coordinative complexity.

Contributions

Findings from this study contribute to research on when and how organizations experience shifts in formal structure, which has been a topic of major interest in the literature on strategy and organizations (Hannan and Freeman 1984; Osterman 2000; Nickerson and Zenger 2002; Balogun and Johnson 2004; Lin et al. 2006; Gulati and Puranam 2009; Guadalupe and Wulf 2010; Raveendran 2020). The picture that emerges from much of this literature is that of formal structure being a fairly stable organization-level characteristic, with periods of punctuated, large-scale change that occurs in response to shifts in technology, competitive pressures, and internal leadership transitions. Culture, insofar as it appears in these accounts, has generally also been treated as an organization-level property (e.g., Nickerson and Zenger 2002; Gulati and Puranam 2009). Meanwhile, the studies that have examined the microfoundations of formal structure and how it can endogenously change by virtue of factors internal to the organization have generally overlooked the role of culture and mostly derived insights using agent-based simulations (e.g., Siggelkow and Rivkin 2005; Clement and Puranam 2018). We add to these lines of

work by demonstrating how endogenous change in formal structure can also arise through ongoing shifts in small-scale culture (Eliasoph and Licherman 2003; Srivastava and Banaji 2011; Fine 2012; Lu et al. 2023)—the degree of linguistic alignment between individuals—as well as the complexity of the tasks they are engaged in. Moreover, our results reinforce the external validity of microfoundational research through empirical evidence from the administrative records and electronic communications of organizations.

Next, this study contributes to cross-disciplinary research that examines the efficiency benefits of corporate culture (Camerer and Vepsalainen 1988; Kreps 1990; Weber and Camerer 2003; Van den Steen 2010; Chatman et al. 2014; Corritore et al. 2020). Across the fields of economics, finance, sociology, strategy, and organizational behavior, the dominant assumption has been that cultural alignment eases interpersonal coordination such that it can effectively substitute for formal structure. In contrast, we develop the novel argument that culture can instead complement formal structure, and we highlight the conditions—based on the degree of coordinative complexity of the work peers are engaged in—under which this is likely to be the case. In doing so, we also contribute to the broader sociological project of understanding how structure and culture are mutually constitutive (Sewell 1992; Pachucki and Breiger 2010; McLean 2016; Tasselli et al. 2020; Burt and Reagans 2022).

That a facet of informal organization can foretell shifts in formal organization also suggests the need to revisit the prevailing narrative about how they relate to one another (McEvily et al. 2014). Whereas much of the literature has examined how shifts in formal organization—for example, a merger or restructuring—fluence different facets of informal organization (Hannan et al. 2003; Nickerson and Zenger 2002; Gulati and Puranam 2009; Allatta and Singh 2011; Srivastava 2015; Bhatt et al. 2022), we instead show that informal organization in the form of interpersonal linguistic alignment can predict changes in formal organization as manifested in the form of supervisory relationships.

Finally, the study makes several methodological contributions to research on structure and culture in organizations. First, whereas prior work on the microfoundations of formal

structure has considered whether one actor is another's supervisor or subordinate (e.g., Siggelkow 2003; Soda and Zaheer 2012), we expand the conceptualization and measurement of a supervisory unit from the individual to the dyadic level—that is, whether two individuals are connected to each other in formal structure by virtue of having the same boss. We believe this broader conceptualization and our associated measurement strategy are better suited to understanding how coordination occurs within organizations than are individual-level approaches. In similar fashion, we redefine the construct of “cultural fit,” which has heretofore been conceptualized and operationalized as the extent to which a focal individual is cognitively and behaviorally aligned with such reference groups as the individual’s current interlocutors, her department, and the organization as a whole (O’Reilly III et al. 1991; Rivera 2012; Doyle et al. 2017; Mobasseri et al. 2019), such that it operates, and is measured, at the level of dyads rather than individuals. Finally, we introduce a novel measure of coordinative complexity, which is based on emergent patterns of communication between focal dyads and the job titles of their peers in the organization.

Limitations and Future Directions

We acknowledge that the study has certain limitations, which also point to avenues for future research. First, although we estimate models with lagged independent variables to establish the temporal ordering of effects, our research design does not yield causal estimates. Our additional analyses provide suggestive evidence of mechanisms that are consistent with our theory, and our robustness checks should help to address concerns that we are merely picking up on known transitions from one job role to the next. That said, there are a host of unobserved factors—for example, individual-level shifts in knowledge or expertise—that could simultaneously influence cultural similarity between peers and their likelihood of being placed within the same supervisory unit, and we cannot fully exclude the possibility that such factors are driving our results. Future studies would benefit from identifying exogenous shifts in cultural similarity—for example, a downsizing or large-scale reorganization that does not affect a focal pair of individuals but, by virtue of

compositional shifts in their respective peer groups, changes the degree of cultural similarity between them. Similarly, it may be possible to find exogenous sources of variation in coordinative complexity—for example, based on the adoption of a new technology that changes the nature of interpersonal coordination.

Second, our theory makes assumptions about the perceptions and beliefs of organizational designers as they determine where to allocate supervisory capacity in the reporting structure. Yet we are unable to identify in our data who the designers are or what perceptions and beliefs they have about the conditions under which culture might substitute for or instead complement structure. It would be useful in future research to survey organizational designers about the logic underpinning their supervisor allocation choices and to measure the performance consequences of the shifts in supervisory capacity they make.

Another limitation of our data is that we do not directly observe the nature of the tasks that pairs of employees are engaged in at a given point in time. Task interdependence, which is partly shaped by an organization's choice of technology and division of labor, has long been tied to choices about formal structure (e.g., Thompson 1967). Prior studies have sought to assess the nature of these interdependencies by examining documented workflows and administering surveys (Gokpinar et al. 2010; Soda and Zaheer 2012). In contrast, our models include an admittedly imperfect proxy for shifting task interdependence: the intensity of communication between each pair of employees in the prior period. Relative to typical survey-based measures of task interdependence, this measure has the advantage of picking up on subtle shifts in task interdependence that may occur over time. Yet it also conflates task-related communication with social and other types of exchange. Hence, while our analytical strategy was to identify the effect of culture on formal structure net of changes in task interdependence among employees, it may have done so imperfectly. Future studies could address this limitation by including data from organizations that use online project management platforms that include records of specific activities assigned to individuals and the interdependencies among them.

Finally, our measure of cultural similarity is based on a single form of expression, email messages, which are transformed into the relatively simple LIWC lexicon. Yet cultural expression in organizations occurs in multiple ways that are not reflected in our data—for example, how people speak in face-to-face or virtual meetings, how they dress, and how they represent shared beliefs in the form of artifacts (Schein 2010). The growing availability of data sources that go beyond text—for example, audio and video recordings from virtual meetings—and computational methods for processing such data open the door to the development of more sophisticated measures of interpersonal cultural alignment (e.g., Williams et al. 2020).

Conclusion

Organizational theorists have long recognized that structure and culture are two of the most powerful forces that facilitate interpersonal coordination and thereby enable organizations to function effectively. Yet the interrelationships between them are obscured when we examine organizations at a macro scale. To understand when and how they are redundant or instead synergistic, it is necessary to delve into the elemental level of workplace interaction. In deciding where managers are needed, our study points to a simple heuristic: Focus supervisory capacity on interfaces with high levels of interpersonal linguistic alignment and coordinative complexity, while potentially removing it from interfaces that do not have these attributes.

References

- Aceves P, Evans JA (2024) Mobilizing conceptual spaces: How word embedding models can inform measurement and theory within organization science. *Organization Science* 35(3):788–814.
- Albert D (2018) Organizational module design and architectural inertia: Evidence from structural recombination of business divisions. *Organization Science* 29(5):890–911.
- Albert D (2024) What do you mean by organizational structure? acknowledging and harmonizing differences and commonalities in three prominent perspectives. *Journal of Organization Design* 13(1):1–11.
- Aldrich H (1979) *Organizations and Environments* (Stanford University Press).
- Alexy O, Poetz K, Puranam P, Reitzig M (2021) Adaptation or persistence? emergence and revision of organization designs in new ventures. *Organization Science* 32(6):1439–1472.
- Allatta JT, Singh H (2011) Evolving communication patterns in response to an acquisition event. *Strategic Management Journal* 32(10):1099–1118.
- Askin N, Mauskapf M (2017) What makes popular culture popular? product features and optimal differentiation in music. *American Sociological Review* 82(5):910–944.
- Bail CA, Brown TW, Wimmer A (2019) Prestige, proximity, and prejudice: How google search terms diffuse across the world. *American Journal of Sociology* 124(5):1496–1548.
- Baker G, Gibbons R, Murphy KJ (2002) Relational contracts and the theory of the firm. *The Quarterly Journal of Economics* 117(1):39–84.
- Baldwin CY, Clark KB (2000) *Design Rules: The Power of Modularity*, volume 1 (MIT press).
- Balogun J, Johnson G (2004) Organizational restructuring and middle manager sensemaking. *Academy of Management Journal* 47(4):523–549.
- Banerjee M, Cole BM, Ingram P (2023) “distinctive from what? and for whom?” deep learning-based product distinctiveness, social structure, and third-party certifications. *Academy of Management Journal* 66(4):1016–1041.
- Barley SR (1986) Technology as an occasion for structuring: Evidence from observations of ct scanners and the social order of radiology departments. *Administrative Science Quarterly* 78–108.
- Barley SR (1990) The alignment of technology and structure through roles and networks. *Administrative Science Quarterly* 61–103.
- Beck N (2020) Estimating grouped data models with a binary-dependent variable and fixed effects via a logit versus a linear probability model: The impact of dropped units. *Political Analysis* 28(1):139–145.
- Bhatt AM, Goldberg A, Srivastava SB (2022) A language-based method for assessing symbolic boundary maintenance between social groups. *Sociological Methods & Research* 51(4):1681–1720.
- Biancani S, McFarland DA, Dahlander L (2014) The semiformal organization. *Organization Science* 25(5):1306–1324.

- Brown SL, Eisenhardt KM (1997) The art of continuous change: Linking complexity theory and time-paced evolution in relentlessly shifting organizations. *Administrative Science Quarterly* 1–34.
- Burt RS, Reagans RE (2022) Team talk: Learning, jargon, and structure versus the pulse of the network. *Social Networks* 70:375–392.
- Camerer C, Vepsäläinen A (1988) The economic efficiency of corporate culture. *Strategic Management Journal* 9(S1):115–126.
- Chatman JA, Caldwell DF, O'Reilly CA, Doerr B (2014) Parsing organizational culture: How the norm for adaptability influences the relationship between culture consensus and financial performance in high-technology firms. *Journal of Organizational Behavior* 35(6):785–808.
- Chatman JA, O'Reilly CA (2016) Paradigm lost: Reinvigorating the study of organizational culture. *Research in organizational behavior* 36:199–224.
- Christensen M, Knudsen T (2010) Design of decision-making organizations. *Management Science* 56(1):71–89.
- Clement J (2023) Missing the forest for the trees: Modular search and systemic inertia as a response to environmental change. *Administrative Science Quarterly* 68(1):186–227.
- Clement J, Puranam P (2018) Searching for structure: Formal organization design as a guide to network evolution. *Management Science* 64(8):3879–3895.
- Clement J, Shipilov A, Galunic C (2018) Brokerage as a public good: The externalities of network hubs for different formal roles in creative organizations. *Administrative Science Quarterly* 63(2):251–286.
- Corritore M, Goldberg A, Srivastava SB (2020) Duality in diversity: How intrapersonal and interpersonal cultural heterogeneity relate to firm performance. *Administrative Science Quarterly* 65(2):359–394.
- Cox DR (1972) Regression models and life-tables. *Journal of the Royal Statistical Society: Series B (Methodological)* 34(2):187–202.
- Cyert RM, March JG (1963) A behavioral theory of the firm. *Englewood Cliffs, NJ* 2(4):169–187.
- Daft RL, Lengel RH (1986) Organizational information requirements, media richness and structural design. *Management Science* 32(5):554–571.
- Dahlander L, McFarland DA (2013) Ties that last: Tie formation and persistence in research collaborations over time. *Administrative Science Quarterly* 58(1):69–110.
- DiMaggio P (1997) Culture and cognition. *Annual Review of Sociology* 23(1):263–287.
- DiMaggio PJ, Powell WW (1983) The iron cage revisited: Institutional isomorphism and collective rationality in organizational fields. *American Sociological Review* 147–160.
- Donaldson L (2001) *The Contingency Theory of Organizations* (Sage).
- Doyle G, Goldberg A, Srivastava S, Frank MC (2017) Alignment at work: Using language to distinguish the internalization and self-regulation components of cultural fit in organizations. *Proceedings of the 55th Annual Meeting of the Association for Computational Linguistics (Volume 1: Long Papers)*, 603–612.

- Drazin R, Van de Ven AH (1985) Alternative forms of fit in contingency theory. *Administrative Science Quarterly* 514–539.
- Edmondson AC, Bohmer RM, Pisano GP (2001) Disrupted routines: Team learning and new technology implementation in hospitals. *Administrative Science Quarterly* 46(4):685–716.
- Eliasoph N, Lichterman P (2003) Culture in interaction. *American Journal of Sociology* 108(4):735–794.
- Ethiraj SK, Levinthal D (2004) Bounded rationality and the search for organizational architecture: An evolutionary perspective on the design of organizations and their evolvability. *Administrative Science Quarterly* 49(3):404–437.
- Fang C, Lee J, Schilling MA (2010) Balancing exploration and exploitation through structural design: The isolation of subgroups and organizational learning. *Organization Science* 21(3):625–642.
- Fine GA (2012) *Tiny Publics: A Theory of Group action and Culture* (Russell Sage Foundation).
- Galbraith J (1973) Designing complex organizations. *Reading, Mass .*
- Galunic C, Ertug G, Gargiulo M (2012) The positive externalities of social capital: Benefiting from senior brokers. *Academy of Management Journal* 55(5):1213–1231.
- Galunic DC, Eisenhardt KM (1996) The evolution of intracorporate domains: Divisional charter losses in high-technology, multidivisional corporations. *Organization Science* 7(3):255–282.
- Garg N, Schiebinger L, Jurafsky D, Zou J (2018) Word embeddings quantify 100 years of gender and ethnic stereotypes. *Proceedings of the National Academy of Sciences* 115(16):E3635–E3644.
- Gibbons R, Henderson R (2012) Relational contracts and organizational capabilities. *Organization Science* 23(5):1350–1364.
- Gibbons R, Siegel J, Weber RA (2021) Strategy meets culture (for breakfast): Understanding the relationship and highlighting its potential. *Strategy Science* 6(2):111–118.
- Gittell JH (2001) Supervisory span, relational coordination and flight departure performance: A reassessment of postbureaucracy theory. *Organization Science* 12(4):468–483.
- Gokpinar B, Hopp WJ, Iravani SM (2010) The impact of misalignment of organizational structure and product architecture on quality in complex product development. *Management Science* 56(3):468–484.
- Goldberg A, Srivastava SB, Manian VG, Monroe W, Potts C (2016) Fitting in or standing out? the tradeoffs of structural and cultural embeddedness. *American Sociological Review* 81(6):1190–1222.
- Gouvard P, Goldberg A, Srivastava SB (2023) Doing organizational identity: Earnings surprises and the performative atypicality premium. *Administrative Science Quarterly* 68(3):781–823.
- Guadalupe M, Wulf J (2010) The flattening firm and product market competition: The effect of trade liberalization on corporate hierarchies. *American Economic Journal: Applied Economics* 2(4):105–127.
- Gulati R, Puranam P (2009) Renewal through reorganization: The value of inconsistencies between formal and informal organization. *Organization science* 20(2):422–440.

- Hannan MT, Freeman J (1984) Structural inertia and organizational change. *American Sociological Review* 149–164.
- Hannan MT, Polos L, Carroll GR (2003) The fog of change: Opacity and asperity in organizations. *Administrative Science Quarterly* 48(3):399–432.
- Henderson RM, Clark KB (1990) Architectural innovation: The reconfiguration of existing product technologies and the failure of established firms. *Administrative Science Quarterly* 9–30.
- Herbert S, et al. (1962) The architecture of complexity. *Proceedings of the American Philosophical Society* 106(6):467–482.
- Ketkar H, Workiewicz M (2022) Power to the people: The benefits and limits of employee self-selection in organizations. *Strategic Management Journal* 43(5):935–963.
- Keum DD, See KE (2017) The influence of hierarchy on idea generation and selection in the innovation process. *Organization Science* 28(4):653–669.
- Kleinbaum AM (2012) Organizational misfits and the origins of brokerage in intrafirm networks. *Administrative Science Quarterly* 57(3):407–452.
- Kleinbaum AM, Stuart TE, Tushman ML (2013) Discretion within constraint: Homophily and structure in a formal organization. *Organization Science* 24(5):1316–1336.
- Knudsen T, Srikanth K (2014) Coordinated exploration: Organizing joint search by multiple specialists to overcome mutual confusion and joint myopia. *Administrative Science Quarterly* 59(3):409–441.
- Koçak Ö, Levinthal DA, Puranam P (2023) The dual challenge of search and coordination for organizational adaptation: How structures of influence matter. *Organization Science* 34(2):851–869.
- Koçak Ö, Puranam P (2022) Separated by a common language: How the nature of code differences shapes communication success and code convergence. *Management Science* 68(7):5287–5310.
- Kovacs B, Kleinbaum AM (2020) Language-style similarity and social networks. *Psychological Science* 31(2):202–213.
- Kreps DM (1990) Corporate culture and economic theory. *Perspectives on Positive Political Economy* 90–143.
- Lawrence PR, Lorsch JW (1967) *Organization and the Environment: Managing Differentiation and Integration* (Harvard Business School Press).
- Lazear EP (1999) Culture and language. *Journal of Political Economy* 107(S6):S95–S126.
- Lee E, Puranam P (2016) The implementation imperative: Why one should implement even imperfect strategies perfectly. *Strategic Management Journal* 37(8):1529–1546.
- Lee S (2019) Learning-by-moving: Can reconfiguring spatial proximity between organizational members promote individual-level exploration? *Organization Science* 30(3):467–488.
- Levinthal DA, Warglien M (1999) Landscape design: Designing for local action in complex worlds. *Organization Science* 10(3):342–357.
- Lin J (1991) Divergence measures based on the shannon entropy. *IEEE Transactions on Information theory* 37(1):145–151.

- Lin Z, Zhao X, Ismail KM, Carley KM (2006) Organizational design and restructuring in response to crises: Lessons from computational modeling and real-world cases. *Organization Science* 17(5):598–618.
- Lix K, Goldberg A, Srivastava SB, Valentine MA (2022) Aligning differences: Discursive diversity and team performance. *Management Science* 68(11):8430–8448.
- Lounamaa PH, March JG (1987) Adaptive coordination of a learning team. *Management science* 33(1):107–123.
- Lu R, Chatman JA, Goldberg A, Srivastava SB (2023) Two-sided cultural fit: The differing behavioral consequences of cultural congruence based on values versus perceptions. *Organization Science*.
- Marchetti A, Puranam P (2023) Are less hierarchical firms organized around stronger cultures? evidence from big data. *Working paper*.
- McEvily B, Soda G, Tortoriello M (2014) More formally: Rediscovering the missing link between formal organization and informal social structure. *Academy of Management Annals* 8(1):299–345.
- McLean P (2016) *Culture in Networks* (John Wiley & Sons).
- Mihm J, Loch C, Huchzermeier A (2003) Problem-solving oscillations in complex engineering projects. *Management Science* 49(6):733–750.
- Miles RE, Snow CC (1978) *Organizational Strategy, Structure, and Process* (New York: McGraw-Hill).
- Miller JH, Page S (2009) *Complex Adaptive Systems* (Princeton University Press).
- Mintzberg H (1989) *The Structuring of Organizations* (Springer).
- Mobasseri S, Goldberg A, Srivastava SB (2019) What is cultural fit? *The Oxford Handbook of Cognitive Sociology* 305.
- Mohr LB (1971) Organizational technology and organizational structure. *Administrative science quarterly* 444–459.
- Nickerson JA, Zenger TR (2002) Being efficiently fickle: A dynamic theory of organizational choice. *Organization Science* 13(5):547–566.
- Okhuysen GA, Bechky BA (2009) Coordination in organizations: An integrative perspective. *Academy of Management annals* 3(1):463–502.
- O'Reilly III CA, Chatman J, Caldwell DF (1991) People and organizational culture: A profile comparison approach to assessing person-organization fit. *Academy of management journal* 34(3):487–516.
- Osterman P (2000) Work reorganization in an era of restructuring: Trends in diffusion and effects on employee welfare. *ILR Review* 53(2):179–196.
- Pachucki MA, Breiger RL (2010) Cultural holes: Beyond relationality in social networks and culture. *Annual review of sociology* 36:205–224.
- Patterson O (2014) Making sense of culture. *Annual Review of Sociology* 40:1–30.

- Pennebaker J, Chung C, Ireland M, Gonzales A, Booth R (2007) The development and psychometric properties of liwc2007 (liwc. net, austin, tx) .
- Pettigrew AM (1979) On studying organizational cultures. *Administrative Science Quarterly* 24(4):570–581.
- Pinker S (2007) *The Stuff of Thought: Language as a Window into Human Nature* (Penguin).
- Puranam P (2018) *The Microstructure of Organizations* (Oxford University Press).
- Puranam P, Raveendran M, Knudsen T (2012) Organization design: The epistemic interdependence perspective. *Academy of Management Review* 37(3):419–440.
- Puranam P, Swamy M (2016) How initial representations shape coupled learning processes. *Organization Science* 27(2):323–335.
- Raveendran M (2020) Seeds of change: How current structure shapes the type and timing of reorganizations. *Strategic Management Journal* 41(1):27–54.
- Raveendran M, Puranam P, Warglien M (2022) Division of labor through self-selection. *Organization Science* 33(2):810–830.
- Retelny D, Robaszkiewicz S, To A, Lasecki WS, Patel J, Rahmati N, Doshi T, Valentine M, Bernstein MS (2014) Expert crowdsourcing with flash teams. *Proceedings of the 27th annual ACM symposium on User interface software and technology*, 75–85.
- Rhee L, Leonardi P (2024) Borrowing networks for innovation: The role of attention allocation in secondhand brokerage. *Strategic Management Journal* 45(7):1326–1365, URL <http://dx.doi.org/https://doi.org/10.1002/smj.3585>.
- Rivera LA (2012) Hiring as cultural matching: The case of elite professional service firms. *American Sociological Review* 77(6):999–1022.
- Rivkin JW, Siggelkow N (2003) Balancing search and stability: Interdependencies among elements of organizational design. *Management Science* 49(3):290–311.
- Schein EH (2010) *Organizational Culture and Leadership*, volume 2 (John Wiley & Sons).
- Sewell WH (1992) A theory of structure: Duality, agency, and transformation. *American journal of sociology* 98(1):1–29.
- Shi W, Markoczy L, Dess GG (2009) The role of middle management in the strategy process: Group affiliation, structural holes, and tertius iungens. *Journal of management* 35(6):1453–1480.
- Siggelkow N (2003) Why focus? a study of intra-industry focus effects. *The Journal of Industrial Economics* 51(2):121–150.
- Siggelkow N, Rivkin JW (2005) Speed and search: Designing organizations for turbulence and complexity. *Organization Science* 16(2):101–122.
- Simon H (1947) *Administrative Behavior* (Macmillan Company), URL <https://books.google.com/books?id=DS3geDDzxw8C>.
- Soda G, Zaheer A (2012) A network perspective on organizational architecture: Performance effects of the interplay of formal and informal organization. *Strategic Management Journal* 33(6):751–771.

- Sørensen JB (2002) The strength of corporate culture and the reliability of firm performance. *Administrative Science Quarterly* 47(1):70–91.
- Sosa ME, Gargiulo M, Rowles C (2015) Can informal communication networks disrupt coordination in new product development projects? *Organization Science* 26(4):1059–1078.
- Sparrowe RT, Liden RC (2005) Two routes to influence: Integrating leader-member exchange and social network perspectives. *Administrative science quarterly* 50(4):505–535.
- Srivastava SB (2015) Intraorganizational network dynamics in times of ambiguity. *Organization Science* 26(5):1365–1380.
- Srivastava SB, Banaji MR (2011) Culture, cognition, and collaborative networks in organizations. *American Sociological Review* 76(2):207–233.
- Srivastava SB, Goldberg A, Manian VG, Potts C (2018) Enculturation trajectories: Language, cultural adaptation, and individual outcomes in organizations. *Management Science* 64(3):1348–1364.
- Stan M, Puranam P (2017) Organizational adaptation to interdependence shifts: The role of integrator structures. *Strategic Management Journal* 38(5):1041–1061.
- Tasselli S, Zappa P, Lomi A (2020) Bridging cultural holes in organizations: The dynamic structure of social networks and organizational vocabularies within and across subunits. *Organization Science* 31(5):1292–1312.
- Thompson JD (1967) *Organizations in Action: Social Science Bases of Administrative Theory* (Routledge).
- Tortoriello M, McEvily B, Krackhardt D (2015) Being a catalyst of innovation: The role of knowledge diversity and network closure. *Organization Science* 26(2):423–438.
- Valentine MA (2018) Renegotiating spheres of obligation: The role of hierarchy in organizational learning. *Administrative Science Quarterly* 63(3):570–606.
- Valentine MA, Edmondson AC (2015) Team scaffolds: How mesolevel structures enable role-based coordination in temporary groups. *Organization Science* 26(2):405–422.
- Van den Steen E (2010) Culture clash: The costs and benefits of homogeneity. *Management Science* 56(10):1718–1738.
- Weber M (1978) *Economy and Society: An Outline of Interpretive Sociology*, volume 2 (University of California press).
- Weber RA, Camerer CF (2003) Cultural conflict and merger failure: An experimental approach. *Management Science* 49(4):400–415.
- Williams NW, Casas A, Wilkerson JD (2020) *Images as Data for Social Science Research: An Introduction to Convolutional Neural Nets for Image Classification* (Cambridge University Press).
- Wooldridge JM (2010) *Econometric analysis of cross section and panel data* (MIT press).
- Zhang L (2023) The changing role of managers. *American Journal of Sociology* 129(2):439–484.
- Zhou YM (2013) Designing for complexity: Using divisions and hierarchy to manage complex tasks. *Organization Science* 24(2):339–355.

Tables and Figures

Table 1: Descriptive Statistics

Data Period	Jan 2013 - Feb 2018									
Number of Employees	1044 unique employees during the data period									
Number of Hierarchical Levels	8									
Employee Demographics	41 years old and 66 months tenure on average; 49% White; 51% women									
Departments	82 departments, including both location-focused and functional departments									
Variable	Between-Dyad sample					Within-Dyad sample				
	Obs	Mean	S.D.	Min	Max	Obs	Mean	S.D.	Min	Max
1.Presence of Formal Tie	1187210	0.09	0.28	0	1	44699	0.50	0.50	0	1
2.Linguistic Alignment	1187210	1.97	0.57	0	3.57	44699	2.24	0.56	0	3.55
3.Coordinative Complexity	1187210	0.76	0.15	0	0.98	44699	0.77	0.14	0	0.96
4.Visibility	1187210	3.27	1.38	0	7.23	44699	3.18	1.40	0	6.90
5.Hierarchy	1187210	4.84	0.67	2	8	44699	4.90	0.77	2	7
6.Communication Intensity	1187210	0.00	0.02	0	1	44699	0.01	0.04	0	0.69
7.Span of Control	1187210	13.12	6.84	1	45	44699	14.41	7.08	1	35
8.Same Gender	1187210	0.52	0.50	0	1					
9.Same Ethnicity	1187210	0.35	0.48	0	1					
10.Same Department	1187210	0.08	0.28	0	1					
11.Same Location	1187210	0.46	0.50	0	1					

Table 2: Correlation Matrix

Variable	Between-Dyad sample										Within-Dyad sample					
	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6
1.Presence of Formal Tie																
2. Linguistic Alignment	0.06										-0.02					
3.Coordinative Complexity	-0.02	0.57									-0.07	0.49				
4.Visibility	-0.09	0.37	0.41								-0.16	0.37	0.48			
5.Hierarchy	0.04	0.06	0.10	-0.10							0.03	-0.01	0.09	-0.05		
6.Communication Intensity	0.20	0.10	0.05	0.04	0.01						0.07	0.02	0.06	0.11	0.00	
7.Span of Control	0.24	-0.17	-0.07	-0.11	-0.01	0.00					0.35	-0.10	-0.07	-0.12	0.05	0.01
8.Same Gender	0.13	0.11	0.03	0.00	-0.04	0.04	-0.02									
9.Same Ethnicity	0.06	0.11	0.05	0.00	0.09	0.02	-0.03	0.04								
10.Same Department	0.73	0.05	-0.04	-0.07	-0.03	0.24	0.17	0.12	0.06							
11.Same Location	0.19	-0.08	0.04	-0.06	-0.05	0.11	0.12	0.04	0.03	0.25						

Table 3: Formal Tie Presence

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
	Between-Dyad Sample: OLS				Within-Dyad Sample: Cond. Logit			
Linguistic Alignment		0.015*** (0.003)	0.017*** (0.003)	0.017*** (0.003)		0.295*** (0.074)	0.357*** (0.077)	0.404*** (0.083)
Coordinative Complexity		0.008*** (0.001)	0.000 (0.001)	0.008*** (0.002)	0.008*** (0.002)	0.062 (0.065)	-0.009 (0.066)	0.101 (0.078)
Visibility		-0.007*** (0.002)	-0.009*** (0.002)	-0.010*** (0.002)	-0.013*** (0.002)	-0.253** (0.096)	-0.293** (0.097)	-0.312** (0.095)
Linguistic Alignment # Coordinative Complexity				0.008*** (0.001)	0.012*** (0.001)		0.143** (0.045)	0.168** (0.051)
Linguistic Alignment # Visibility						-0.001 (0.002)		0.153* (0.077)
Coordinative Complexity # Visibility						0.000 (0.001)		-0.032 (0.054)
Linguistic Alignment # Coordinative Complexity # Visibility						0.003*** (0.001)		0.058+ (0.032)
Hierarchy	0.017*** (0.004)	0.016*** (0.004)	0.015*** (0.004)	0.015*** (0.004)	0.102 (0.199)	0.099 (0.200)	0.108 (0.202)	0.123 (0.202)
Communication Intensity	0.009*** (0.003)	0.008** (0.003)	0.008** (0.003)	0.008** (0.003)	0.103** (0.036)	0.094** (0.035)	0.090** (0.034)	0.090** (0.033)
Span of Control	0.037*** (0.003)	0.038*** (0.003)	0.039*** (0.003)	0.039*** (0.003)	2.043*** (0.153)	2.045*** (0.153)	2.043*** (0.152)	2.039*** (0.151)
Same Gender	0.014*** (0.002)	0.012*** (0.002)	0.012*** (0.002)	0.013*** (0.002)				
Same Ethnicity	0.005** (0.002)	0.004** (0.001)	0.004* (0.001)	0.004* (0.001)				
Same Department	0.196*** (0.005)	0.194*** (0.005)	0.194*** (0.005)	0.194*** (0.005)				
Same Location	-0.001 (0.002)	0.001 (0.002)	0.000 (0.002)	0.000 (0.002)				
Constant	0.117*** (0.005)	0.116*** (0.005)	0.114*** (0.005)	0.113*** (0.005)				
Month Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Dyad level Dummies	No	No	No	No	Yes	Yes	Yes	Yes
R-squared	0.559	0.561	0.562	0.563	0.331	0.334	0.336	0.338
log likelihood	308080	310534	311771	312409	-12870	-12812	-12770	-12735
chi-squared					1196	1239	1218	1341
Observations	1187210	1187210	1187210	1187210	44699	44699	44699	44699

Two-way clustered standard errors in parentheses

+ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

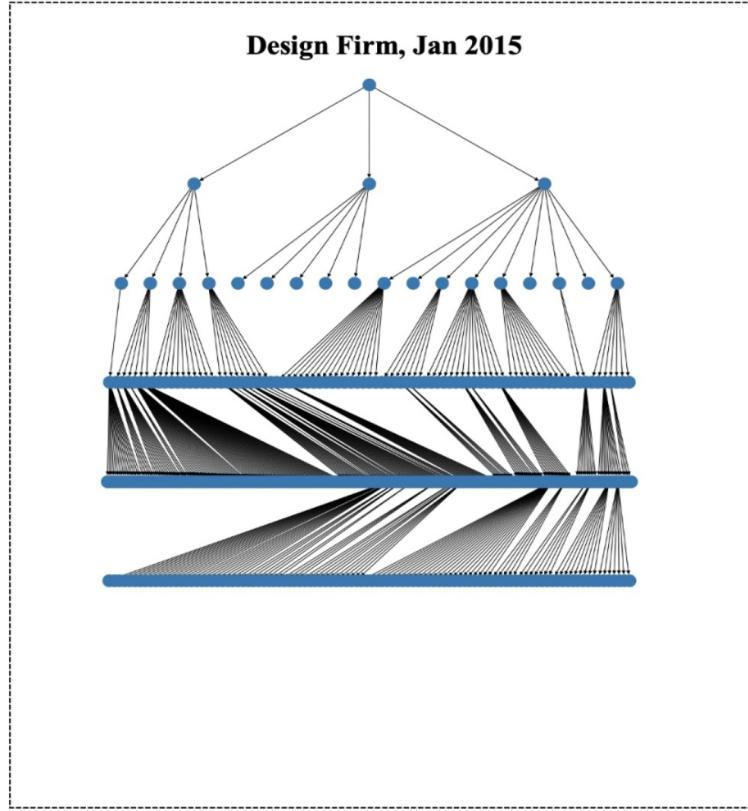
Table 4: Formal Tie Formation and Dissolution

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
	Formal Tie Formation Cox Prop. Hazard				Formal Tie Dissolution Cox Prop. Hazard			
Linguistic Alignment	1.133*** (0.104)	-0.515 (0.332)	-0.008 (0.593)		-0.318*** (0.049)	1.160*** (0.245)	0.186 (0.276)	
Coordinative Complexity	0.419 (0.370)	-1.743*** (0.390)	-5.183*** (0.697)	-2.787* (1.140)	-2.543*** (0.211)	-0.288*** (0.033)	0.529 (0.529)	0.266 (0.656)
Visibility	-0.072* (0.036)	-0.095* (0.039)	-0.106** (0.039)	0.000 (.)	0.082* (0.032)	0.095** (0.032)	0.111*** (0.032)	0.000 (.)
Linguistic Alignment # Coordinative Complexity			2.222*** (0.419)	0.984 (0.769)			-1.846*** (0.318)	-1.409*** (0.415)
Linguistic Alignment # Visibility					-0.275 (0.254)			0.697*** (0.136)
Coordinative Complexity # Visibility					-1.022* (0.508)			1.002*** (0.304)
Linguistic Alignment # Coordinative Complexity # Visibility					0.542+ (0.308)			-0.640*** (0.171)
Hierarchy	0.166+ (0.088)	0.125 (0.090)	0.069 (0.090)	0.090 (0.089)	-0.731*** (0.053)	-0.736*** (0.053)	-0.709*** (0.054)	-0.715*** (0.054)
Communication Intensity	-0.692 (1.410)	-1.070 (1.529)	-1.342 (1.585)	-0.991 (1.481)	2.016* (0.802)	2.097** (0.801)	2.308** (0.788)	2.029** (0.767)
Span of Control	0.177*** (0.006)	0.178*** (0.006)	0.183*** (0.006)	0.184*** (0.006)	-0.078*** (0.005)	-0.079*** (0.005)	-0.081*** (0.005)	-0.080*** (0.005)
Same Gender	0.554*** (0.087)	0.370*** (0.087)	0.355*** (0.087)	0.341*** (0.087)	-0.540*** (0.093)	-0.547*** (0.094)	-0.559*** (0.094)	-0.606*** (0.092)
Same Ethnicity	0.360*** (0.089)	0.288** (0.088)	0.269** (0.088)	0.258** (0.089)	0.152 (0.095)	0.153 (0.094)	0.150 (0.095)	0.142 (0.096)
Same Department	5.137*** (0.108)	4.888*** (0.113)	4.903*** (0.113)	4.907*** (0.115)	-2.044*** (0.091)	-2.030*** (0.091)	-2.053*** (0.091)	-2.089*** (0.092)
Same Location	-0.595*** (0.087)	-0.420*** (0.087)	-0.439*** (0.087)	-0.452*** (0.087)	-0.280** (0.096)	-0.314*** (0.095)	-0.295** (0.096)	-0.282** (0.097)
Month Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Dyad level Dummies	No	No	No	No	No	No	No	No
R-squared	0.24	0.25	0.25	0.25	0.13	0.13	0.13	0.13
log likelihood	-8328	-8229	-8214	-8208	-14841	-14835	-14806	-14770
chi-squared	6881	6724	7248	7408	2827	2811	3264	2952
Observations	1068473	1068473	1068473	1068473	96310	96310	96310	96310

Two-way clustered standard errors in parentheses

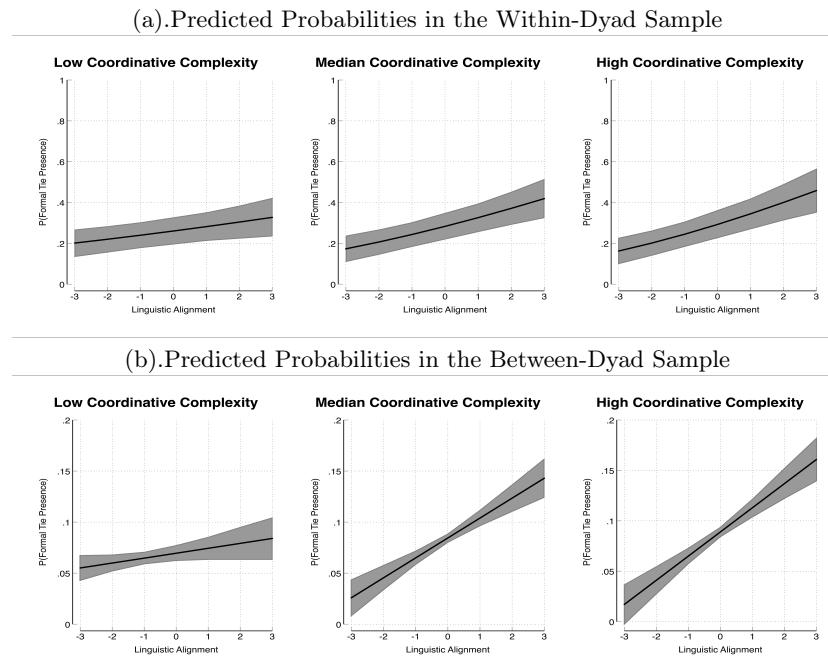
+ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Figure 1: Visual Representation of the Organizations' Formal Reporting Structures



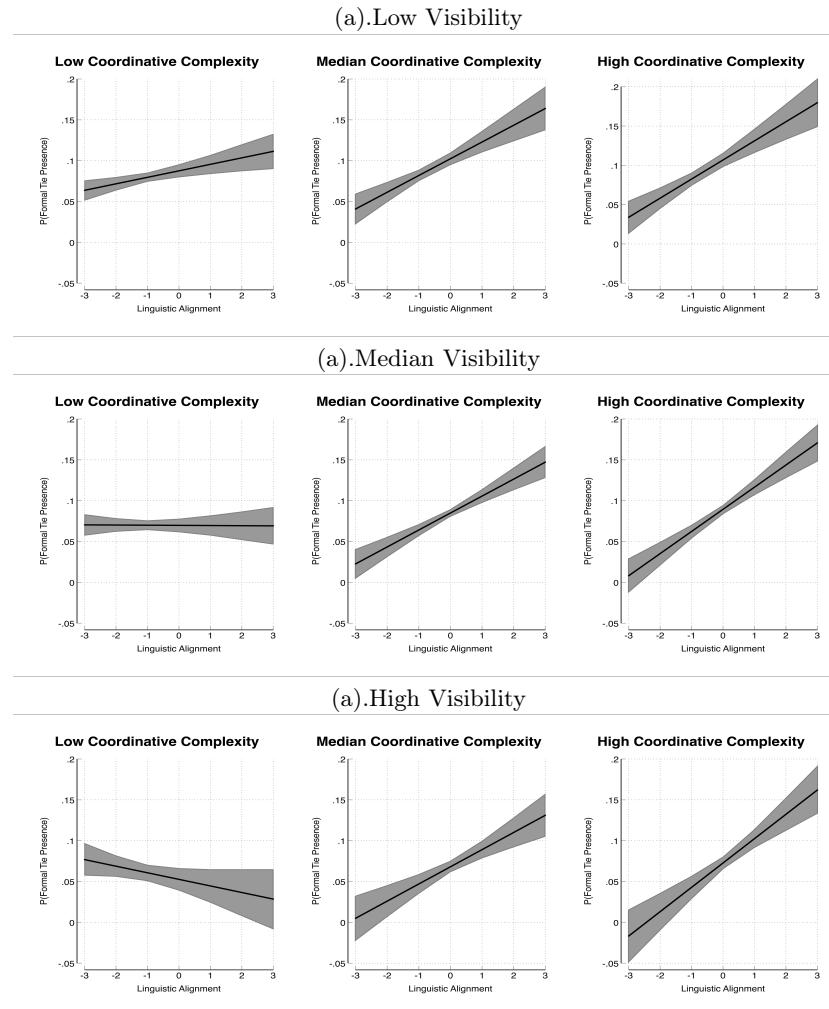
Note: The organizational formal structures are based on the formal reporting relationships collected from the HR records over time. We visualize a snapshot of the organizational formal structure captured during the middle month in our observation period. The node represents each employee, the directed edge represents each supervisor-to-subordinate relationship, and the vertical positions of the nodes represent the cascading reporting hierarchy.

Figure 2: Marginal Effects of Linguistic Alignment on Formal Tie Presence, at Varying Levels of Coordinative Complexity



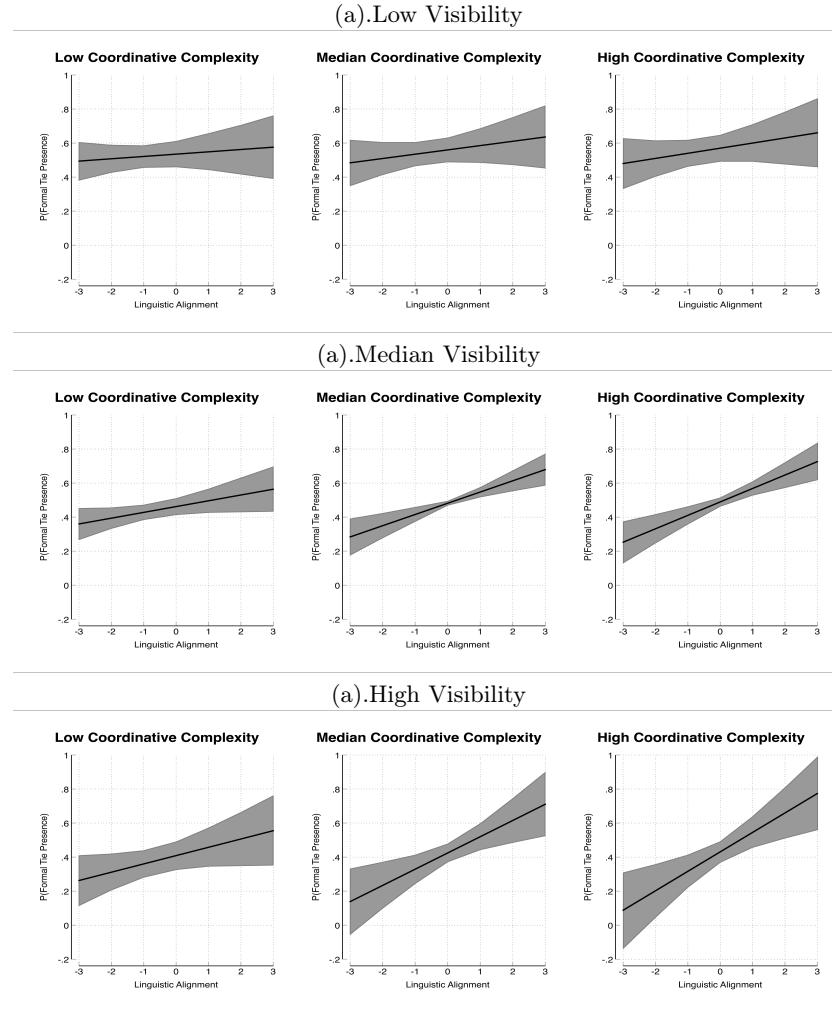
Note: The x-axis represents the number of standard deviations a dyad is from the mean level of linguistic alignment. Low coordinative complexity corresponds to the 10th percentile, and high coordinative complexity to the 90th percentile. Probabilities are calculated assuming mean values for control variables. Gray shading corresponds to 95% confidence intervals.

Figure 3: Marginal Effects of Linguistic Alignment on Formal Tie Presence for the Between-Dyad sample, at Varing levels of Coordinative Complexity and Visibility



Note: The x-axis represents the number of standard deviations a dyad is from the mean level of linguistic alignment. Low coordinative complexity and low visibility correspond to the 10th percentile, and high coordinative complexity and high visibility to the 90th percentile. Probabilities are calculated assuming mean values for control variables. Gray shading corresponds to 95% confidence intervals.

Figure 4: Marginal Effects of Linguistic Alignment on Formal Tie Presence for the Within-Dyad sample, at Varying levels of Coordinative Complexity and Visibility



Note: The x-axis represents the number of standard deviations a dyad is from the mean level of linguistic alignment. Low coordinative complexity and low visibility correspond to the 10th percentile, and high coordinative complexity and high visibility to the 90th percentile. Probabilities are calculated assuming mean values for control variables, and assuming that dyad fixed effects are zero. Gray shading corresponds to 95% confidence intervals.

Appendix: Supplemental Analysis and Robustness Checks

We first sought to rule out an alternative explanation for our findings: that our observed effects are an artifact of anticipated role transitions. In other words, they reflect shifts in linguistic alignment that occur when people find out that they will be moving to a different supervisory unit, even if the actual move occurs a few weeks after they learn of the impending change. Recall that our main models already include independent variables that are lagged by one month relative to our dependent variable. That said, we estimated models with longer lag periods. Table A1 reports results based on two-month lags. The pattern of results looks comparable to our main models; however, *Linguistic Alignment # Coordinative Complexity* in Table A1, Model 6 becomes marginally significant given that the number of observations also decreases as we move from a one-month to a two-month lag. Overall, this pattern of results helps to rule out anticipated role transitions as an alternative explanation for our findings.

Insert Table A1 about here

Next we sought to unpack whether our hypothesized effects differ for horizontal moves—that is, two peers either come into the same supervisory unit or move to different ones while both remaining at the same hierarchical level—relative to for vertical moves—that is, two peers experience a change in shared supervisory status by virtue of one getting promoted or, much less commonly, demoted. As reported in Table A2, the results remain fairly consistent when we restrict the sample to dyads that remain at the same horizontal level throughout the observation period. We find that *Linguistic Alignment # Coordinative Complexity* is significant and of the expected sign (Table A2, Models 3 and 6). Overall, this pattern of results suggests that the dynamics of linguistic alignment and coordinative complexity are not fundamentally different when we consider shifts in formal structure that are driven by horizontal versus vertical movement.

Insert Table A2 about here

Insert Figure A1 about here

Insert Figure A2 about here

Table A1: Formal Tie Presence — Two-Month Lag

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
	Between-Dyad Sample: OLS				Within-Dyad Sample: Cond. Logit	
Linguistic Alignment		0.018*** (0.003)	0.019*** (0.003)		0.327*** (0.082)	0.355*** (0.082)
Coordinative Complexity	0.009*** (0.002)	0.000 (0.002)	0.009*** (0.002)	0.069 (0.075)	0.006 (0.076)	0.099 (0.097)
Visibility	-0.009*** (0.002)	-0.012*** (0.002)	-0.013*** (0.002)	-0.255* (0.111)	-0.302** (0.112)	-0.310** (0.110)
Linguistic Alignment # Coordinative Complexity			0.011*** (0.001)			0.093+ (0.053)
Hierarchy	0.018*** (0.004)	0.018*** (0.004)	0.016*** (0.004)	0.157 (0.240)	0.158 (0.241)	0.159 (0.242)
Communication Intensity	0.009*** (0.003)	0.008** (0.003)	0.008** (0.003)	0.198** (0.073)	0.176* (0.069)	0.171* (0.068)
Span of Control	0.037*** (0.003)	0.040*** (0.003)	0.041*** (0.003)	2.047*** (0.167)	2.052*** (0.167)	2.047*** (0.167)
Same Gender	0.015*** (0.002)	0.013*** (0.002)	0.013*** (0.002)			
Same Ethnicity	0.005** (0.002)	0.004* (0.002)	0.004* (0.002)			
Same Department	0.195*** (0.005)	0.193*** (0.005)	0.193*** (0.005)			
Same Location	-0.000 (0.002)	0.002 (0.002)	0.001 (0.002)			
Constant	0.127*** (0.006)	0.124*** (0.006)	0.122*** (0.006)			
Month Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Dyad level Dummies	No	No	No	Yes	Yes	Yes
R-squared	0.556	0.558	0.559	0.304	0.308	0.309
log likelihood	228334	230825	232034	-10389	-10337	-10326
chi-squared				980	1047	1049
Observations	972482	972482	972482	34173	34173	34173

Two-way clustered standard errors in parentheses

+ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

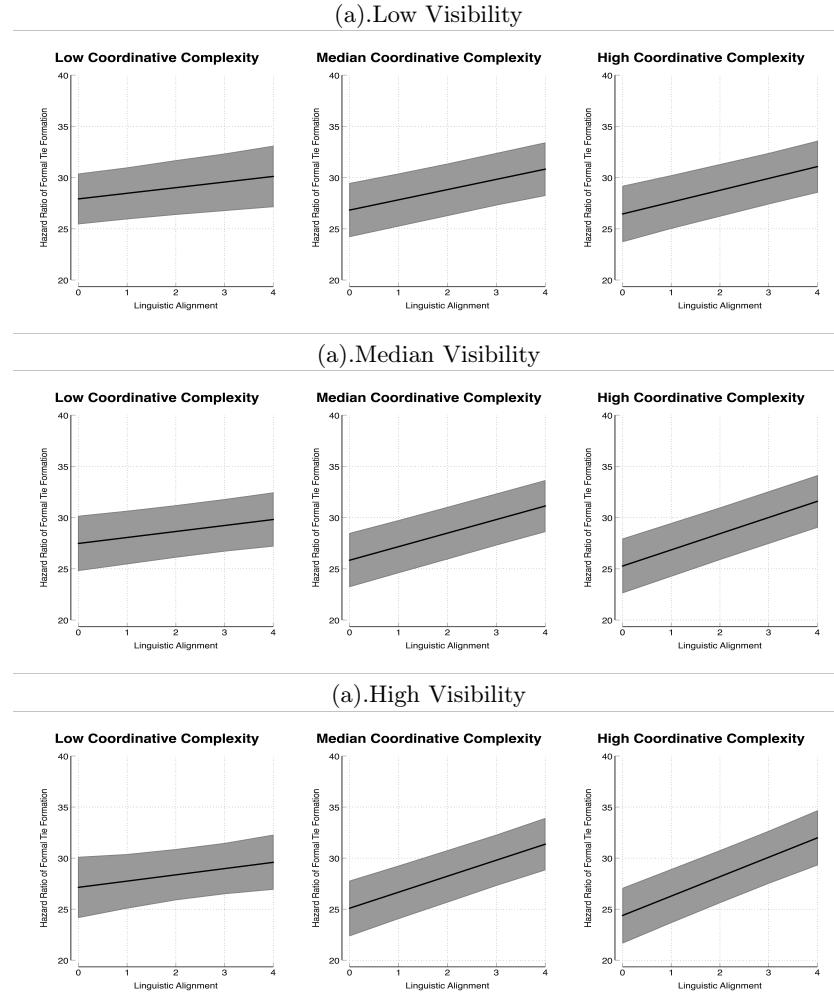
Table A2: Formal Tie Presence — Same Horizontal Level

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
	Between-Dyad Sample: OLS			Within-Dyad Sample: Cond. Logit		
Linguistic Alignment		0.014 *** (0.002)	0.015 *** (0.002)		0.496 *** (0.133)	0.682 *** (0.144)
Coordinative Complexity	0.005 *** (0.001)	-0.001 (0.001)	0.005 ** (0.002)	0.026 (0.080)	-0.073 (0.085)	0.275 + (0.142)
Visibility	-0.007 *** (0.002)	-0.009 *** (0.002)	-0.010 *** (0.002)	-0.320 * (0.143)	-0.377 ** (0.143)	-0.420 ** (0.137)
Linguistic Alignment # Coordinative Complexity			0.006 *** (0.001)			0.278 *** (0.071)
Hierarchy	0.016 *** (0.003)	0.016 *** (0.003)	0.015 *** (0.003)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
Communication Intensity	0.005 (0.003)	0.004 (0.003)	0.004 (0.003)	0.073 (0.054)	0.063 (0.054)	0.050 (0.052)
Span of Control	0.020 *** (0.003)	0.020 *** (0.003)	0.021 *** (0.003)	2.535 *** (0.242)	2.556 *** (0.242)	2.564 *** (0.240)
Same Gender	0.009 *** (0.002)	0.009 *** (0.002)	0.008 *** (0.002)			
Same Ethnicity	0.002 (0.001)	0.001 (0.001)	0.001 (0.001)			
Same Department	0.184 *** (0.007)	0.182 *** (0.007)	0.182 *** (0.007)			
Same Location	0.001 (0.002)	0.002 (0.002)	0.002 (0.002)			
Constant	0.092 *** (0.006)	0.091 *** (0.006)	0.090 *** (0.006)			
Month Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Dyad level Dummies	No	No	No	Yes	Yes	Yes
R-squared	0.462	0.464	0.465	0.396	0.403	0.412
log likelihood	236772	237941	238367	-3746	-3701	-3648
chi-squared				756	929	981
Observations	635565	635565	635565	14075	14075	14075

Two-way clustered standard errors in parentheses

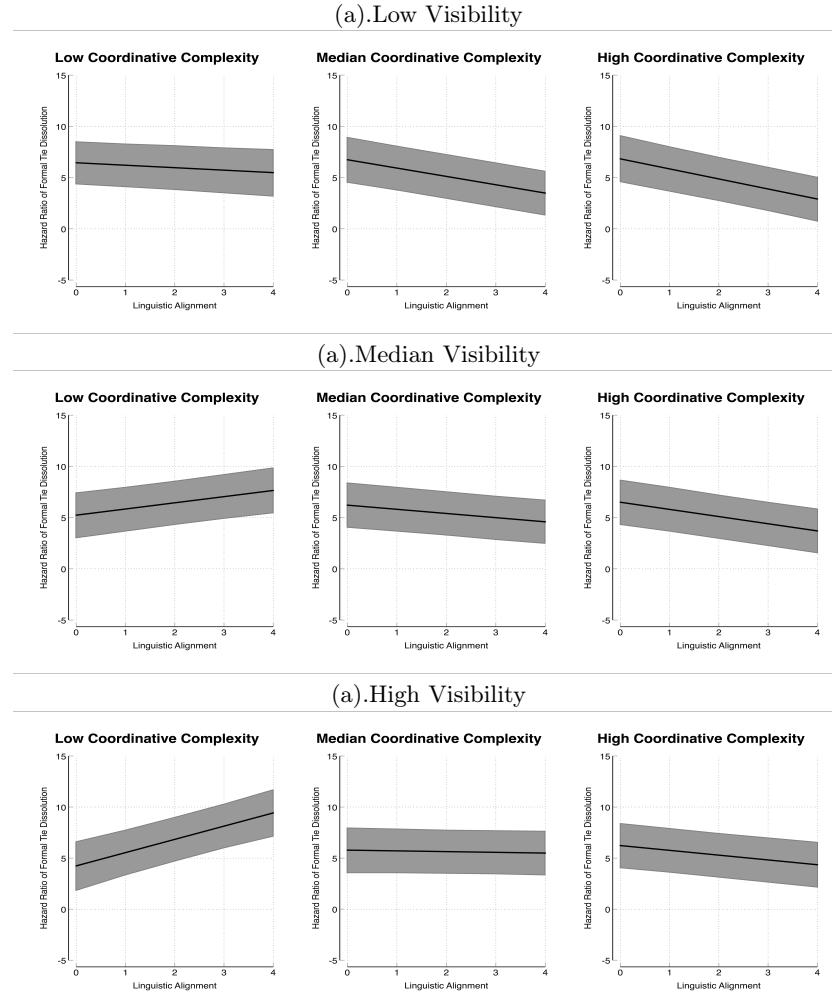
+ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Figure A1: Marginal Effects of Linguistic Alignment on Hazard Ratio of Formal Tie Formation, at Varing levels of Coordinative Complexity and Visibility



Note: The x-axis represents the linguistic alignment in the tie formation analysis sample. Low coordinative complexity and low visibility correspond to the 10th percentile, and high coordinative complexity and high visibility to the 90th percentile. Hazard ratios are calculated relative to a dyad assuming mean values for control variables. The y-axis is logarithmically scaled. Gray shading corresponds to 95% confidence intervals.

Figure A2: Marginal Effects of Linguistic Alignment on Hazard Ratio of Formal Tie Dissolution, at Varying levels of Coordinative Complexity and Visibility



Note: The x-axis represents the linguistic alignment in the tie dissolution analysis sample. Low coordinative complexity and low visibility correspond to the 10th percentile, and high coordinative complexity and high visibility to the 90th percentile. Hazard ratios are calculated relative to a dyad assuming mean values for control variables. The y-axis is logarithmically scaled. Gray shading corresponds to 95% confidence intervals.