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The Dynamics of Post-Bureaucracy: How Status Shapes Authority in Contemporary Organizations

Bernier, Clark

Princeton, NJ : Princeton University

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The Dynamics of Post-Bureaucracy: How Status Shapes Authority in Contemporary Organizations

Clark Bernier

A DISSERTATION

PRESENTED TO THE FACULTY

OF PRINCETON UNIVERSITY

IN CANDIDACY FOR THE DEGREE

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Adviser: Paul DiMaggio

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Abstract

This dissertation contributes to the development of a dynamic account of status and authority in contemporary organizations. The papers in this dissertation brings social-psychological mechanisms out of the lab into complex real-life settings, develop new computational measures to operationalize theoretical ideas, and ground these quantitative measures and ideas in ethnographic work. The project draws on billions of interactions among hundreds of thousands of individuals in thousands of teams and small organizations taken in a task-and-project-management software I refer to as TaskFlow. Metadata from this software allow me to separately measure communication patterns, order giving, exchange of digital work artifacts, and acts of deference. I ground these digital data in four months of participant observation and interview data collected while working as a data scientist at the pseudonymous hotel-services startup GuestInn.

In Chapter 1, I use a combination of the participant observation and interview data to develop theory about the ways that people coordinate work when roles are ambiguous. I argue that mechanisms that support normative control, such as the *vertical* control of membership rights, provide accountability for *lateral* coordination. I also introduce the concept of *generalized authority rights* to describe authority rights that are decoupled from official position and nominally granted to all employees. In Chapter 2, I use mixed methods to develop a dynamic process model, based on previously-demonstrated mechanisms, of how individuals' status changes unfold. I show that conspicuously *avoiding* giving orders may serve to increase one's status more than giving orders does. Contrary to existing models of status emergence, some status behaviors, such as giving orders, may be a source of status hierarchy *stability* rather than status change. Finally, in Chapter 3, I develop the idea that increased interdependence in the structure of work leads to status being more important in individuals' decision making. Using detailed interaction data from more than 3,000 organizations, I demonstrate that increases in two forms of interdependence increases the extent to which status factors into who is willing to give direct orders.

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Introduction

Over the past 60 years, observers have regularly pointed out that organizations increasingly coordinate work through means other than the centralized authority hierarchies that characterized traditional bureaucracies (DiMaggio 2001). Many alternatives to bureaucracy have been classified and analyzed: post-bureaucracy (Heckscher 1994; Johnson et al. 2009), heterarchy (Girard and Stark 2003), conversational firms (Turco 2016), collaborative enterprises (Adler and Heckscher 2006; Heckscher 2007), organic organizations (Burns and Stalker 1961), network firms (Powell 1990), normative control (Kunda 1992), concertive control (Barker 1993), less-hierarchical (Lee and Edmondson 2017). Despite their differences, a common thread through these accounts is that work has become (a) too complex, in the sense of multiple, interconnected parts, and (b) too dynamic for traditional bureaucracies to be effective.

This complexity and dynamism has not, however, been reflected uniformly in theories crucial to describing social life in these organizations. Specifically, theories of status and authority have tended to reflect the relative stasis of the contexts in which they first developed: the lab and the Prussian state, respectively. This project seeks to contribute to the development of a dynamic account of status and authority in contemporary organizations. To do so, the papers in this dissertation brings social-psychological mechanisms out of the lab into complex real-life settings, develops new computational measures to operationalize theoretical ideas, and ground these quantitative measures and ideas in ethnographic work. While these data do not permit me to develop a full account of authority in contemporary organizations, the three chapters of this dissertation use these data to ask and suggest answers to questions that have not previously been addressed or addressable.

Negotiating Provision Role Relations

Accounts of *coordination* (Bechky and Chung 2018) offer an orienting framework for understanding work in complex and dynamic environments. However, these accounts have tended to focus on organizations with well-institutionalized occupational communities (Van Maanen and Barley 1984) or generalized role structures (Bechky 2006), leaving open the question of how organizations coordinate work when role structures—the ways that roles are expected to interact with one another—are unclear or in flux. Relying on externally-defined role relations to coordinate production is only viable when production involves (a) self-sustaining external communities of practice (Bowker and Star 1999) or occupational communities (Van Maanen and Barley 1984) that (b) regularly work with one another. When production involves roles or combinations of roles that are new or uncommon, pre-existing role relations will not be sufficient for coordination.

Locally-defined role relations, such as team structures, may also be difficult to sustain in the face of dynamic environments and learning (Edmondson 2012; Mortensen and Haas 2018). This raises questions of how more fluid teams generate or maintain collective responsibility and trust (McEvily et al. 2003; Meyerson et al. 1996) and shared understanding (Okhuysen and Bechky 2009) in light of shifting demands and memberships (Valentine and Edmondson 2014). Chapter 1, *Negotiating Provisional Role Structures in the Shadow of Hierarchies*, develops an answer to this question by investigating how coordination is achieved in an organization with ambiguous role relations. The model I develop in this paper extends existing theory of emergent coordination and also contributes to theories of normative control and of the role of formal hierarchies in less-hierarchical organizations.

Hierarchies in Motion

Chapter 2, *Hierarchies in Motion: Towards a Dynamic Account of Status Change*, is the first work, to my knowledge, to model status and authority changes as continuous processes in existing hierarchies. In prior work, status is often conceptualized either as a position in a static social structure constraining individual behavior (e.g., Anicich et al. 2016) or as a structure emerging from interactions among individuals (e.g., Skvoretz et al. 1996). Work in the latter vein demonstrates that particular status behaviors (Mark 2018)—such as giving orders or interrupting another speaker—leads to a specific ordering of status perceptions in groups of strangers (Askin et al. 2015; Skvoretz et al. 1996). Theoretical accounts of status change within *existing hierarchies*, rather than emergence, are rare (Sauder et al. 2012) despite the fact that social life is often neither static nor emergent. Outside of the controlled conditions of the lab, most groups' environments are in flux *and* their structures enduring.

The analysis in Chapter 2 is an attempt to bridge this gap. In it, I develop a process model where status rankings are treated as both cause and effect. The findings directly challenge the applicability of models of status hierarchy *emergence* for explaining status hierarchy *change* in existing groups.

Interdependence and the Role of Status

If work in organizations is, indeed, becoming more complex, then existing theory indicates that heightened complexity may further increase the importance of status in interpersonal decisions that is demonstrated in Chapter 2. Current social psychological theory proposes two features of decision that lead people to rely on status when making choices: uncertainty about the abilities of their fellow group members and whether the success of the decision hinges on others' perceptions of it. This seems to imply that the more coordination entailed in a particular setting—the

more *interdependent* the setting—the more likely that decisions made in that setting will incorporate status beliefs instead of personal beliefs. If true, this is important because contemporary organizational life has become more interdependent than ever (Child and McGrath 2001; Edmondson 2012; Bechky and Chung 2018). Individuals are likely to engage in work that requires close coordination with their coworkers. Furthermore, this coordination is increasingly likely to occur across official organizational divisions, undermining the ability for formal structures to guide decisions. The question is, does this increased interdependence in the workplace lead to an increased reliance on status and status beliefs in individuals' decisions compared to more isolated or modularized work?

The link between coordination and the importance of status has only been demonstrated at the level of the individual decision (Correll et al. 2017). It remains an open question whether increasing levels of interdependence at the organizational level will affect the importance of status to the decisions made within these organizations; this theoretical link remains to be developed. This is partially due to the difficulty of collected the detailed, longitudinal interaction data in the field that would be necessary to measure (a) interdependence and (b) the extent to which status affects decisions. In Chapter 3, *Interdependence and the Role of Status*, I develop theory linking two dimensions of organizational interdependence—*intensive*, how deeply interdependent work is, and *dispersed*, with how many others the average person's work is interdependent—to their impact on the role of status in decision making. This chapter argues that both types of organization-level interdependence increase the importance of status in individuals' decisions. In it, I demonstrate this relationship for a particular decision—the decision whether to give direct orders to coworkers—using the detailed interaction data described below.

Data

These three papers make use of complimentary sources of data. Chapters 2 and 3 draw heavily on continuously-collected interactions among tens of thousands of individuals in thousands of teams and small organizations taken in a task-and-project-management software I refer to psuedonomously as TaskFlow. From terabytes of software logs, I extract metadata that allow me to separately measure communication patterns (497 million messages sent), order giving (66.7 million tasks assigned), exchanges of digital work artifacts (84.5 million attachments), and acts of deference (42 million instances of seeking advice). I describe these data in more detail in the Data sections of Chapters 2 and 3; I explain the software and how it is used in day-to-day work in Appendix 1.

I ground these digital data in four months of participant observation I collected while working as a data scientist at the pseudonymous hotel-services startup GuestInn. GuestInn agreed to de-anonymize their TaskFlow metadata and link it to my fieldnotes. I used these linked data to validate the measures of communication, deference, and order-giving in the metadata and as the basis for a novel interview protocol. In order to longitudinally focus interviews, I created interactive displays of individuals' TaskFlow usage to guide semi-structured questions regarding their work histories. I describe these data and this interview protocol in more detail in the Data section of Chapter 1.

Research Innovations

In addition to engaging the aforementioned theoretical gaps using these data, this project makes a number of innovative contributions to sociological and organizational research more broadly.

All three papers in this volume demonstrate innovations in the temporal scope of research. The fine-grained interactional data used to build the measures used in Chapters 2 and 3 are simultaneously more temporally macro and micro than any prior studies of status or authority. These data are more macro in that they span multiple years of individuals' work histories. This allows me to see relatively rare changes, such as individuals first beginning to give orders to coworkers, which I leverage in the research design of Chapter 2. It also allows for a within-organization analytical design in Chapter 3 that rules out alternative explanations due to variations between organizations. On the other hand, these data are also more micro: they capture every interaction taken in TaskFlow between coworkers. This allows me to build measures that take into account interaction histories at both the dyad and individual level, such as identifying regular order-giving relationships. These characteristics allow me to base my empirical measures on ongoing behavioral patterns rather than momentary reported perceptions, as when status is measured using sociometric surveys.

In Chapter 1, the interactive digital dashboard that I built based on TaskFlow data to guide interviews gave the interviews a *longitudinal focus* that they lacked when I conducted interviews without the dashboard. Many interviewees had occupied multiple roles in their organization over several years. Details about work before their most recent role were more difficult to obtain in a standard interview due to the limits of memory and relevance. The completeness of the interaction record in the dashboard, however, served as a focal object for our conversations, regularly eliciting narratives that the interviewee claimed to have forgotten until seeing the dashboard.

Finally, the analyses in Chapters 2 and 3 hinge on re-purposing continuously-collected trace data to develop measures of existing theoretical concepts (Salganik 2017). The mixed-methods nature of this project allowed me to ground the development of these measures in data from actual users of the TaskFlow software, from myself as a

participant-user, and in conversation with TaskFlowCo's user experience research team, who interviewed hundreds of users at other organizations. When developing the measures in Chapter 2 and 3, I could check assumptions, such as whether the "add-to-conversation" feature was a reliable indicator of interpersonal deference, against these data. Furthermore, using my notes and the official HR data from GuestInn, I could check measures against more qualitative ways I would have operationalized the same concept. This synthesis of data extends the concepts of trace ethnography (Geiger and Ribes 2011) beyond using digital traces to conduct ethnographic research to using ethnographic research to ground the *interpretation* of digital trace data.

Chapter 1: Negotiating Provisional Role Structures in the Shadow of Hierarchies

Abstract

Emergent coordination has been studied primarily in environments where generalized role structures and occupational communities are well-established. How individuals coordinate work in less-institutionalized or more rapidly-changing environments is less understood. I use a combination of participant observation and interview data collected in a medium-sized startup, GuestInn, to develop theory about the ways that people coordinate work when roles are more ambiguous. GuestInn management uses an institution, locally referred to as "ownership," to foster commitment in employees. Lacking developed role relations, employees of GuestInn continually negotiate *provisional role relations* for coordinated work using the same institution, "ownership." The analysis contributes to our understanding of emergent coordination by showing how it works when role structures are less developed. They also refine our understanding of normative control to consider how it shapes employee-employee coordination. It also refines theory on the role of formal hierarchies in organizations with distributed authority rights: people's ability to negotiate *lateral* coordination without deep shared understanding of one another's work is facilitated by the shadow cast by *vertical* membership rights over negotiations, without directly involving nominal superordinates. Finally, I introduce the concept of *generalized authority rights* to describe authority rights that are decoupled from official position and nominally granted to all employees.

Introduction

> Ravi [VP Engineering, interview]: How do you define a culture of ownership? One simple way to define it is people don't have boundaries. They don't say, "That's not my job." They always go above and beyond. . . [if] you're always dependent on drawing the lines clearly, you will never get the lines right and things will fall through the cracks."
>
> Edgar [Head of Pricing, interview]: When we all came on, the idea was actually all three of us would be doing everything start to finish, but it evolved into me focusing on the pricing and the forecasting, Liam focusing

on post-close coordination, and Richards, I actually don't remember what Richards did. Funny enough, but he wasn't doing what I was doing.

Interviewer: Did you all talk about that?

Edgar: It was like what was everyone most interested in, or aptitude. It seemed quite organic.

Ravi articulates a common managerial vision at GuestInn: less-defined roles will foster employee commitment leading people to "go above and beyond" creating an organization that keeps up with a changing environment better than well-defined roles would. Lacking defined roles, Edgar, Liam, and Richards "organic[ally]" work out a division of labor between themselves, specialized enough that Edgar can afford to forget what part of his former responsibilities Richards takes care of. How are Edgar, Liam, and Richards able to achieve this role clarity with neither pre-existing roles nor managerial intervention? How does this local role clarity support ongoing coordination? And what role does management play in cultivating and supporting this "culture of ownership?"

The "culture of ownership" that Ravi describes echoes the pronouncement of many authors over the past 60 years that traditional bureaucratic control does not deal well with change, complexity, or learning. In the face of environmental instability, the highly developed staff positions of a bureaucracy are unsustainable and it is better to rely on external professions to guide coordination (Stinchcombe 1959). Bringing together multiple professions with distinct value systems creates heterarchies of value that must be navigated to coordinate work (Girard and Stark 2003; Stark 2006). To the extent that an organization (or part of an organization) is actively learning or engaged in exploration (March 1991), a more organic rather than mechanistic arrangement of work will allow for greater experimentation (Burns and Stalker 1961). And motivating professionals in such organic production relies on organizational

commitments to maximize worker autonomy (Freeland and Zuckerman-Sivan 2018; Burns and Stalker 1961), necessitating communication-heavy interactional (Heckscher 1994) or conversational (Turco 2016) coordination (March and Simon 1958; Thompson 1967).

Accounts of emergent coordination (Bechky and Chung 2018) offer an orienting framework for understanding how these forms of organizing coordinate work. However, they have tended to focus on organizations with well-institutionalized occupational communities (Van Maanen and Barley 1984) or well-developed roles and role structures (Bechky 2006), leaving open the question of how these organizations coordinate work when role structures—the ways that roles are expected to interact with one another—are in flux or unclear. Relying on externally-defined role relations to coordinate production is only viable when production involves (a) self-sustaining external communities of practice (Bowker and Star 1999) or occupational communities (Van Maanen and Barley 1984) that (b) regularly work with one another. When production involves roles or combinations of roles that are new or uncommon, pre-existing role relations will not be sufficient for coordination.

Locally-defined role relations, such as team structures, may also be difficult to sustain in the face of dynamic environments and learning (Edmondson 2012; Mortensen and Haas 2018). This raises questions of how fluid teams generate or maintain collective responsibility and trust (McEvily et al. 2003; Meyerson et al. 1996) in light of shifting demands and memberships (Valentine and Edmondson 2014).

Work on emergent coordination has tended to focus on contexts where organizational control is highly formalized (e.g., Bechky and Chung 2018). More normative or cultural forms of control (Kunda 1992; Barley et al. 1988) may be more common in organizations trying to facilitate more improvisational work practices (Miner et al. 2001). Indeed, Ravi's comment reflects a strategy of normative control on the part of

GuestInn's management. Organizational culture has been shown to be a tool for facilitating increased commitment (Kunda 1992) and decentralized decision-making (Turco 2016). While these accounts richly describe the *vertical* relationship between organization and employee that organizational culture facilitates, the role of organizational culture in the *lateral* coordination between employees has been less explored (though see Heckscher 1994 on the importance of culture for facilitating coordination across bureaucratic boundaries).

To develop theory on how coordination operates in organizations with ambiguous or undeveloped role structures, I studied work in a middle-stage startup. I draw on a uniquely rich mix of data: four months of participant observation at a rapidly-growing hotel services startup, GuestInn,[1] archival HR data, notes and transcripts of 30 meetings, detailed interaction metadata from the organization's task and project management software, TaskFlow,[2], and 33 interviews conducted with a novel longitudinal interview protocol that uses interactive representations of participants' software metadata to frame discussions about past interactions.

I find that emergent coordination is indeed supported by the organizational culture when role structures are ambiguous or unavailable at GuestInn. GuestInn management uses an institution from the startup environment, emically referred to as "ownership," to foster employee commitment and link individual goals to organizational goals.

Lacking developed role relations, employees of GuestInn used ownership to continually negotiate *provisional role relations* for coordinated work. This institution of normative control provided a conceptual basis which allowed individuals to (a) construct their own roles, (b) coordinate without developing shared understanding of one another's work, and (c) trust that accountability would be enforced in negotiated

[1]Not its real name.
[2]Not its real name.

relations. The analysis contributes to our understanding of emergent coordination by showing how people coordinate when role structures are ambiguous. It also refines our understanding of normative control to consider how it shapes coordination among employees. It also refines theory on the role of formal hierarchies in organizations with distributed authority rights: people's ability to negotiate *lateral* coordination without deep shared understanding is facilitated by the shadow cast by *vertical* membership rights over the negotiations, without directly involving nominal superordinates. Finally, I introduce the concept of *generalized authority rights* to describe authority rights that are decoupled from official position and nominally granted to all employees.

Complex and Dynamic Coordination

Despite a range of analytical foci, authors over the past 60 years have pointed to several shifts in the nature of work that limits the effectiveness of traditional bureaucratic structures (Lee and Edmondson 2017; DiMaggio 2001).

First, the *complexity* of work has increased. Contemporary organizing is characterized by increased levels of interdependency (Thompson 1967): accomplishing one's job requires more *intensive* coordination with others as well as more *dispersed*interaction with a wider range of others (Bernier 2019b). Even where bureaucratic role structures are well defined, complex work necessitates coordination across different branches of the organization chart, meaning that some coordinative device beyond administrative control is necessary to avoid frequently and inefficiently traversing up the hierarchy to a common boss. There are various ways organizations respond to this challenge (Heckscher 2007, 72–73), but all share a push to decentralize decision-making so that such interdependencies can be worked out locally (March and Simon 1958; Thompson 1967; Burns and Stalker 1961).

Complexity in highly-skilled production systems also brings together different communities of practice (Bowker and Star 1999) or occupational communities (Van Maanen and Barley 1984; Bechky 2006). Coordinating across these groups often necessitates dedicated boundary objects that "inhabit several intersecting social worlds and satisfy the information requirements of each of them" (Star and Griesemer 1989, 393; Star 2010). Different communities can rely on established boundary objects to create enough common ground to coordinate without having a complete grasp of one another's community-specific details (Bechky 2003a).

Second, organizations in *rapidly-changing* environments face a situation where any formalized systems of coordination can rapidly go stale. Bureaucracies require fairly stable environments because they cannot easily expand and contract (Stinchcombe 1959). Furthermore, the ability to bring new members into an organization as the environment changes can be key to staying competitive (March 1991).

When rapid change is combined with complex work, internal operations will involve continual shifts in patterns of interdependence. For example, new technologies or shifts in the competitive landscape may make a prior pattern of coordinating activity obsolete. Role clarity—reducing interdependencies between people by specifying the content or their roles and the relation between them—is helpful in complex environments, but is prone to failure if the environment produces surprises. Girard and Stark (2003) argue that this combination of complexity and change characterized engineering work in silicon alley startups, requiring that production proceed as a series of "provisional settlements."

Finally, organizations engaged in *learning* (Levitt and March 1988)—encoding inferences from experience into routines—are faced with similar coordination challenges as those in complex and changing environments. The way that work is coordinated today might not be how it is coordinated tomorrow when an organization

or group is exploring its production options. Well-defined roles can inhibit the growth and innovation necessary for learning, while blurring member roles can enhance innovative activity (Goodman and Goodman 1976; Burns and Stalker 1961). And unless organizational routines support experimentation with and reflection on (Edmondson 2002) the routines themselves, individual-level learning may be drowned out by established routines (March 1991).

Emergent Coordination

Burns and Stalker (1961) argued that organic structures, or loosely coupled networks of workers, are better able to innovate than what they call mechanistic structures with clearly-defined roles. The blurred definition of individual roles allows groups of individuals to experiment more readily with new combinations of ideas or techniques and to reflect (Edmondson 2002) on these experiments. When an entire organizational field (Powell and DiMaggio 1991) is engaged in learning, these loosely coupled networks may extend beyond the nominal border of particular organizations, involving members of other organizations in a given organizations' learning processes (Powell 1990). These perspectives, however, do not help us understand how work is coordinated within these organizations.

Okhuysen and Bechky (2009) argue that a focus on *coordination* offers a more useful framework for understanding work than a focus on structure alone. They argue that coordination mechanisms (such as routines, meetings, plans, and schedules) impact the work of organizations by creating three integrative conditions for coordinated activity: predictability, common understanding, and accountability.

One way to facilitate these integrative conditions is through well-defined, structured role relations. Bechky (2006) shows how the generalized role structure of the film industry—a pattern of relationships between roles that transcends particular projects

where they are enacted—allows coordination in the making of movies. Valentine and Edmondson (2014) describe how doctors, nurses, and staff roles are formally combined into what they call "team scaffolds" that provide a meso-level framework for coordinating hospital work independent of the individuals comprising any given team. In these settings, predictability and common understanding are facilitated by individuals' familiarity with their own roles and those roles' usual relation to others whereas accountability is provided by the occupational communities (Van Maanen and Barley 1984) that monitor, enforce, and reinforce the role performances of members.

When work entails coordination across communities with very different understandings or valuation systems (Girard and Stark 2003), common understanding may be more difficult to achieve. In established organizations, material boundary objects—objects that facilitate communication between two communities by having different community-specific meaning to each (Star and Griesemer 1989; Star 2010)—may facilitate shared understanding of work without requiring deep understanding between communities.

Like generalized role structures, such coordination relies on communities and their relations with one another being well-established. However, as Bechky (2006) points out, in many organizational contexts, role structures are "not as longstanding or well-developed as that of the film industry. . . prompt[ing] consideration of how temporary organizing can be successful in settings without a generalized role structure." Institutionalized role structures, in general, will require fairly stable environments so that stable expectations and organizational routines linking these roles can be developed and maintained over time. Organizations engaged in exploration (March 1991) or merely operating in complex or changing environments may not be able to rely on well-defined roles for coordination. Boundary objects' ability to coordinate also rely on a fairly stable history of cross-community

collaboration and a future that will be similar to the past (Star and Griesemer 1989). In organizations bereft of developed boundary objects, trust (Meyerson et al. 1996; McEvily et al. 2003) may be necessary to allow coordination without requiring deep understanding across communities. We would therefore expect a different set of meso-level tools and structures to coordinate work between individuals in rapidly changing or learning organizations.[3]

Organizational Culture and Normative Control

Burns and Stalker (1961) argued that the non-routinized decision making characteristic of organic organizing relies on a shared organizational culture to act as a basis for beliefs about how work should be done. Rather than engage in direct supervision or program routines, management can try to control the assumptions and definitions that are taken for granted in a group, and thereby shape the collective decisions the group makes, a strategy Perrow (1986) calls "premise control." Both Burns and Stalker (1961) and Perrow (1986) contend that premise control becomes more important when organizational tasks are less routine (see Weick 1995, 113–18 for a more thorough discussion).

Such control of culture is often intertwined with organizational efforts to foster greater employee loyalty. Kunda (1992) describes how one large organization's management promoted a particular vision of an ideal employee that workers were encouraged to model. Such group prototypes (Hogg and Terry 2000) serve simultaneously to model ideal behavior (and thus serve as a means of premise control) and to promote group loyalty by articulating the superiority of the ideal group member over non-members.

[3]The importance of shared understanding, how it is facilitated by boundary objects, and how it is created in their absence will require a little more development. Kellogg et al. (2006) give an account of "trading zones" where communities can work out coordination when work is too unstable to support boundary objects. In these trading zones, communities make local (i.e., community-specific) knowledge visible and legible to other communities rather than requiring complete translation. This idea will serve as a basis for developing this concept further.

By engaging in direct manipulation of this prototype, the organization's management exercises a type of *normative control* over employees (Kunda 1992).

The precise definition of a prototypical employee is at one extreme of normative control. More often, cultural control is exercised through more generalized (and vaguer) *maxims*. For instance, Turco (2016) describes how a media organization named TechCo, inspired by the success of Netflix's much-publicized "freedom and responsibility" maxim, built its culture around empowering individuals to "use good judgment" (itself taken from Nordstrom's) in their work and interactions. Nominally, so long as they make decisions in accordance with the maxim, employees have the autonomy to make their own decisions. This autonomy, in turn, increases employees commitment both to the organization as a whole and to the decisions that the employee makes. Premise control in such organizations is manipulated by managers shaping perceptions and interpretations of the maxim through their own public interpretations and enforcements of it (Turco 2016).

While these accounts richly describe the *vertical* relationship between organization and employee that organizational culture facilitates, culture's role in the *lateral* coordination between employees has been less explored. Insomuch as *institutions of normative control*—such as prototypical employees or maxims—act as a substitute for defined roles and routines, what roles do they play in facilitating coordination in organizations relying on them?

Negotiation and the Hierarchy of Membership Rights

Even when other authority rights are delegated, the right to hire and fire—control of membership rights—is almost always centrally-held, often as an employment contract between the organization and the individual (Simon 1947). Centrally-held membership rights mean that internally "the firm [is] its own court of ultimate

appeal" (Williamson 2002). In theory, unresolved issues at one level of the organization can thus be appealed to a higher level for resolution.

However, interdependent work often requires regular coordination between individuals at lower levels of the organization. If every matter were to go to appeal, it is doubtful any work would get done (Freeland and Zuckerman-Sivan 2018). If appeals have to go up the hierarchy until a common superordinate can adjudicate, then settlements between people working across departments or functional areas may be very costly to resolve. Furthermore, if the potential cost of such appeals invokes the threat of firing or if such appeals are seen as costly, people may be hesitant to rely on the official hierarchy to guide lower-level coordination.

To the extent possible, nominal peers are motivated to work out coordination with a minimum of appeal to the local hierarchy. Insomuch as such coordination involves the allocation of scarce resources (such as employees' time, effort, or attention), then it is likely to involve *negotiation* (Cyert and March 1963) between concerned parties, producing local negotiated social orders (Strauss 1978). Like ranchers negotiating local orders in the shadow of the law but not using the law (Ellickson 1991), organization members negotiate in the shadow of the formal hierarchy, but need not invoke it directly. This shadow may be more pronounced in some parts of an organization than others. In the interstitial spaces where the organization chart offers no guidance or in organizations where the structure of interaction is decoupled from the official hierarchy due to rapid change or environmental uncertainty, official hierarchies may be merely one social resource among others in ongoing negotiations of coordination.

The importance of negotiation in interdependent work has been noted before. Girard and Stark (2003), for example, argue that the competing value systems of the occupational communities involved in producing webpages in an early Silicon Alley

company necessitated regular negotiation of *provisional settlements*. The organization and its members did not decide once-and-for-all on a plan, but rather would renegotiate the meaning and methods of its work with each new project. Even in more traditionally hierarchical settings, change imposed from above often involves negotiation at lower levels of the organization. Valentine (2017), for example, shows that hospitals' change initiatives were more successful when managers of groups whose work was altered were able to *renegotiate* their official obligations in light of the change rather than merely being told to implement it.

These two examples rely on clearly-defined external roles and well-defined local bureaucratic roles, respectively. In the absence of established roles, it is less understood how such negotiated orders are built and maintained.

Below, I extend this negotiated order view to understand how an institution intended as normative control is used by organization members plays a crucial role in these negotiations: lending them accountability and facilitating coordination without deeply shared understanding of one another's work. The terms of normative control provided grounding for people to negotiate what I term *provisional role relations* which served as temporary role relations to guide ongoing coordination but are seen as subject to renegotiation as new information comes to light or as the task structure changes.

Data and Methods

From September to December 2017, I conducted participant observation in a rapidly-growing, San Francisco-based startup, which I refer to as "GuestInn." GuestInn operates short-term rental apartments in several North American and European cities.[4] Each city operates as an independent business unit, managing

[4]To protect GuestInn's confidentiality, I am unable to disclose the precise number of cities in which it operates.

growth and operations with support from headquarters (HQ)—a traditional production line / staff arrangement (Dalton 1959; Stinchcombe 1959). GuestInn's HQ, where I worked, housed several staff departments: upper management, data science, engineering, HR, finance, interior design, supply chain management, hospitality, real estate, and recruiting. City teams included real estate acquisition specialists and operations teams who built out and operated GuestInn's rental units and provided concierge services for guests.

When I left the field, GuestInn had 234 employees in addition to dozens of outside contractors. GuestInn offers a unique research site in that it incorporates a greater variety of production types—guest services, technological, real estate, supply chain management, interior design—than most companies its size.

In order to engage fully with the organization and its members, I worked at GuestInn, unpaid, as a data scientist throughout my observation.[5] The projects I worked on involved regular interaction with more than twenty people spread across seven departments, providing me broad exposure to different parts of HQ. I also visited and conducted interviews at two different cities' central offices.

As an employee, I had access to the full array of digital tools used in the conduct of engineering work. These included, but were not limited to: project management systems, chat systems, code repositories, email, digital calendars, shared digital documents, and shared document folders. Incorporating such digital trace data (Geiger and Ribes 2011) into ethnographic accounts of organizations has become more essential as more interaction takes place online (Turco 2016; Takhteyev 2012). Much of my coordination with coworkers was mediated through the TaskFlow task and

[5]My role as a researcher was public and well-known. It was announced via company-wide email when I began and I mentioned my research affiliation whenever meeting a new co-worker. I also carried my field notebook with me at all times in the office and at after-work functions to remind people. This was the subject of near-daily meta jokes such as, "are you writing down this question I'm asking?"

project management system and through digital chat systems. During my participant observation, I wrote daily field notes, collected audio transcripts of 37 technical or planning meetings, and wrote weekly analytical field memos.

I also conducted 39 one-to-three-hour interviews using a semi-structured data-driven interview protocol built around a dynamic, interactive dashboard I designed for the study. This dashboard allowed interviewees and I to explore their weekly history of co-worker interactions taken in TaskFlow over the entire duration of their employment.[6] Interviews were conducted in closed-door conference rooms to protect the privacy of the interviewees.[7]

TaskFlow is designed to *replace* task-related email within organizations. Official policy at GuestInn was that "TaskFlow allows us to organize our projects, our meetings and our daily habits," and internal guidance documents encouraged employees to enforce this usage pattern of TaskFlow: "anytime someone [sends you] something that should be in TaskFlow, ask them to put it in TaskFlow." I witnessed many such corrections in practice and people reported in interviews that they would regularly correct coworkers. All new staff employees (including me) and line managers underwent a 30-minute orientation run by GuestInn's head of HR to teach them how TaskFlow was used at GuestInn. This institutionalized centrality of TaskFlow to operations and project work at GuestInn meant that the patterns of interaction in the software mapped closely to patterns of work overall.

Figure 1 shows an example of the interview dashboard I created for this study. For any time period selected, the dashboard displayed the interviewee's TaskFlow interactions with their top 8 correspondents during that time period. The upper left

[6] I also conducted six interviews without the interactive dashboard, all of which I repeated with the data-driven protocol. This gave me an opportunity to observe how responses differed under the protocol.

[7] I informed people at the beginning of interviews that I would keep their responses confidential from their coworkers, and would consult them before using any quotations which could uniquely identify them to their coworkers in published materials. All names have been altered.

panel showed the amount of communication the interviewee directed to each coworker each week. The upper right showed the amount of communication coworkers directed to the interviewee. The lower-left panel showed the task-assigning balance between the interviewee and each coworker, in which negative numbers represent coworkers who gave more direct orders to the interviewee than vice-versa and positive numbers indicate that the interviewee made gave direct orders to that coworker during that week. The lower right panel presented the interviewee's overall network centrality (row-normalized indegree) and order-giving balance, but were generally too abstract to be useful during the interviews.

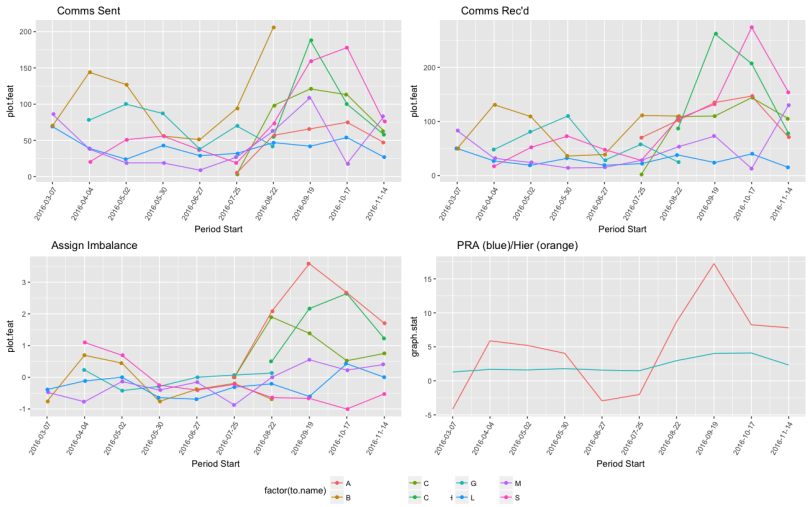


Figure 1: Example TaskFlow Interview Dashboard

During an interview, as an interviewee would tell me about what they had done—such as projects they worked on—during a particular period of time, we would alter the dashboard to focus on that period, tracing out the events they described. Patterns of interaction that were inconsistent with their account would often lead us into additional discussion about the details of these periods. Sometimes, they would open TaskFlow on their own computer to track down the meaning of certain interaction histories which frequently turned up important projects about which they had forgotten. Occasionally, in his or her excitement, an interviewee would stand up

near the screen and excitedly trace the lines of the graph on the display with his or her hands while recounting experiences at the company, as in Figure 2. One asked me, earnestly, to send him a screen shot of his overall history so he could "print and hang it up" at his desk, which he did.



Figure 2: A GuestInn employee excitedly explains part of his tenure at GuestInn using the his TaskFlow interaction history dashboard.

Reactions like this and the way people's stories reflected the shapes of the curves on the screen indicate that interviewees *saw themselves and their histories* in the aggregated traces they had generated in TaskFlow. The historical focus of the dashboards gave the interviews a *longitudinal focus* that the interviews lacked without the dashboard. Many interviewees had occupied multiple roles over several years. Details about coordinative work before their most recent role were more difficult to obtain in a standard interview. The completeness of the interaction record in the dashboard, however, served as a focal object for our conversation, regularly eliciting narratives that the interviewee claimed to have forgotten until seeing the dashboard. Although I was a participant at GuestInn for only four months, the interviews covered up to five years of company history.

I interviewed people from seven staff departments and two city line operations at GuestInn, as well as both co-founders and two General Managers of city operations. I over-sampled early employees to get a view of the evolution of the organization over time, interviewing 11 out of 15 employees hired before 2016. I interviewed 10 people hired in 2016 before the company moved its HQ, the second generation (Gen2) of employees, and 12 hired in 2017 (third generation, Gen3). Ten of the interviews were with executives or Heads of Department, and the remaining 22 with either middle managers in city operations or members of staff departments. The gender distribution of my interviews reflects that of the company overall: I interviewed both of the women hired before 2016, and 41% of the interviews with later hires were with women, compared to an overall rate of 43%. The only group of employees I was unable to interview (because of their hourly status) were the front-line production employees responsible for operations in the cities.

Analysis

I open coded (Charmaz 2006; Saldaña 2009) the first sixteen interviews and the first half of my fieldnotes. I focused on coding the reasons that people gave for collaboration, instances in which coordination plans were discussed, and the justifications people gave for giving orders—making direct requests that a particular person perform a particular task. I then iteratively grouped the items while relating them to their original contexts until clear categories emerged. During this process, the notion of *ownership* emerged as a central category. I recoded the first half of the data to identify all mentions and uses of the idea of ownership, again iteratively grouping instances until clear categories emerged. I then recoded the full data set using these new categories. No additional categories were apparent during this stage, indicating theoretical saturation (Charmaz 2006).

Structural Context

The Official Structure of GuestInn

The City Teams, which manage GuestInn's real estate units, constitute the organization's production *line* (Dalton 1959; Stinchcombe 1959). Each City Team is led by a General Manager (GM) with the employees arranged hierarchically in a standard tree-like structure. HQ houses the *staff* departments listed above, which provide services to company as a whole, particularly focused on improving the efficiency and coordination of *line* activities. Each staff department is headed by a single Head of Department (HOD), with one to twelve direct reports. Two departments added a layer of middle-management during my tenure. Most, however, were continuing to grow while maintaining flat structures internally. Cross-functional work, while common, tended to be structured on an *ad hoc* basis; there was no formalized matrix system at GuestInn.

The line, on the other hand, was highly bureaucratized by the time I conducted my fieldwork: organization structures, roles, and routines were both well-defined and relatively consistent across cities (with some variation due to market size). Line work had, however, been just as *ad hoc* in GuestInn's earlier days. The longitudinal focus of the data-driven interview protocol allowed me to focus interviews with line managers on early periods of time when the production process was still being invented and established roles and routines were not available.

All employees at GuestInn had an official manager recorded in the company's HR system, but the only official role played by all managers was that they approved vacation time of nominal subordinates. When I was at GuestInn, there was no official review policy nor official policy for raises or bonuses. Promotions, raises, and firings did occur. However, they were handled on *ad hoc* bases.

Managerial positions in both the line and staff included a "generous stock option plan" in their official compensation descriptions. Non-manager employees, however, were only granted stock if they were in an HQ staff department; line positions below manager were not offered stock. In HQ and managerial roles, compensation is tilted towards stock.

This produces selection effects towards individuals willing to accept lower guaranteed cash payments for the possibility of a much higher potential upside. Indeed, many informants described "wanting to be an in entrepreneurial company" as part of their motivation for joining GuestInn. Stock compensation also serves to materially align individual incentives to organizational outcomes by distributing the organization's risk among managerial and staff employees (Neff 2012). This incentive structure was reinforced by a normative emphasis on GuestInn being a "company of entrepreneurs." The prototypical employee (Kunda 1992; Hogg and Terry 2000) was expected to proactively seek out opportunities rather than wait for direction to do so, a sentiment that resonated with the Silicon Valley start up environment in which HQ was hiring employees. Many employees took this to heart in their approach to their job, as Edgar describes, " 'I'm just going to go out and get this,' that's how I ended up in the role that I was in. I actually am completely under qualified for the role, but it was very much a matter of, well, one of our core values is, 'we are entrepreneurs.' "

Complexity, Learning, and Ambiguous Role Structures

> The challenges we're facing in scaling GuestInn are quite complex. Not only is this due to our product being operationally difficult to deliver but also to the fact that (1) we're growing so quickly (2) the market we're in is growing so quickly (3) things change very often and (4) we have a distributed team, working in multiple offices and time zones.

- 'How We Work' internal guide to coordination at GuestInn, December 2017

Work at GuestInn was highly interdependent (Thompson 1967) within the formally-defined structure. For example, the underwriting algorithm I worked on had parameters set by the head of finance, the executive team, the head of growth, and the head of real estate. It was used daily by real estate team members. It was maintained by a data scientist. The reports and analyses it generated were used by the finance team, the executive team, and the business intelligence team. Moreover, its functionality required it to interface with software or data built and maintained by each of the growth team, the engineering team, the finance team, other parts of the data science team, and two different external organizations. This was not an uncharacteristic level of interdependence: multiple staff teams were involved in supporting even the most routinized of line operations. The contours of this complexity were often unknown as particular pieces of work were undertaken, necessitating iterative learning as new interdependencies were discovered. When an interdependency between two teams was identified—such as the tension between the growth team's goal to maximize new unit acquisition and the design team's goal to only acquire units consistent with a city's style—the lack of formalized role structures meant that decisions were often negotiated *ad hoc*.

The number of full-time employees at GuestInn roughly doubled each year; at any point in time more than half of the employees had less than a year of tenure. Some of this growth was due to expanding operations in existing cities and adding new cities, but the number of employees working in HQ also grew rapidly, doubling during the four months of observation. GuestInn was a startup in the sense that they regularly (roughly annually) took on venture funding. Rapid growth and the cyclicality of the fund-raising cycle contributed to constant change in GuestInn's official structure,

laying bare the analytic artifice of the distinction between formal and informal (McEvily et al. 2014) that seems natural when organizational structures and practices are more calcified.

In some ways, this constant change meant that GuestInn shared key features with temporary organizations such as movie crews (Bechky 2006). Few tasks were routinized or even documented, especially within the staff departments. Many tasks were new or even one-off, meaning that there was no institutional memory to draw on.

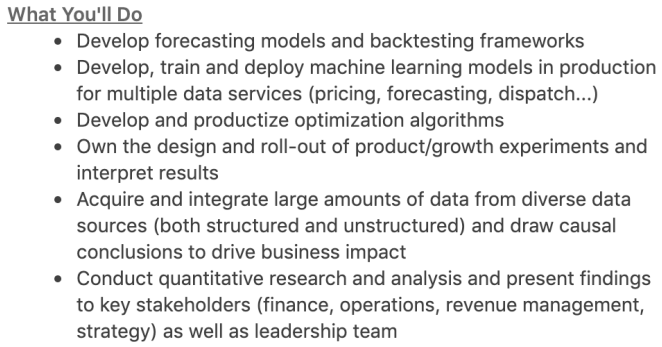
Unlike movie sets, however, the occupational roles and their interrelation were not nearly as institutionalized at GuestInn. People working on film sets had worked on numerous films before (Bechky 2006), but no one at GuestInn had ever worked at a company trying to replace hotels with a distributed physical footprint. GuestInn worked in a continual state of exploration (March 1991)—seeking new modes of production and relationships to their market that would prove profitable. As such, employees at GuestInn were discovering and inventing the roles and relations that are necessary to build an organization of this kind.

Many positions at GuestInn reflected the newness of the production process in which GuestInn engaged. Although people had experience in relevant communities of practice (Bowker and Star 1999) or occupational communities (Van Maanen and Barley 1984; Bechky 2003b), they were often engaged in work that was rare or novel to those communities. Prior experience in an occupation did not, therefore, necessarily guide how such novel work should be done. As the head of Design remarked in an interview, it was often easier to hire a person with little work experience because training was "easier that un-training practices learned elsewhere."

Other departments involved communities of practice with nascent and developing identities, such as the Data Science department in which I worked. Even in departments engaged in relatively standard work from fairly established communities

of practice, such as software engineering and finance, individuals were not always able to relay on established role *relations* to other communities because shifts in production practices frequently generated combinations that people had not experienced before. For instance, when the business intelligence team decided to create an internal dashboard linked to a database I managed, I suddenly had to learn how to coordinate with an entirely new set of roles.

The instability of roles and role relations at GuestInn set three key pieces of context for coordination. First, it meant that the division of labor on many tasks was not clear *ex ante* and thus open to negotiation between parties with the relevant skill sets. Roles were defined in very broad and vague terms. For example, Figure 3 shows the list of "responsibilities" in the job description used to hire my replacement. This list accounts for multiple full-time jobs. Like most roles at GuestInn, it was defined in terms of the broadest possible scope, rather than particular obligations.



What You'll Do

- Develop forecasting models and backtesting frameworks
- Develop, train and deploy machine learning models in production for multiple data services (pricing, forecasting, dispatch...)
- Develop and productize optimization algorithms
- Own the design and roll-out of product/growth experiments and interpret results
- Acquire and integrate large amounts of data from diverse data sources (both structured and unstructured) and draw causal conclusions to drive business impact
- Conduct quantitative research and analysis and present findings to key stakeholders (finance, operations, revenue management, strategy) as well as leadership team

Figure 3: List of responsibilities from an official job posting for a role equivalent to mine at GuestInn.

Second, because a person's *obligations* were not determinable *ex ante*, the "authority required for the discharge of these duties" (Weber 1978, 196) also could not be distributed ahead of time to persons or positions. Delegation, as I will show below, was a much more fluid affair at GuestInn.

Third, without clearly defined occupational hierarchies to rely on, even *ex post*

verification of performance was difficult. When many of one's tasks are new, it is unlikely that one's manager will have the necessary knowledge and experience to evaluate the decisions one makes while doing them.

Finally, role instability and task novelty meant that the boundaries between departments, skill sets, and occupations were often blurred at GuestInn. Upper managers and executives repeatedly stated their expectation that individuals would not allow occupational boundaries to constrain the actions they took to get work done.

GuestInn seemed to operate under four of the five elements that Weick (1993) proposes constitute a recipe for disorganization: people in unfamiliar roles, with some key roles unfilled, ambiguous tasks, and no credible role system to fall back on. However, things never spiraled in to the "monstrous" collapse of sensemaking that Weick describes. How then did people at GuestInn retain their ability to coordinate regularly while operating with ambiguous role systems on ambiguous tasks? A key piece of it was an institution known locally as "ownership."

Ownership

Commitment and Normative Control

As Ravi's statement at the beginning of this paper indicates, there was a pervasive belief at GuestInn that their uncertain and changing environment and corporate strategy meant that they were unlikely to "get the structure right," and so sought to empower and encourage employees to discover and execute on "what needs to get done." "Ownership" was the institution of normative control through which they tried to achieve this.

The ostensive (Feldman and Pentland 2003) local meaning of ownership at GuestInn

was based on the Objectives and Key Results (OKR) framework.[8] As GuestInn's "How We Work" internal document introduces it, "OKRs (Objectives and Key Results) originally started at Intel with Andy Grove and have since been popularized by Google." The idea is that each organizational objective is broken down into sub-objectives until it can be expressed as set of Key Results (KR), each of which is (a) measurable and (b) small enough for the associated work to be performed by a single person. "Ownership" in the official sense was the relationship between an individual and a KR. Per its official definition:

> Ownership - Every KR in the company should be assigned to only one person, not a team or multiple people. This ensures there is true ownership and accountability on the outcome. Remember that true ownership means owning all of your dependencies.

People were said to "own" a wide range of work entities: software systems (e.g., the customer rental portal); software features (subsets of systems); databases (e.g., the rental history database); models and algorithms; routines (e.g., the month-end close of the financial books); task streams / parts of a routine; external communications (e.g., online listings); integrations with outside entities (e.g., external data streams); relationships with outside entities (e.g., customer dispute resolutions); projects / initiatives; even cities or regions.

Coupled with the literal "ownership" they have through the company stock plan, "owning" work entities was seen by executives as a way to foster commitment from employees to, as Ravi stated, "go above and beyond." Despite not involving literal ownership of organizational assets, it was thought that employees would view themselves as entrepreneurs instead of mere employees. If people feel that they "own" the work they are doing—that is, have the autonomy to make key decisions related to

[8] https://en.wikipedia.org/wiki/OKR (accessed 07-02-2019)

it and get the credit if it is done well—the thinking is that then they will be better workers. Not just that they will work harder, but because they are empowered to make decisions, they will be more likely to act on critical information they have about the organization's environment.

Ownership as Performed

> Interviewer: What does that mean, "ownership?" Anne: It goes beyond the day to day, or that one request, looking at the bigger picture, and looking at everyone who is impacted by the way we do things and really factoring that in.

As performed (Feldman and Pentland 2003), the sense of ownership as simultaneously "accountable for" and "identified with" was decoupled from its ostensive basis in the OKR framework. The *ad hoc* and exploratory nature of work meant that KRs were rarely defined in practice; the rate of change meant that the KRs that were defined rapidly obsolesced. Decoupled from the practice of KRs, ownership took on a much more general and flexible meaning and thereby played a critical part in coordinating work at GuestInn.

Ownership at GuestInn was treated as *a set of rights and obligations associated with a particular work process, outcome, or system* (collectively, "work entities"). Someone who "owned" something that is deemed important to the success of the company had the *right* to make claims on others for necessary assistance related to the owned entity. The owner pledged to take *responsibility* for a given work entity, taking the organization's interest as his or her own (Heimer and Staffen 1998). In return, the organization pledged to support owners with resources needed to exercise their discretion to fulfill their obligations and to credit owners with the success of their owned entities.

Crucially, ownership was also treated as the *obligation* to address any problems or issues which arise related to it. It effectively granted a *generalized authority right* for coworkers to make claims on the time of the owner. This is the meaning of the cryptic phrase "owning all of your dependencies" in the OKR definition of ownership: if someone owns something that depends on something you own, that person has a right to make a claim on your time if necessary to deliver on their ownership obligations. These generalized authority rights were key to how coordination unfolded in interdependent work at GuestInn: they permitted people to make claims on one another when they discovered interdependencies.

Ownerships spanned a range of sizes. Some owned entities were small fractions of the total work a single individual might be responsible for. For example, I owned the maintenance of a software system which accounted for less than 5% of my work during my last two months at GuestInn. My ownership meant that any co-worker interacting with the software system could invoke their generalized authority rights over my ownership obligations to justify requests to tweak an existing feature or fix an identified bug. I also had the right to request input from relevant users of the software or for resources from the engineering team to help me fulfill my obligations.

At the other extreme, an individual might own a multi-person team, as city General Managers (GMs) were said to own their cities. In this case, GMs had the right to make hiring and firing decisions on their teams as well as ask for support from any number of HQ-based staff member. They bore the obligations to account for quarterly profits in their cities in front of a group of company executives and to respond to the requests of financial staff analysts in HQ, no matter how junior.

Role Fragments Job titles at GuestInn often specified a domain of *potential ownership* within which individuals negotiated (Simon 1947; Cyert and March 1963; Strauss 1978; Valentine 2017) the specific work entities that they would own. For

instance, as a Data Scientist, I was eligible to own anything related to data (with the exception of some financial records). Software engineers could similarly own specific features within the company's software, entire stand-alone pieces of software, or even all code in any system deployed in a particular programming language. One's expertise loosely defined a potential domain of what one could own, rather than the actual content. Ownership was not limited to the engineering sides of the organization: financial analysts owned particular reports or reconciliation processes, for example.

This proscription was very weak at GuestInn; ownership was expected to transcend occupational or departmental boundaries. The obligation was that the work would get done by an owner even if it meant engaging in activities beyond the scope of his or her area of expertise. For example, as a data scientist, I was expected to regularly engage in software engineering, business research, and understanding the company's financial models. I was encouraged to reach out to experts in these other occupational communities for advice and guidance, but the expectation was that I would either do the work myself or make formal claims on another group's resources if I could not.

Individual work was constructed (and regularly reconstructed) by piecing together enough owned work to form a full-time set of obligations. The resulting collages of work were frequently referenced in interviews as "wearing many hats." In this sense, owned work entities constituted *role fragments*, rather than fully-specified roles.

Ownership differs from more traditional task delegation (Aghion and Tirole 1997) in that formally-assigned ownership was the exception rather than the rule. Role content was determined not by fiat from managers but through an ongoing process of renegotiating ownership obligations (Valentine and Edmondson 2014; Simon 1947; Strauss 1978). A frequent refrain during planning meetings was "who is going to own this?"

During my first six weeks working at GuestInn, the most frequent questions directed to me were of the form "what would you like to own?" or "would you like to own this?" These questions came from a wide array of coworkers: my nominal manager, my data science peers, and members of other teams. While my official manager encouraged me to "find bigger things to own," he did not direct me to own anything in particular. I saw a similar pattern of non-fiat in all team planning meetings I witnessed. When a new piece of work was identified during a meeting, the people involved in that meeting would discuss and decide who should own it. Common arguments for someone owning a particular piece of work were prior experience, relative time availability, relevant prior professional experience, and relative skills.

For new senior hires, ownership negotiations often occurred *during the interview process*. Colin, the head of the growth support team, told me how the co-founders had asked him to propose a software solution to a problem and then hired him with the understanding that he owned building out that system. Similarly, the head of business intelligence, Neeraj, owned the creation of the reporting dashboard he had proposed during his interviews. The ability to engage in successful ownership negotiation was a de facto interview criterion for many senior hires.

Ownership allowed for a more flexible and fluid definition of roles within the organization. Critically, it facilitated quantitative flexibility in both the number of work objects eligible for ownership and the number of employees available to own them. This flexibility was key to reshuffling people in the processes of discovering new goals or work products and abandoning old ones. Furthermore, with membership roughly doubling every year, a collection of work entities that might be owned by a single individual one year would often, by the next year, be spread across multiple individuals each of whom owned part of the collection.

Ownership and Interdependencies The importance of ownership at GuestInn went beyond the flexible discovery and definition of individual commitments. It also played a key part in how role *relations* were discovered, negotiated, and specified in the process of people's negotiation and interpretation of situations (Strauss 1978; Weick 1995). By specifying rights and obligations and providing a set of identifiable role fragments, ownership was crucial to emergent *coordination* at GuestInn, despite its ostensive focus on committing individuals to particular work.

The identification between individuals and their work extended to how others perceived a focal individual and the work he or she owned. It was very common to refer to particular work entities using the possessive: "the scraper [a piece of data collection software], that's Anthony's." This identification served as an addressing system—the map from work entities to individuals—for identifying and untangling interdependencies as they were discovered. It also permitted a wider scope of coordination without requiring the coordinated individual to understand one another's work deeply. It allowed domain-specific knowledge and objects to be visible and legible to other domains rather than requiring complete translation (Kellogg et al. 2006).

For instance, in my time at GuestInn, I owned the underwriting algorithms that fed predictions into the Growth team's real estate assessment tool. Despite the tight coupling between my work and their system, I was unable to achieve even a partial mental map of the system that used my algorithm's outputs. Rather, I knew that Colin, the head of Growth and the owner of that system (though not, interestingly, its builder), could immediately answer any technical question regarding my interdependencies with their system, direct me to a relevant teammate, or point me to part of the code where I could make my changes directly.

In the process of discussing the piece of work in question, we would discover and

specify the role relation between our two pieces of ownership as a by-product of discussing the relationship between the work objects. In the example with Colin and the Growth team, whether Colin directly answered my questions or directed me to a team member or system shaped the role relation by which we would navigate that particular interdependency: maintaining my dependence on him, shifting that dependence to the relevant teammate, or removing it entirely, respectively. In this way, the ownership mapping of individuals to work entities served as a preliminary mapping system for navigating interdependencies.

Generalized Authority Rights Importantly, this mapping also described the distribution of authority rights at GuestInn. On the one hand, a particular person owning a particular work entity gave that person the right to make formal requests of coworkers' time and organizational resources. For example, I asked Irene why there was increase in the number of orders she was giving to a nominal superordinate, Carl, in TaskFlow during one period on the interview dashboard. She explained that she owned property operations in a particular city at that time: "the biggest challenge there was that a lot of the properties were very old and needed a lot of work. I was assigning Carl a ton of stuff to fix up those units."

On the other hand, owning something obligated the owner to acquiesce to requests made by coworkers when they discovered (or the environment created) an interdependency with the owned entity. The obligations of particular negotiated role relations often *generalized* beyond the parties involved in a negotiation. The terms of ownership established in one negotiation were often invoked by others to justify subsequent requests. For example, Akram, a member of the Business Intelligence team, and I agreed that I would own the data coming from an external vendor which we both used in analyses. When Julien discovered that one of his projects had a dependency on the same data, he directly made claims on my time on the basis of

this ownership.

These *generalized authority rights* were particularly important in facilitating coordination in parts of the organization where more formal means—routines and the official hierarchy of authority—were undefined. I coded the justification given in all instances of order-giving that I observed in my fieldnotes and all discussions of order-giving during interviews. Overall, roughly equal numbers of orders were justified by ownership rights or obligations as were based in the formal hierarchy. However, in the two flattest and most informal departments—data science and engineering—ownership was the basis of authority for 42% *more* orders than traditional bases of authority. The reliance on ownership as a basis of authority was even more pronounced in coordination *between* departments. More than half of all cross-department order-giving was based in ownership, nearly double the amount of orders based in either the formal hierarchy or particular routines.

Negotiating Provisional Role Relations

When ownership was defined, these generalized authority rights were often sufficient to address any interdependency. Often, however, tracing a dependency via ownership would direct someone to the correct coworker but more in-depth negotiations were required to resolve an interdependency.

When I took over ownership of the underwriting algorithm, I was able to make changes but unable to implement my updated code in the system used by the company's real estate agents. I asked the Chief Technology Officer (CTO) about this in passing and he responded, "oh, Robert [a senior software engineer] owns that!" I reached out to Robert, who told me that he didn't have enough time to help me right now. But when I mentioned that the CTO had directed me to him, he set up a meeting for the following day to discuss the matter. When we met, he told me, "I am

so slammed right now, and there really has not been any work on this since Anthony [the algorithm's previous owner] left. I'd rather offload this to you entirely so you don't have to coordinate with me every time you make a change." We discussed a number of forms this could take, given the structure of the various subsystems, my skills and experience, and Robert's availability. We settled on a plan where he would grant me access to the relevant administrative systems, give me an hour of training on the subsystem he owned, and be available for questions over the subsequent weeks if I would take combined ownership of the algorithm and the software subsystem that presented it to users.

Throughout our conversation, we spoke in terms of ownership, in terms of the obligations we were willing to enter into with one another to resolve our interdependency, and in terms of the rights—such as my right to make claims on his time with questions—we would grant one another. What began as a *provisional role relation* negotiated between Robert and Anthony in which each owned a separate subsystem, was transformed through negotiation into a new, also provisional, relation between Robert and me in which I owned both algorithm and subsystem and Robert would act as mentor. That Robert changed from brushing off my request to giving me his time when I mentioned the CTO speaks to the important (though indirect) part played by the formal hierarchy in negotiating role relations at GuestInn. We were able to negotiate without appealing up to our lowest-rank common superordinate (the CEO), but it was the *shadow* of hierarchy (analagous to the shadow of law in Ellickson (1991)) that ultimately brought Robert to the table.

Some negotiated local orders could be much more complex, but were still discussed in terms of ownership. Julien and I jointly owned the design of a new database on which all of GuestInn's internal analyses could be based. This database would draw from every digital system that the company operated and be available for use to every

department in the organization. The initial stage of our design involved identifying these interdependencies by engaging in conversations with the owners of each of the digital systems and with the Business Intelligence team, who acted as representatives of internal database users. Through hours of meetings, we determined what obligations of the database owners would have–i.e., what rights others could expect to have over them–and what rights the database owners could exercise on others' subsystems' owners in terms of data access, reliability, and guidance in interpretation.

Such negotiations were hardly limited to software systems and were often much less formal. Randall, for instance, told me about how his role changed when he hired a new coworker, "I started really focusing on dealing with the city, regulations, and more strategic things with the city while he went out to close deals. He just became more of the hands on day to day sales person and I became more of a strategic city manager at that point."

Phrases like "just became," or as Edgar phrased it in the opening quote of this paper, "it seemed quite organic," were common in retrospective accounts of role-relation negotiations. Once people settled into a negotiated role relation, it frequently seemed like a natural arrangement. My own role as participant as well as the longitudinal interview protocol's focus on moments of change helped to bring to light the non-inevitability and negotiated nature of role relations at GuestInn.

Often, negotiations facilitated the exploration of new role relations that would be replicated elsewhere in the company if proven successful. Cara, for example, described the rapid growth in the city she managed necessitating splitting the ownership of onboarding [preparing a new apartment for rental] and maintaining units:

> We had onboarding agents. We were the first city to need people who are solely responsible for onboarding. And now that's common practice to have kind of onboarding-specific agents. But that wasn't really

> established. We sort of had to map out what, there were no rules. It was like "Okay, no other city is doing this, but it makes sense to have people that are dedicated to onboarding as opposed to guest ops and sort of make that division." I don't think, when I was hired, that was envisioned.

Hiring decisions also offered the opportunity to negotiate role relations. On the data science team, when considering potential employees after interviewing them, we would discuss how the role structure would change given a particular candidate's skill set as compared to current members of the team. Our decisions depended in part on which role structures current team members found most appealing. For example, Julien objected to hiring a highly-experienced statistician in favor of a less experienced generalist data analyst because Julien's role would involve coordination with the statistician candidate but not with the less-experienced generalist.

Shared Understanding, Trust, and Accountability

Ownership at GuestInn facilitated lateral coordination between people without detailed development of shared understanding of one another's work. However, it did so in the absence of well-developed boundary objects or role relations to manage the coordination. When Akram confirmed that I was now the owner of an historic pricing database—"Hey, Clark. Just spoke w/ Edgar. Sounds like you're gonna own working on the [pricing database]"—he was confirming that he no longer needed to worry about the integrity or interpretation of the database. From that conversation forward, he simply requested that I build particular queries he needed rather than figuring out how to build them himself. In general, asking "who owns this" was a question about whether the asker needed to invest in personally understanding "this."

Framing the discussion in terms of ownership offered a rough approximation that was sufficient for most negotiated role relations. "I will own X and you will own Y," was

the level of depth of most agreements. Both parties trusted that any necessary details would be worked out over time. As McEvily et al. (2003) define it, "trust as a heuristic is a frame of reference that allows actors to conserve cognitive resources... by simplifying the acquisition and interpretation of information." The more someone trusts a coworker, the less he or she needs to understand completely the work that the coworker does. If someone can trust that their coworkers will "go above and beyond" to do what needs to be done—trust that they are good employees as defined by the terms of normative control—then coordination can occur with less understanding of the specifics of the other person's work. As with Akram above, it's enough to know that it is owned.

This role of normative control can best be seen by looking at how ownership was enforced at GuestInn. The most common method of enforcing a claim based on the rights or obligations of ownership involved copying an official superior of the request recipient to a request. Usually, no intervention from the superior occurred: merely evoking the specter of official hierarchy by including a superordinate on a request was enough to ensure compliance. Repeated failures to comply with ownership-based requests carried fairly extreme sanctions, which the official superior would be responsible for enforcing. I was told several stories of prior employees—stories often provoked by the drop of a line on the interview dashboard to zero communications—who had failed to deliver or felt overwhelmed by the responsibility inherent in their negotiated ownership obligations.

Failure of coworkers to respect a person's ownership rights carried the risk of being seen as unreasonable, obstructive, or evidence of not being a team player, all three of which were reasons cited for some prior employees being fired or choosing to leave. As Natasha, a five-year employee, explained, concerns about job security also motivated a willingness to continually renegotiate obligations: "there was a lot of fear of job

security at the beginning. I don't really have that fear anymore, you can prove that you're flexible." And upper management saw one of their roles as using their control of membership rights to "protect the culture of ownership," as Ravi the VP of engineering described,

> As soon as you get somebody who says, 'hey we need to define roles,' and then any time that something is outside that role, they say, 'I don't know that stuff, it's not my problem.' As soon as you have things like that, you will build a culture where everyone is just covering their ass."

The formal hierarchy did not adjudicate every breach of the ownership relationship (Williamson 2002); it was ordinarily not so much appealed to as *invoked*. And negotiated provisional role relations were not merely *relational contracts* (Baker et al. 2002; Gibbons and Henderson 2012), enforced by the parties' shared concern for continuing the particular relationship. Rather, the *shadow of the hierarchy*—an implicit threat over the employment contract—infused each negotiation with a concern for the future that each party might not have had (or believed the other had). This was much like the "shadow of the law" in which California ranchers negotiate local orders to handle frictions arising in their communities (Ellickson 1991). The accountability, and presumption of accountability in the counterparty, necessary for successful coordination (Bechky and Chung 2018) relied upon this shadow. And people's ability to negotiate *lateral* coordination without deep shared understanding was facilitated by the shadow cast by *vertical* membership rights over the negotiations, without directly involving nominal superordinates.

Undesirable Work

The fate of undesirable work at GuestInn illustrates how ownership worked and failed. A large amount of "dirty" work—from cleaning the offices to cleaning and making the

beds in rental units—was outsourced to contracting agencies. In fact, a lot of organizational design effort went into identifying and routinizing the most undesirable work so that it could be outsourced or staffed with unskilled labor. For example, many long-time employees recounted handling customer phone calls during their early days at GuestInn. By the time I joined, however, GuestInn had built out a call center in a lower-cost city. As William, the head of the call center described, "paying literally hundreds of thousands of dollars for people to [take calls] and enter data in San Francisco is not a tenable solution." The call center's physical separation from HQ was not just a matter of labor costs though. Even before it was moved, these highly routinized employees were physically separated from the parts of the company where ownership was important. As William described, having them "literally on the same floor as HQ was an abject nightmare. I told [the co-founder], 'this thing can not stay here. I don't care if we move to the [suburban area near HQ]. It can not stay here.' "

Of course, not all undesirable work could be de-skilled and outsourced. Some groups, such as the engineering team, would use ceremonies, like a dedicated weekend of bug-fixing, to address large amounts of undesirable work as a group. Regular team meetings, such as Engineering's "Friday Throwdowns" or Real Estate's Daily Standup, also provided a space to draw attention to undesirable work. During these meetings, undesirable work would be mentioned by peers who noticed it and the relevant owner would be encouraged (or teased) to prioritize it. Work with no obvious owner was often discussed in terms of *proximity* to a current owner. "Clark, you're closest to that, why don't you take a look," Edgar remarked during one planning meeting, indicating that a task was similar to work I already owned. And, of course, the generalized authority rights of ownership meant that anyone could prod a nominal peer into doing undesirable work at any time, as when Julien, a fellow data scientist, invoked my ownership of the seasonality algorithm when he assigned me a task in TaskFlow: "Write README for seasonality repo :)." The smile indicated the

teasing nature with which this enforcement of ownership obligations often unfolded, masking the exercise of authority with humor.

One form of undesirable work frequently went underrepresented, however: owning the obsolete or soon to be obsolete. There were more potential reputational rewards in building the next generation solution to a problem than in maintaining current processes. Rowan explained how he continues to pursue what he calls "startup opportunities" in order "to be in a position where I get to have that type of influence, that type of freedom. I mean, with ambiguity comes freedom. I seek it out." Many of the people who lauded the entrepreneurial culture of GuestInn voiced such a pursuit of new ownership opportunities.

In the cases where no one continued maintenance of old systems, delays in new systems could prove disastrous. I saw lots of evidence of *uninhabited work* (Hallett and Ventresca 2006): work entities that had once been owned but were no longer. With no person at whom to direct a request, uninhabited work could stall the efforts of interdependent coworkers. When I arrived, a critical piece of data acquisition software had been not working for several months and had left the pricing team with outdated models. As a teammate mentioned when I took ownership of this software, "thankfully Clark is now taking this on, because this is the state it gets in when no-one really owns it."

Fortunately, there were often people willing to accept lower reputational rewards in order to keep old systems working while new ones were developed. Natasha lamented how a major procurement system was causing havoc in her tracking expenditures, "I think there was this idea of, 'We'll come in with like a fresh eye, reinvent it from scratch,' and I think that will work when we have a new system totally set up, but the problem is there's been no clear directive in the meantime: do we keep doing the old system?" While two teams worked to build out the new system, she focused on

maintaining the existing processes, "I keep offering them, 'I don't need to make the decision. I don't need any of the glory, but just send me the invoices.' " In Natasha's case, as in several others I witnessed, the person who devoted themselves to maintaining existing processes was rarely, if ever, rewarded with as much praise as people who work on developing new systems.

Other Limitations of Ownership

Ownership at GuestInn had other problems beyond uninhabited undesirable work. Burns and Stalker (1961) point out two key difficulties of the sort of ambiguity ownership is based in: "nervous preoccupation with hazards of social navigation... and with the relative validity of their own claims to authority" (p. 93). Nervous preoccupation was, indeed, common at GuestInn. A downside of delivering on ownership-based requests and provisional role relations was *there were very few positive signals of acceptable levels of performance.* The company's resident interpersonal coach[9] told me that the most common complaint expressed to her by employees was "a lack of clear feedback as to whether they are doing a good enough job." Anxiety around a lack of feedback has also been observed in other post-bureaucratic organizations (e.g., Turco 2016; Kunda 1992). Living with the threat of punishment if vague relational contracts are not upheld while getting little indication of whether one is performing "above and beyond" takes its psychological toll.

People also frequently second-guessed the validity of their authority claims. Burns and Stalker (1961) argue that effective work in organic organizing requires that nothing inhibit people asking for additional effort from others. In terms of the

[9]Like other "undesirable" work, GuestInn outsources some of the emotional labor of managing. A part-time executive/interpersonal coach, the only person at GuestInn with a dedicated office, worked with executives and middle managers to develop personal growth plans and voice and address their concerns.

foregoing analysis, this would mean nothing inhibiting people exercising generalized authority rights to make requests of owners. Yet, people at GuestInn often expressed hesitation to make direct requests, engaging in a form of forbearance where they would ask indirectly for the help they needed without directly exercising ownership rights. Even in an official managerial capacity, people were hesitant to make direct requests of former peers. When asked why he started giving orders to two of his direct reports, but not the third (as indicated by the divergence of three lines on the interview dashboard), Edgar explained "I'm not as comfortable leading him, because he wasn't hired by me. Anton and Ying, they always reported to me, but Elliot was different, you know?" Working with TaskFlow data from 2500 organizations like GuestInn, Bernier (2019a) shows that this behavior is not uncommon: people tend not to exercise authority rights directly unless their coworkers are already defering to them. To the extent that patterns of informal deference shape who is willing to exercise distributed authority rights, greater differences in interpersonal status (Ridgeway 2011) may undermine the functioning of distributed authority systems like ownership.

Conclusion

The provisional role relations regularly negotiated at GuestInn under the "ownership" system are much more flexible than the generalized role relations that are relied on in temporary organizations engaged in more routine production (Bechky 2006) or organizations whose formal structure defines role relations clearly (Bechky and Chung 2018). They also offer more enduring structures, in the form of provisional role relations, than organizing relying on trust (Meyerson et al. 1996) alone. Once ownership is negotiated, they generate a system of generalized authority rights, backed by the same implicit threats that maintain normative control through the

institution of *ownership*. Furthermore, because the parties affected by the interdependence are the ones negotiating, they can factor local, specific knowledge into role relations more than centrally-designed organizational structures could.

Despite its drawbacks, the combination of ownership and provisional role relations seemed to provide people at GuestInn a framework in which to experiment and explore new possibilities in their environment and within the organization. While quantifying the extent of this practice beyond GuestInn is beyond the scope of the present study, the concept never seemed foreign to new employees joining GuestInn or during interviews with prospective employees. I have also encountered the language of "ownership" being used in a taken-for-granted fashion in formal interviews conducted with employees of Google, Uber, Pinterest, AirBnb, TaskFlowCo, and in informal interviews with employees of dozens of other Bay Area and New York organizations. The OKR framework, which GuestInn executives credit as the origin of the local sense of "ownership," returns more than 17 million search results on Google search.[10] However, the degree of variation in this institution of normative control across organizations and whether it supports negotiated provisional role relations in the same way as I observed at GuestInn remains an open question. Despite this limitation of scope, the present study does offer three specific contributions to theoretical understandings of coordination in organizations like GuestInn.

Normative Control and Lateral Coordination At GuestInn, ownership was introduced and maintained by executives because it was thought to increase employee commitment, driving them to "go above and beyond." It was a institution of normative control, defining the *vertical* relationship between the organization and the employee. But it was key to how *lateral* coordination was navigated and negotiated.

While not every organization that motivates employee commitment through

[10]https://www.google.com/search?q=okr, accessed December 20, 2019.

organizational culture uses the institution of ownership, lateral coordination necessarily relies on the vertical aspects of normative control and especially the centrally-held membership rights that underwrite it. Heckscher (1994) argues that IBM's protoypical "IBMer" and notion that IBM was "one big family" served precisely this function for IBM. As a massive bureaucracy operating in complex environments, individuals at IBM frequently collaborated with coworkers from different departments or divisions. Cross-functional coordination could not rely on the formal bureaucracy, but could be negotiated in terms of "whether it was good for the family," with trust based on the assumption that others would be "good IBMers." Similarly, in the TechCo that Turco (2016) studied, the normative control maxim, "use good judgment," formed a background for how decisions were negotiated across departments. This is a side of normative control systems that has been overlooked in prior work focused on its role in shaping the vertical relationship between organization and member. As a shared definition of the situation, and in the absence of well-defined role relations, normative control prototypes and maxims also become the basis for lateral coordinative practices.

Distributed / Generalized Authority Rights The foregoing analysis makes clear that, despite the centralization of membership rights, task authority rights were widely distributed in non-routine work at GuestInn. This marks a departure from how authority rights are usually conceptualized. The rights to make requests of coworkers at GuestInn were not tied to official position to enable the "discharge of [the position's] duties" (Weber 1978, 196). Nor were they embedded in the hierarchy of seniority of particular occupational communities (Stinchcombe 1959; Bechky 2006; Van Maanen and Barley 1984). Rather, the obligations of ownership offered *generalized* rights, rights that could (nominally at least) be exercised by anyone who depended on the owned work entity, regardless of their official rank or position. This

system of generalized authority rights approximates organizational forms described by past authors as facilitating organizational innovation (Burns and Stalker 1961; Kanter 1984), where individuals are empowered to explore and act on interdependencies in their work.

Conclusion

This paper reveals the important interplay between the *vertical* relationship between the organization and individuals and its role in the negotiation of *lateral* relationships of coordination between those individuals. In the case of GuestInn, intentionally-vague role relations were negotiated using the same institution that upper management intended for normative control—*ownership*—lending the former the accountability mechanisms of the latter. Confronted with a task neither had done before, two people who had not previously worked together, could confidently and productively begin their conversation, "so, who is going to own this piece?"

Chapter 2: Hierarchies in Motion: Towards a Dynamic Account of Status Change

Abstract

Theories of status hierarchy dynamics generally build on models of status hierarchy emergence, tracing which status behaviors lead to status differences. However, these models are not consistent with findings showing that status hierarchies constrain the status behaviors of their constituent members and that some status behaviors can actually limit status gain. In this paper, I develop a dynamic processual account, based on laboratory-demonstrated mechanisms, of how individuals' status changes when their pattern of one type of status behavior—giving orders to coworkers—changes. I use continuously-collected, interactional measures of communication, advice-seeking, and order giving among 41,000 individuals in 2,400 teams and small organizations over multiple years, contextualized and deepened by four months of participant observation and 39 interviews. The findings indicate that (a) relative status more strongly constrains some status behaviors than those status behaviors shape relative status and (b) counter to theories of status hierarchy emergence, the status behavior of giving orders does not increase but rather stabilizes individuals' status.

Introduction

> *Akram*: I was starting to take the lead on some of this stuff. I created some tasks, assigned some to Rebecca. And she messaged me, "you're not my boss, don't give me orders!" I'm more cautious with assigning tasks because that scarred me a bit: I don't want to give the impression that I'm bossing someone around.
>
> *Akram, explaining his giving orders several months after the conflict with Rebecca*: It was pretty organic, among the people on the team I definitely understood what needed to get done, so I took ownership of the process. I just gave orders to whomever needed to do something.

People who give orders in teams and organizations have empirically higher status than those who do not; alters direct more deference to leaders than they do to

non-leaders and people who receive more deference are more able to issue legitimate orders (Zelditch 2001). Even order givers, however, usually begin their careers as order-takers; like Akram, they go from unable to give orders to regularly directing others' work. How does their status change when they switch from not giving orders to giving them? Is it only those with long-established higher status that are able to give orders, does the act of giving orders further increase individuals' status, or are status and order giving only linked indirectly through the formal bureaucracy? Do simple mechanisms, well-established in laboratory research, linking status and order giving account for such changes, or is a richer dynamic model necessary? How do people like Akram become comfortable with giving orders, and how does this interact with their status in the eyes of other group members? And what does this process tell us about how status changes more generally?

The present study pursues an unorthodox strategy to answer these questions and develop a dynamic account of how such changes unfold—an account that has proven elusive in prior work (Sauder et al. 2012). First, it establishes the empirical trajectory of how status changes when people first begin to give orders. Second, it identifies the combination of relevant mechanisms established in prior work that can account for this trajectory. Finally, it uses ethnographic methodologies to validate and further develop the proposed combination of mechanisms.

An unorthodox strategy requires unorthodox data. Static, survey-based sociometric measures would be insufficient to explore dynamics; without prior indications of the appropriate timescale, we do not even know the necessary frequency required for longitudinal measures (Ancona et al. 2001). Relying on retrospective self-report of order giving would bias us towards formalized relations which are more easily recollected. Even with high-frequency observation, individuals' transition from not giving orders to giving orders is a rare enough event that one would have to collect

data at many organizations over a long period of time to observe enough transitions. This study uses a dataset which will allow precisely that: observing both relative status and order giving in 2,400 groups of ten or more coworkers over one to three years each, allowing measurement of 4,735 transitions into giving orders. To ground these data and aid in their interpretation, the study also uses ethnographic data collected over four months at one of the largest organizations, complementing the *breadth* of the larger dataset with the *depth* of ethnographic methods.

I find that, contrary to behavioral interchange accounts of status hierarchy *emergence* (Skvoretz et al. 1996; Fişek et al. 1991), individuals' status does not increase once they begin to give orders. Rather, the data show a clear pattern of status increase for up to 20 weeks *before* individuals first regularly give orders. Their status then stabilizes as soon as they begin. Numerous mechanisms demonstrated in social psychological work are consistent with this empirical pattern, but no one mechanism alone can account for it. Rather, I argue that a model of status change must take into account how both audience and ego perceptions shape behavior as well as the interaction between the two.

I propose a process model of the interaction between alters' and ego's perceptions to account for the observed pattern. When shifts in the pattern of work create *opportunities* for focal actors to give orders to a coworker (Aime et al. 2014), it entails a behavior in which these focal actors have not previously engaged. As such, they must assess (Tost 2011) whether their coworkers would view order giving as legitimate (Zelditch 2001), relying on alters' perception of the focal actors' status to guide the assessment (Anderson et al. 2006; Anderson et al. 2012). If they are high status already, they will begin to give orders. If they are lower status, however, they will handle the opportunity by either working harder or being indirect in the requests they make of their coworkers; either way, this *conspicuous forbearance* will increase

coworkers' assessment of a focal actor and hence his or her status over time (Willer et al. 2012). Finally, when focal actors assess that they have sufficient status to legitimately give orders, they will begin to give orders. Their order giving undermines the mechanisms driving status growth (Willer et al. 2012) and their status stabilizes.

This model contributes to a number of conversations in a range of literatures. First, it develops theory linking laboratory constructs of power and power-use to order-giving behaviors in the field, thereby offering a field validation of lab-demonstrated mechanisms linking power and status.

Second, by theorizing order-giving behavior in organizations, the model presented here lays the groundwork for more rigorous theorizing of authority in flat, non-hierarchical, heterarchic (Stark 2006; Girard and Stark 2003), conversational (Turco 2016), or post-bureaucratic (Heckscher 1994) organizational forms that increasingly characterize contemporary workplaces. With increased complexity inducing more collaboration outside formally-defined structures of authority and the proliferation of organizational forms that rely less on formal authority by design, an updated understanding of informal authority is increasingly necessary.

Finally, models of status change have proven elusive in work focused on either status structures emerging from individual actions in groups of strangers (Skvoretz et al. 1996) or the effects of static status structures on individual action (Sauder et al. 2012). The dynamic account developed here shows the importance of focusing on both structure and action—on both ego behavior and alter perceptions—and of exploring the way mechanisms relevant to each group interact with one another and over time. In particular, it shows that accounts focused on status *emergence* may not be good models of change over longer periods of time (Bendersky and Shah 2013). The approach I develop thus acts as a model for studying status dynamics more broadly.

Theoretical Framework

Status

Status—the prestige, respect, or esteem that alters have for a focal individual—shapes the expectations those alters hold for the contribution of that individual in a task-oriented setting (Berger et al. 2014). In a task-oriented setting, individuals try to make decisions about whose perspective or opinion is reasonable to rely on (Ridgeway and Nakagawa 2017) but face constraints on their inference. First, in many situations, it is often unclear who has higher ability than whom. Faced with such uncertainty, people rely on whether others seem to defer or not to a focal individual in making inferences about relative ability (Gould 2002; Lynn et al. 2009). Second, even if an individual feels relatively certain in his or her assessment of an alter, they may still behave as if they share others' indicated status beliefs in situations where the group is highly interdependent (Correll et al. 2017). Regardless of the reasons that people rely on status signals to infer ability, status distorts underlying differences in ability (Gould 2002; Lynn et al. 2009; Manzo and Baldassarri 2015). In doing so, it is a key mechanism in reproducing social inequalities (Ridgeway 2011; Sauder et al. 2012).

Status is often conceptualized either as a position in a static social structure constraining individual behavior (e.g., Anicich et al. 2016) or as a structure emerging from interactions among individuals (e.g., Skvoretz et al. 1996). Work in the latter vein demonstrates that particular status behaviors (Mark 2018)—such as giving orders or interrupting another speaker—leads to a specific ordering of status perceptions in a group of strangers (Askin et al. 2015; Skvoretz et al. 1996).

Theoretical accounts of status change within existing hierarchies, rather than emergence, are rare (Sauder et al. 2012) despite the fact that social life is often

neither static nor emergent. Outside of the controlled conditions of the lab, most groups' environments are in flux *and* their structures enduring. A dynamic account of change must consider both. The present study focuses on one particular instance of status change to develop such an account: the change which accompanies an individual beginning to give their coworkers orders in a team or organization.

Giving Orders

By *giving orders*, I refer to a member of an organization or team publicly telling a coworker to do a particular task. Such an action requests that the target coworker adjust their course of action in deference to either the requesting individual or to the collective goals of the team or organization (Ridgeway and Nakagawa 2017). Order giving, as I use it here, does *not* necessarily reflect the formal hierarchy of the organization. The nature of work in complex organizations often brings together people from different functional areas such that formalized manager-subordinate relationships are not defined or able to guide order-giving behavior (Heckscher 2007; Heckscher and Adler 2006). Furthermore, even when orders have a formal basis, relative status can still shape who is able to give orders without generating conflict (Anicich et al. 2016).

In addition to offering empirical traction on studying status change, order giving is an important organizational behavior in its own right. The shift from only taking orders to having some authority over coworkers is the largest shift in relative authority that individuals will face in their careers (Tannenbaum et al. 1974) and has been implicated as a major factor in the reproduction of class, race, and gender inequalities (Wright 1994; Wright et al. 1995).

Order giving potentially maps onto a number of well-established laboratory constructs. However, the narrow scope of the lab, while providing strong construct

validity, leaves it unclear which established lab mechanisms will be most relevant in organizational contexts (Turner 2006). Publicly telling a coworker what to do may be seen as a form of *social dominance* (Cheng et al. 2013), but does not necessarily induce the fear that dominance usually implies. It also is a form of *power use*, insomuch as the order giver mobilizes some basis of organizational or resource-access power in order to justify the order. However, it is not clear that findings about power operationalized as advantage in an exchange network (Cook and Emerson 1978) extends to order giving in organizations.

Finally, in recent organizational behavior research, order giving has been modeled as a dimension of indices of *leadership behavior* (DeRue et al. 2015) or *power expression* (Aime et al. 2014). For example, Aime et al. (2014) show that access to relevant resources predicts who expresses power (which includes order giving) in small groups. It is unclear, however, the extent to which exogenous changes in workflow and resources bear on the order-giving component of these indices as opposed to their other dimensions.

Work Linking Status and Order Giving

Because order giving in the wild potentially maps to multiple constructs in the lab, a range of potential mechanisms link status and order giving in the field. Figure 4 presents an overview of how each of the relevant mechanisms link status—alters' perceptions of a focal individual—to the focal individual's self-assessment of the legitimacy of giving orders and that individual actually giving orders to group members.

Legitimacy Judgments. The legitimacy theory branch of the expectation states tradition (Zelditch 2001; Zelditch 2006) demonstrated that higher status serves to legitimate order giving. Recent work has reinforced this perspective, showing that

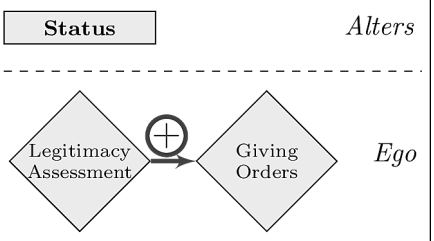
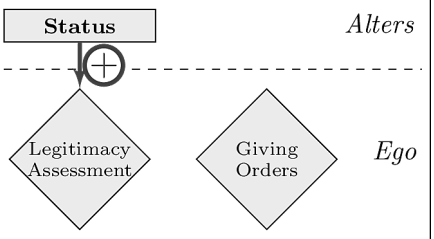
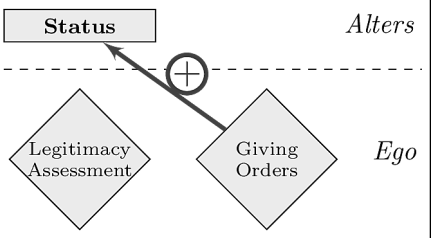
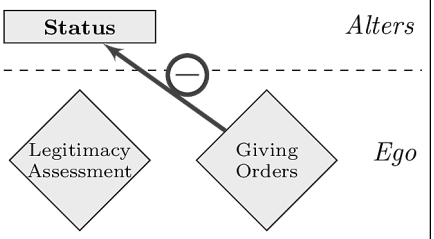
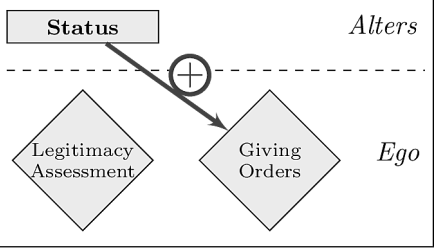
Mechanism	References	Sketch
Legitimacy Judgment	Zelditch (2001); Zelditch (2006); Tost (2011)	
Self-assessment	Anderson et al. (2006); Anderson et al. (2012)	
Behavioral Interchange	Skvoretz and Fararo (1996); Fisek et al. (1991)	
Power-Use and Power-Non-Use	Lovaglia (1995); Willer et al. (2005); Willer et al. (2012)	
Long-term Status Advantage	Brass (1984); Burkhardt and Brass (1991)	

Figure 4: Relevant social-psychological mechanisms linking order giving, status perceptions, and ego legitimacy assessments, with definitive references. Rectangles (Alters' perceptions of ego) are continuous values; decision diamonds (Legitimacy Assessment and Ego Giving Orders) are binary Yes/No assessments or decisions made by a focal individual.

order giving by lower-status individuals, even when formally permitted, tends to provoke conflict among coworkers (Anicich et al. 2016). Because individuals have been shown to be more sensitive to the the threat of status loss than the promise of status gain (Pettit et al. 2010), people may be even more inclined to avoid the risk of conflictual order giving.

Reassessing Legitimacy. To the extent that legitimacy—judging as correct a particular person taking a particular action—links status to order giving, it is important to consider how legitimacy assessments change. Tost (2011) proposes a three-phase model of individual-level legitimacy judgments: judgment formation, judgment use, and potential reassessment. Initial judgments can form quickly and once an individual forms an initial judgment, repeated examples of the focal individual taking the focal action are processed relatively automatically. Changing an existing judgment, however, requires a more deliberative *reassessment* mode. For the purposes of the foregoing analysis, when someone who has never given orders first considers giving orders, there may be a reassessment phase during which the focal individual or his or her alters are more attune to whether the new action—giving orders—is to be considered legitimate when performed by the focal individual.

Self-assessment. Anderson et al. (2006) and Anderson et al. (2012) established that people in task-oriented environments base their self-assessments—of relative ability, the rewards they deserve, and the actions it is appropriate for them to take—on their perceptions of others' perceptions of them. In terms of the model being developed here, individuals judge the legitimacy of their own potential order giving by their status in the eyes of their coworkers, as indicated by their coworkers' deference to them.

Behavioral Inference (Interchange). Behavioral interchange theory (Fişek et al. 1991; Skvoretz and Fararo 1996) has offered influential accounts of how status

hierarchies emerge among strangers. They argue that status behaviors (Mark 2018) indicating the relative status of two individuals—such as one giving an order to another—will reinforce others' perceptions of the initiator of the action being higher status than the recipient. Regularly giving orders should increase an individual's status in the eyes of alters as they infer that the order giver is more capable. In a recent paper, Cheng et al. (2013) argue that dominance behaviors, including bossing people around, may offer an alternative route to high status than demonstrating relative competence.

Power Use and Power Non-Use. Lovaglia (1995) challenges this view, having found that power does not increase deference to a powerful individual. Willer et al. (2012) and Willer et al. (2005) build on this insight, showing that using power (operationalized as advantage in an exchange network) provokes negative feelings among observers (i.e., non-targets) of the power use which in turn tempers the perceptions of competence they hold for the power user. Conversely, when someone occupies a powerful position but does not use the power, their status in the eyes of alters increases (Willer et al. 2012). Although these studies use an exchange-network operationalization of power, to the extent that giving orders in an organization is perceived by alters as a type of power use, then it would have similar impacts on status: not giving orders when one could should increase status, while giving orders may undercut further status increases.

Long-Term Status Advantage. Finally, some status theorizing treats individuals' status as relatively fixed characteristics of those individuals. During a group's initial interactions, there may be some discovery of relative status expectations, but once these expectations stabilize they continue to shape behavior but do not themselves change. Under this view, which I term *long-term status advantage*, the people who are able to begin giving orders to their coworkers are those that have had higher status in

a group. Because perceptions of status are shared among group members, there is little new information in order-giving behavior, thus status remains unchanged when order giving begins. Prior field studies linking status and authority have reflected and reinforced this perspective (e.g, Brass 1984; Brass and Burkhardt 1993).

The Limitations of Mechanisms Alone

These laboratory studies have many advantages: their focus on construct validity and consistency across experimental contexts has allowed for cumulative understanding of the social psychological processes underlying the causes and effects of status. However, when fitting these mechanisms into an explanation of empirical status *dynamics*, a few limitations become apparent.

First, status in the wild bears upon and is shaped by behaviors that do not directly map to laboratory constructs. The order-giving behavior on which the present study focuses, for instance, can be seen as a type of power-use (Willer et al. 2012; Cook and Emerson 1978), authority (Evan and Zelditch 1961), dominance (Cheng et al. 2013), or leadership behavior (DeRue et al. 2015). This multiple-mapping from construct to the empirical world reflects the narrow scope of laboratory work; for example, we know a lot about power when operationalized as a position in an exchange network where the only behavioral choices are exchange choices, but less so about whether our understanding of power extends to situations where other behavioral options are available and other social structures bear on the exchange network.

Second, lab work observes effects that play out within the time frame allowed by the experiment. As a result, these studies tend to focus on relatively instantaneous mechanisms which limits our ability to build dynamic accounts involving duration. Finally, lab work necessarily focuses on simplified causal mechanisms linking structure and action: does status increase power use (Zelditch 2001), does power use

affect status (Willer et al. 2012), or do displays of dominance increase status (Cheng et al. 2013)? When change occurs, however, mechanisms may interact with one another. Social structure may shape behavioral choices that in turn affect the structure (Barley 1986). A focal individual's behavior may shape audience perceptions and behavior that in turn shapes the focal individual's choices.

Putting the Mechanisms Together

As in the story of the blind men and the elephant,[11] the mechanisms above each provide a precise, but narrow, piece of understanding how status changes as order-giving behavior changes. Prior work does not tell us, however, how to fit these pieces into a coherent model of status change. The present study approaches this puzzle in two stages. First, it draws on rich interaction data to determine the empirical status trajectories of people who begin to give orders. These trajectories are used to rule out mechanisms which are contradicted by the data. They also set up the empirical pattern that must be explained by a model of status change—an approach common in the use of agent-based models to test combinations of laboratory mechanisms (Smith and Rand 2017). Once that pattern is established, the present study draws on ethnographic methods to combine the relevant causal mechanisms into a dynamic model and ground the features of that model in an empirical context.

Data and Methods

The present study uses an unprecedented combination of data to pursue this strategy. I draw on user interaction logs from a task and project-management software I refer to as TaskFlow[12] to observe patterns of relative status and order giving in 2,400

[11] https://en.wikipedia.org/wiki/Blind_men_and_an_elephant
[12] Not its real name.

organizational groups over one to three years each. In total, I measure the status of 4,735 individuals who begin giving orders for the first time. To ground these data and aid in their interpretation, I also employ ethnographic data collected over four months at one of the larger organizations, complementing the *breadth* of the larger dataset with the *depth* of ethnographic methods.

TaskFlow Metadata

TaskFlow is a software tool used in a wide variety of teams and organizations to coordinate task and project work. It is used to replace email for project-and-task-related communications, and so offers a convenient view into the structure and timing of collaborative work in organizations that use it. Appendix 1 presents more detail about the software itself and how it is used in teams and organizations. The dataset used in this study is the complete set of actions in the software taken by individuals in 2,400 sample organizations over a 35-month period. Some of the sampled organizations have multiple teams using TaskFlow; in others only a single team or department are in the data. Each data row specifies: (1) the user taking the action, (2) the task on which the action was taken, (3) the type of action taken, (4) the recipient(s) or target of the action, and (5) the action's timestamp. All individual names, organization names, and task content had been removed from the data.

The present study focuses on the three most common user actions taken in TaskFlow: 260 million instances of a person sending a message to one or more recipients; 42 million instances of one person assigning a task to another person; and 42 million instances of one person adding another person to an existing conversation. Critically, the fact that these three types of actions require different user interactions and result in different displays in the software allows them to be used to separate indications of

coworking (*regular messaging*) from acts of deference (*adding to conversations*) and order giving (*assigning tasks*)—interpretations which are supported by the ethnographic data described below. The analysis focuses on the 41,000 individuals in the data with at least a full year (48 weeks) of active TaskFlow use.

Participant Observation and HR Data

To ground interpretations of the TaskFlow data and inform model development, I also draw on 16 weeks of participant observation conducted while working at the pseudonymous GuestInn as a data-science intern. GuestInn operates short-term rental apartments in several North American and European cities.[13] Each city operates as an independent business unit, managing growth and operations with support from headquarters (HQ). GuestInn's HQ, where I observed, houses several departments: upper management, engineering, HR, finance, interior design, supply chain management, hospitality, real estate, and recruiting.

GuestInn grew rapidly over the four years prior to my arrival, from a few employees in 2014 to 234 employees and dozens of outside contractors[14] when I departed the field. This growth meant that a number of early employees had gone through a transition into giving orders. As the list of departments shows, GuestInn offers a uniquely rich research site in the wide variety of types of production—guest experience, technological, real estate, supply chain management, interior design—it incorporates.

GuestInn agreed to de-anonymize the metadata from their employees' interactions with TaskFlow, allowing me to match the TaskFlow digital traces to my fieldnotes. This linking allowed me to field a novel interview protocol, using interactive displays of individuals' historic TaskFlow usage to guide semi-structured questions regarding

[13] To protect GuestInn's confidentiality, I am unable to disclose the precise number of cities in which it operates.

[14] All of whom had active accounts in GuestInn's TaskFlow system

their work history at GuestInn.[15] I conducted 39 interviews with 31 different interviewees ranging from one to three hours each. Interviewees regularly spontaneously expressed recognition of the summaries of who they were working with, who they had given orders to, and from whom they had received orders. Several interviewees excitedly trace curves on the screen as they described the evolution of past relationships. I took this as reassurance that the TaskFlow data I use in the broader analysis reflects something these individuals have experienced as real.

Many of the interviews covered events that took place several years prior during rather hectic moments in people's work lives. Having a record of whom they had been messaging with on TaskFlow at the time served to jog subjects' memories, sometimes prompting them to dig into their own TaskFlow history to provide detailed stories about particular interactions. In particular, in interviews covering multiple years of history and potentially dozens of coworking relationships, the protocol allowed us to focus our conversations on moments of transition and on order-giving relationships.

GuestInn also provided me with a snapshot of their HR database at the time I left the field. Using these data, I could identify when transitions in formal managerial relationships occurred. I used the interview data to corroborate the dates and manager relationships in the data, manually correcting the few errors I discovered.

Methods and Measures

Qualitative Methods I document the analysis of the qualitative data in more detail elsewhere (author-identifying, n.d.), but four particular analyses are relevant for the current study.

Adding to conversations. To confirm the validity of interpreting the act of adding

[15]The interview method is more precisely described in another study (author-identifying, n.d.). The description is available upon request.

someone to an ongoing conversation as an indication of deference, I coded all instances where I witnessed one person adding another to a conversation or where an interviewee mentioned adding coworkers. Over fifty such instances, I found 88% were clear indications of deference: making someone aware (38%), asking for advice or input (44%), signaling importance to others in the conversation (4%), and public thanking (4%). The remaining 12% were accidental (2%) or to initiate communication (10%), a less direct indication of status.

Perceptions of Assigning Tasks. I coded all mentions of people's perception of the meaning of assigning tasks. People took the act of assigning a task relatively seriously, routinely expressing discomfort at the idea of assigning a task without justification. Two people even described conflicts that had occurred when they had assigned a task to a peer in the past. Most often it was described less precisely using terms like "weird" or "I just don't."

I corroborated that this was not unique to GuestInn in conversations with TaskFlowCo's User Experience Research (UXR) team. They have routinely found in interviews with other TaskFlow users that people (a) see assigning a task to someone as a form of order giving and (b) are hesitant to do so without proper justification. At organizations where they have observed software use, the head of TaskFlowCo's UXR told me, users "feel uncomfortable assigning to people." This was a sentiment I heard repeated in conversations at GuestInn, both from potential assigners—as Akram indicated in his desire not to be seen as "bossing someone around"—and potential assignees: "I know what I'm doing so don't need her assigning tasks saying to do this." Observing repeated assigning behavior from one person to another indicates that this hesitance has been overcome on the part of the assigner.

Justifying Assigning. The data-driven interview protocol served to provoke justifications of task-assigning from interviewees. I inductively coded (Charmaz 2006;

Saldaña 2009) these justifications and instances of assigning from my fieldnotes to classifying the reasons that people gave for giving orders and for following them. I open-coded sixteen random interviews and then iteratively grouped the codes while relating them to their original contexts until clear categories emerged of the explanations people gave for giving orders to or receiving orders from coworkers. I then recoded the full data set. No additional categories were apparent during this stage, indicating theoretical saturation (Charmaz 2006).

Ultimately, I identified four categories of justifications. First, reference to the **formal hierarchy**, describing orders as given because of a manager-subordinate relationship. Second, people often made indirect reference to **relative status**, such as their superior task knowledge, experience, or "it was just understood." Third, order giving was often embedded within **organizational routines** which included two common types of task routing routines. Finally, emergent patterns of order giving were often justified by the rights and obligations of what was locally called "**ownership**." More fully exploring these is beyond the scope of this paper, but are described in more detail elsewhere (author identifying, n.d). Fewer than half of the order-giving relationships were characterized as formal. These four justifications provided the opportunities to begin giving orders but, as discussed below, did not always directly lead to starting to give orders.

Transitions. Finally, I coded all instances in interviews where interviewees recounted a transition where they began to give orders to coworkers, when a coworker began to give orders to them, or when conflict occurred about order giving. I use these data to ground my interpretation of the transition model presented below, confirm the external validity of the mechanisms it involves, and to calibrate the measures used to identify transitions.

Changes in Giving Orders I inferred transitions into order giving from the start of *repeated and imbalanced* patterns of assigning between a pair of individuals anytime they work together.

To measure imbalance, I use the empirical logit[16] (Lowe et al. 2011) to transform the number of tasks assigned from person A to person B and from person B to person A over each four-week period into a continuous scale of imbalance. When this score is above a threshold, τ, that dyad is determined to have exhibited an imbalance in assigning during that four-week period; anything below is deemed balanced. Working with identified data from GuestInn, I found that $\tau = 0.3$ worked best for identifying order-giving relationships recognized by GuestInn employees.[17] Most dyads who work together (defined as having more than 8 communications each way during a period) have some amount of task assigning between them; only 12% of dyad-periods have none. However, the majority, 63%, of these dyad-weeks are balanced. The remaining 25% of dyad-periods exhibit imbalanced assigning at $\alpha = 4$ and $\tau = 0.3$.

Once a relation between two individuals has shown signs of imbalance during one four-week period, there are four states it could be in during subsequent periods: (1) maintain the imbalance, (2) revert to a balanced relation, (3) reverse the direction of imbalance, or (4) drop off in communication between them, removing the *opportunity* for order giving in the dyad. I use a conservative classification that labels only the first, where the direction of authority is *repeated* in all subsequent periods where the two work together, as an order-giving relationship. To identify the earliest week an individual transitioned into regularly giving orders, I identify the earliest week, across all of their order-giving relationships, in which they gave orders as their week of

[16]The imbalance measure equation is $imbalance_{AB,t} = log(\frac{\alpha+assign_{AB,t}}{\alpha+assign_{BA,t}})$ where $assign_{AB,t}$ and $assign_{BA,t}$ are the number of tasks assigned from person A to person B and from person B to person A, respectively, in four-week period t, and α is a smoothing parameter to push the measure towards zero when there is low assigning activity in a dyad. I use $\alpha = 4$ in the reported analyses but also tested $\alpha = 8$, finding identical results, available upon request.

[17]I also tested $\tau = 0.6$ and $\tau = 1.0$, finding substantively identical results. Results available upon request.

transition to order giving. Any reaction of alters to the order-giving behavior would have to occur in that week or after.

The main results below are based on 18,380 individuals who *Never* regularly gave orders but were highly active TaskFlow users otherwise, 7,080 individuals who are *Established* order givers, and 4,735 individuals who *Transition* into regular order giving. The subsequent analyses focus on the latter group.

Changes in Formal Manager-Subordinate Relationships The anonymized nature of the metadata makes it difficult to distinguish formal and informal order giving. To explore the role of formal managerial relationships in order-giving transitions, I draw on the HR data provided by GuestInn, one of the largest organizations in the main sample. I identified the specific dates when formal manager-subordinate relationships changed at GuestInn. Over the course of the study period, 698 managing relationships began, consisting of 84 distinct managers and 471 distinct subordinates (many people have had more than one manager during their tenure at GuestInn). Of the 84 distinct managers, only 24 exhibited transitions into formal authority after working at GuestInn for 16 weeks or more. The analyses of formal transitions focus on these 24 individuals. The other 60 managers began at GuestInn as managers, a common occurrence in rapidly-growing organizations (Aldrich and Ruef 2006).

Status Status is often operationalized as network centrality. However, as Bothner et al. (n.d.) point out, interpreting centrality as status is only warranted when the network edges connote public acts of deference. As indicated by my analysis of interview and field note data, adding someone to a task-related conversation is a reliable signal of interpersonal deference: they are being asked for advice (Blau 1955; Blau 1964; Krackhardt 1990) or someone wants to make him or her aware of a

conversation. For each individual for each week, I sum the total number of times he or she was added to a conversation by someone else. All of the potential mechanisms theorize the role of alters observing an individual's behavior, rather than the particular alter who receives the orders. To focus the status measure on the broader audience of coworkers, I remove from each individual's sum any requests that originate from people to whom they ever regularly direct orders.

Because norms around adding may differ from organization to organization and over time, I normalized each individual's weekly total by the organizational mean during that week. I cap outliers at five times their organizational mean,[18] yielding a measure that ranges from zero to five with one indicating average status, below one indicating less than average status, and above one indicating greater than average status.[19]

Results

Figure 5 shows the average status trajectories (with 95% confidence intervals) of Never order givers (left plot), Established order givers starting 16 weeks after their first period of giving orders (right plot), and the people who transition between these two groups (middle plot).

Established order givers have significantly higher average status than those who have never given orders, replicating prior cross-sectional findings (e.g., Brass 1984). Second, the significantly higher starting point of the Transition trajectory is evidence that long-term status indeed increases the chance of transitioning into order giving. However, the individuals who transition into giving orders have a lower level of status

[18] Results are robust to many specifications of this cap. Results available upon request.

[19] I also conducted all subsequent analyses using the networks of communication measuring status as either (a) row-adjusted indegree, which is equivalent to the measure used in Gould's (2002) formal model of status hierarchies; and (b) pagerank, which is equivalent to row-normalized Bonacich centrality, the measure used in Bothner et al. (2010). The results using communication data are substantively identical and available upon request.

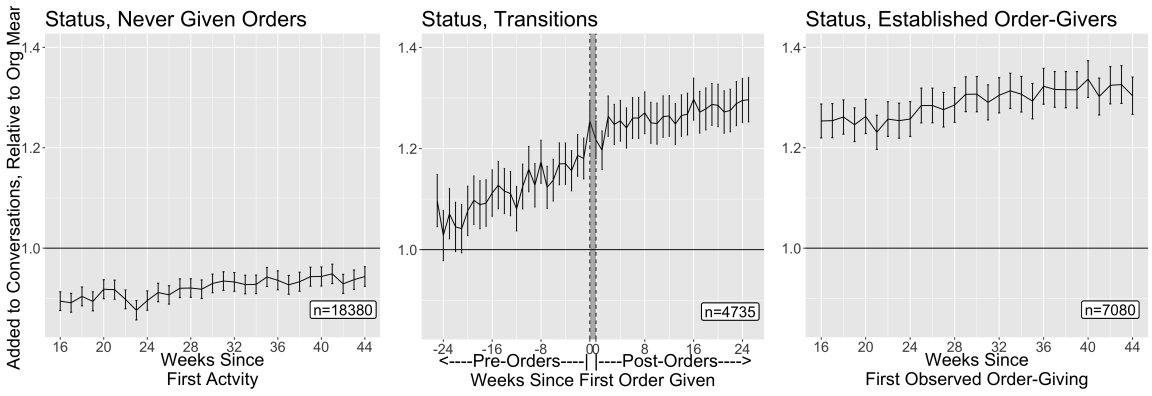


Figure 5: Average Status (with 95% confidence intervals) over time for those who have never given orders (left), those who have been giving orders for 16 or more weeks (right), and those who transition between the two groups (middle). Established order givers have significantly higher average status than Never order givers, replicating prior cross-sectional findings. Transitions exhibit four key patterns: (1) the significantly higher starting point of the range is evidence that people with higher status are more likely to begin giving orders, (2) average status increases before a person starts giving orders, and (3) there is no increase in individuals' status after they begin to give orders.

20 weeks before they give orders than they do when they begin giving orders; long-term status advantages account for some but not the majority of status difference between those who give orders and those who do not.

While Figure 5 is useful for comparing the relative status of the three groups, it has the disadvantage of unbalanced panels: the composition of individuals changes in each week due to weeks of non-usage, left censoring, and right censoring. Figure 6 recalculates the status trajectories using an unbalanced panel fixed effects model as implemented in Croissant and Millo (2008). It models individual status as a function of each week by including a binary indicator variable for each week before and after order giving begins, holding the transition week as the comparison set (thus its lack of confidence interval). The use of binary indicators instead of a linear or quadratic term keeps the model non-parametric (as in Srivastava et al. (2017), who use a similar approach to identify trajectories). This allows it to identify whatever shape of trajectory is evident in the data. In order not to over-emphasize individuals with very

high status, I also included fixed effects for individuals. The resulting model calculates the mean *within-person* deviation in status relative to the first week of order giving, allowing the curves to focus on the average *trajectories* in status, rather than their average level.[20]

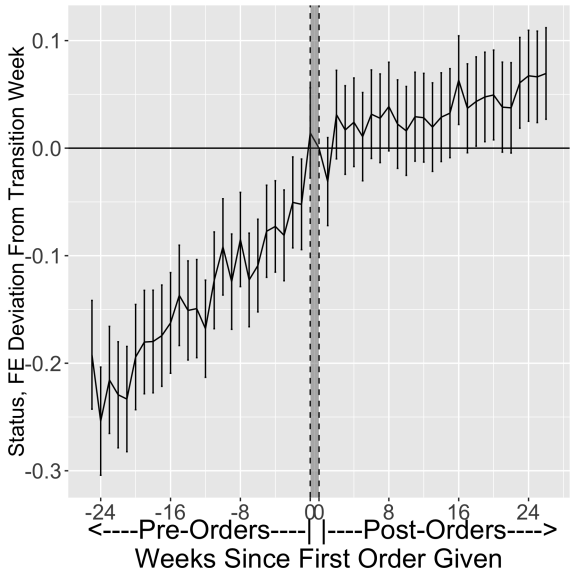


Figure 6: Average within-individual status trajectories. Weekly intercepts and 95% confidence intervals of a time-series model of status with fixed effects for individuals. Period of first order giving is held out as the reference category. The intercept is set so that y=0 for the first week of giving orders. The result confirm (1) 24 weeks of increasing status before individuals' first give orders, (2) no increase in status after they begin giving orders. The slight positive slope after order giving begins is equal to the tenure-driven upward slope observed among Never order givers and other Established order givers.

Figure 6 shows the within-person status trajectories. It offers definitive evidence that status does not increase after a person begins to give orders: *any increase in status occurs before he or she gives the first order.* The implication of behavioral interchange mechanisms—that individuals' status increases as others witness their giving orders for the first time—is not borne out by this trajectory (Skvoretz and Fararo 1996).

[20]While some individuals may be giving orders as proxies for higher-rank alters, to the extent that they are acting entirely as proxies, then their data in the software will actually be measuring this higher-rank alter, in which case all inferences remain the same. If they are only a partial proxy, then their contribution to the within-person findings reflect the way their own status changes as they begin to give orders on behalf on this higher-rank alter.

The trajectory in Figure 6 does reflect the implications of the power-use mechanism: the act of giving orders forestalls any further increases in status due to the transition (Lovaglia 1995; Willer et al. 2012). The small positive trend in status after the transition is equal to the tenure-driven trend observable in both the Never and Established groups. This finding is consistent with the empirical pattern that Blau (1964) described as giving orders "discharging obligations" inherent in high status. It has been more precisely articulated theoretically in Willer et al. (2012): observing an individual use the power they have leads to observers tempering their expectations about the person because of negative feelings triggered by the power use.

Addressing two open questions about this trajectory will help refine the model developed below: does status always increase as part of transitions or is the trajectory driven by there being a threshold level of status necessary to begin giving orders, and do formal transitions (in which the orders are given as the result of a change in an official manager-subordinate relationship) follow the same pattern as transitions in general? To answer these, I draw on the more detailed data from the GuestInn case study.

A Status Threshold Model of Order Giving

In my interviews with and exploration of data from GuestInn employees, I noticed that some people immediately began giving orders when an opportunity arose that justified it whereas others felt a great deal of hesitation. Whether they hesitated or not seemed tied either to their self-perception of their relative ability or to anticipated rejection by others. Anderson et al. (2006) argues that these are two sides of the same coin: individuals' self-perception of their own relative ability will be based on how other group members perceive them. If so, then we would expect those who are already high-status in their coworkers' eyes to not have the same pattern of

waiting to give orders that characterizes the overall trajectories.

Following this intuition, I took all Transitions in the full dataset who had been active in their organization's TaskFlow for at least a half-year before they began to give orders and split them into two groups based on whether they already had status above the average level of order givers (1.25) at least 20 weeks before they began giving orders. The first group, Low Initial, had average statuses below 1.25 over the 26 to 20 weeks before they began to give orders. The second group, High Initial, had average statuses greater than 1.25 during the same period. Figure 7 shows how these two groups' status trajectories differ: the 852 high-status individuals have some initial reversion to the mean but then have relatively unchanged status before and after beginning to give orders. Their status, it appears, is already high enough to legitimize their giving orders. The 1,694 people who begin with lower status, on the other hand, exhibit the pattern observed in Figure 6: their status increases for 20 weeks before they begin to give orders. That 71% of the Transitions were people who had lower status at least a half-year before giving orders is an indication that this is a common path into order giving.

These results show it is those with low status that exhibit an increase in status and that they wait until they have reached a higher status to begin to give orders. As discussed above, Willer et al. (2012) found that having but not using power leads to increased status in the eyes of observers. Assume, by analogy, that having the opportunity to give orders but hesitating to do so because of one's low status enhances status via the same mechanisms as not using exchange-position power. This assumption is reasonable (if provisional) given the unclear scope conditions of power-exchange findings in general. If true, then these findings offer an explanation of the dynamic by which status increases before order giving. Those with low status in the eyes of their coworkers perceive that their orders may be poorly-received and so

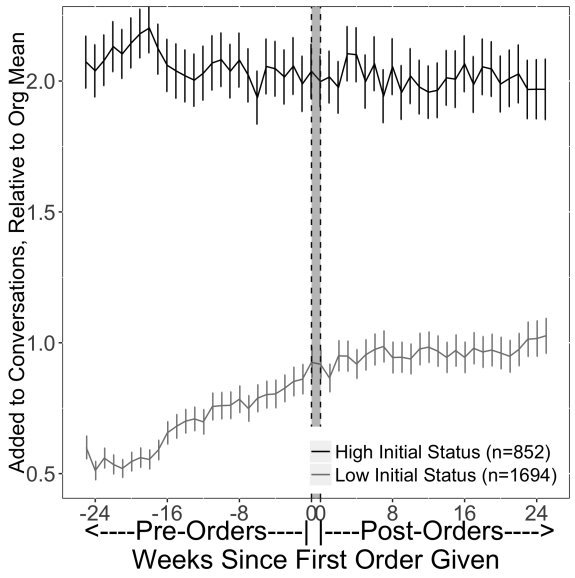


Figure 7: Average Status (with 95% confidence intervals) of individuals with at least 24 weeks' tenure before they first begin to give orders, split by whether they have Low Status (under 1.25) over the 20-26 weeks before giving orders or High Status (above 1.25) over the same period. Individuals who already have status above the average status of order givers (1.25) are able to begin giving orders without going through the status-increasing process. Low-status individuals, on the other hand, wait to give orders until their status has increased.

choose not to give orders. Instead, they engage in *conspicuous forbearance*, either taking on additional work themselves or making requests of their coworkers in indirect ways—activities that I observed daily in my time at GuestInn. Their coworkers, on seeing this behavior, increase their esteem for the focal individuals. This cycle continues until the individual perceives that he or she has sufficient status to begin giving orders, at which point the mechanisms leading to increasing status cease and his or her status stabilizes.

The Role of Formal Roles

At GuestInn, I found formal authority relations and order giving to be much less tightly coupled than frequently assumed. Only 113 out of 698 official manager-subordinate dyads exhibited regular order giving. In most parts of the organization, formal authority was limited to control over hiring/firing, promotion, salary, and vacation time, whereas task-related authority was more fluid. This sort of separation of authority is not uncommon in small, rapidly changing organizations like GuestInn but is also characteristic of matrix-type formal structures used at enormous bureaucratic organizations like IBM (Heckscher 2007). It was also true that order giving was common outside of managerial relationships at GuestInn. Out of 251 dyads which exhibited regular order giving, only 113 had an official manager-subordinate relationship.

To see if the empirical pattern observed in Figure 6 is driven by changes in the formal hierarchy, I used the GuestInn HR data to identify individuals who transitioned into formal managerial roles. Figure 8 shows the status trajectories of the 24 individuals who had worked at GuestInn for at least 16 weeks when they became formal managers of a coworker for the first time. Their average status is relatively flat except during the week of their promotion. This indicates that the trajectory explored in

Figure 6 is driven by low-status individuals transitioning into *informally-justified* order-giving roles, rather than formal changes in managerial authority. This is unsurprising given that we would expect promotions into formal management to be determined largely on the basis of relative status.

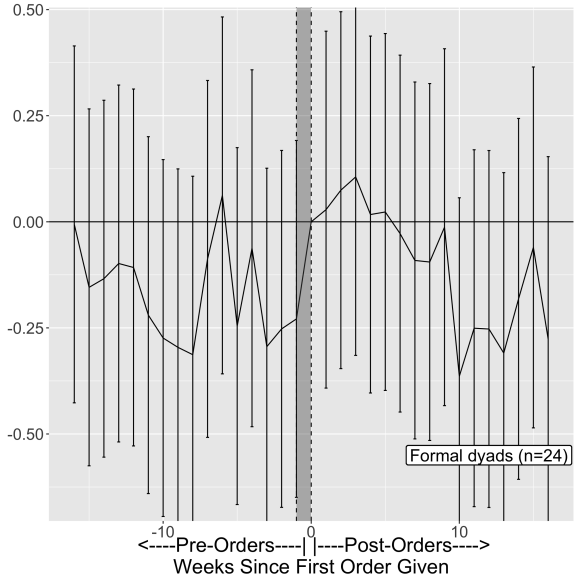


Figure 8: Average within-individual status trajectories for 24 individuals at GuestInn who became formal managers after at least 16 weeks working there. Unlike the trajectory centered around order giving, formal changes appear to produce a one-time rapid upward shift in status, and are not characterized by increasing status before the promotion.

Model and Theoretical Implications

The quantitative findings above trace two modal status trajectories of individuals experiencing transitions in their authority relations to their coworkers: those with high status experience no change in status when beginning to give orders; and those with low status experience up to 20 weeks of status increase before beginning to give orders and have stable status afterwards. These empirical patterns are consistent with a process where self-perception and perception by alters interact through the previously discussed social-psychological mechanisms—legitimacy judgments and

reassessments, self-assessment on the basis of others' perceptions, and power use undermining status increases. Figure 9 a stylized overview of this process.

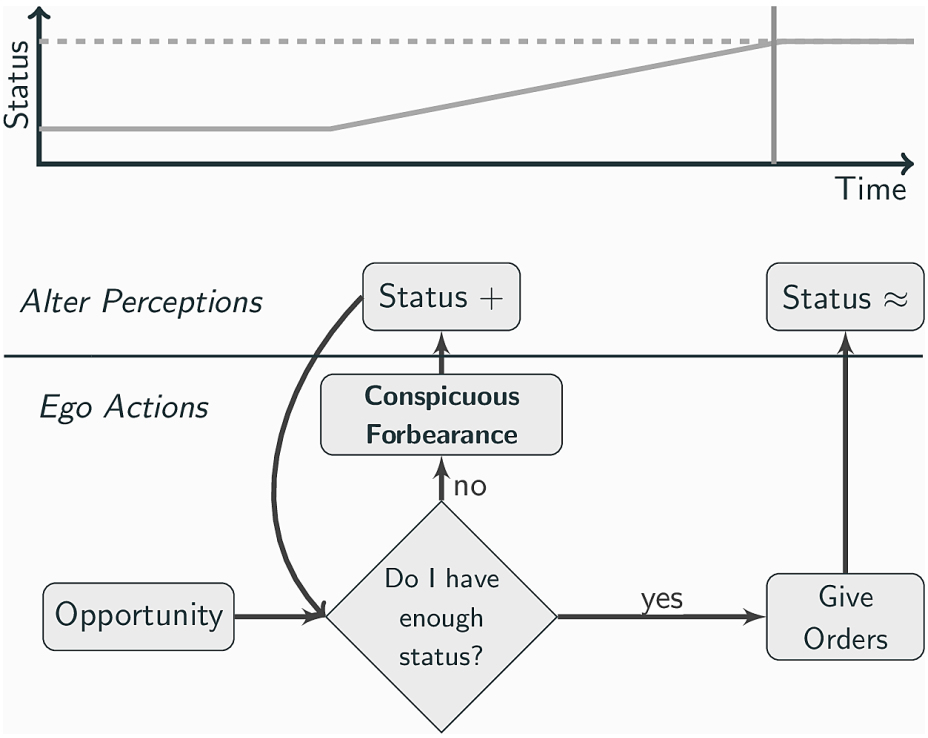


Figure 9: Fitting the mechanisms together into a process model of transitions in order-giving behavior that reflects the empirically-observed status trajectories (stylized representation in top section of figure).

First, an opportunity for or expectation of order giving has been created—either due to formal promotion, unplanned shifts in workload that generate need or opportunity for coordination, or shifts in semi-formal patterns of responsibilities. Analyses of participant observation data and interviews from GuestInn indicated that such changes were common as the organization adapted to its environment and routinely justified new patterns of order giving. New routines—both informal and formal—put people in a position where they needed to make regular requests of others, justified by the shared routine. Workload might increase in a group where one person was perceived as higher ability or more experienced, and that person would take on an informal coordinating role within that group. Finally, a group might decide that a particular person "owned," or was responsible for, a particular piece of work.

Sometimes this would justify others making demands of the person on the basis of obligations associated with their ownership; sometimes the ownership would justify the person making requests of others on the basis of rights associated with ownership.[21]

Prior laboratory work (Aime et al. 2014) has established that such shifts can have immediate impacts on whether an individual gives orders in a group and whether the group sees that behavior as appropriate. In organizations, however, the focal individual has not previously given orders prior to such opportunities; there is a stable *prior assessment* that he or she is not an order giver that must first be overcome.

In the second step, whatever the initiating cause of a shift, people considering giving orders will *reassess the legitimacy* of themselves giving orders (Tost 2011). They base this assessment on others' perceptions of them (Anderson et al. 2006; Anderson et al. 2012). If these focal individuals anticipate that orders will be resisted or judged harshly due to insufficient status (Anicich et al. 2016), they do not give public orders. Rather, they achieve the necessary coordination through other means. People at GuestInn repeatedly mentioned either taking more work on themselves or finding indirect ways to ask their coworkers for help without giving direct orders, engaging in a form of **conspicuous forbearance**. In witnessing the accomplishment of group goals without explicit requests for deference, coworkers increase their assessment of the person (Willer et al. 2012), affording him or her higher status and offering more task-related deference.

Third, those who do (initially or eventually) assess their status as sufficiently high (Anderson et al. 2006; Anderson et al. 2012), come to believe that they can give orders without repercussion (Anicich et al. 2016). When recounting transitions in their own self-perception, many people at GuestInn told me how they had to "get

[21]The concept of ownership is more fully developed in other work using the GuestInn data (author-identifying, n.d.).

comfortable telling [a particular coworker] what to do" or that it took awhile "to feel okay being the boss." At this point, the focal individuals exit the reassessment mode, presuming their order giving to be legitimate (Tost 2011) and begin to give orders. This shift to giving orders undermines the source of their status increasing in the eyes of coworkers (Willer et al. 2012), leading it to stabilize.

This process model combines several laboratory-demonstrated social psychological mechanisms to give an account of how individuals' status changes when they first transition into giving orders that is consistent with the observed empirical patterns of these transitions. This model represents a departure from theorizing status change building from theories of status hierarchy *emergence*. In dynamic theories based on emergence models (e.g., Skvoretz et al. 1996), status behaviors—such as giving orders—are the source of changes in relative status. In the present study, however, giving orders was constrained by status and did not increase, but rather stabilized, individuals' status. Because the status hierarchies in emergent models are nascent, they do not constrain behaviors the way existing status orders can and do in more established social life.

When status behaviors are themselves subject to legitimacy judgments based in existing status hierarchies, we have to look elsewhere for the interactional bases of changes in status. I have proposed, based on ethnographic inquiry and prior laboratory work, that conspicuous forbearance plays a large role in the status increases that serve to legitimize an individual ultimately giving orders. More broadly, this indicates that the development of dynamics accounts of status change may require considering not just the status behaviors that are associated with higher status, but other behaviors that may increase status when individuals are already known to fellow group members.

Discussion: Open Questions

Some elements of the model are more speculative than others and point the way to potential future research on the relationship between status, power, and order giving in organizations.

First, the mechanism by which status is proposed to increase in the process model—through conspicuous forbearance leading to higher assessments—is consistent with work on power use (Lovaglia 1995; Willer et al. 2012) and more recent work showing the importance of individuals mitigating negative feelings associated with their high rank in social hierarchies (Hahl and Zuckerman 2014; Bai 2017). More directly replicating the results of Willer et al. (2012) both in and out of the lab, however, would help establish the causal validity of conspicuous forbearance in accounting for how status changes unfold.

Future work could also address whether it is forbearance itself—not using power—or performances of generosity that lead to status increases. For example, an investigation of *failed* transitions—people who attempted to give orders and then stopped—might uncover further details about the interpersonal work that allows individuals to shift into legitimately giving orders. It will also be important to explore how this mechanism interacts with the status characteristics of individuals: to what extent is conspicuous forbearance a route to status for all people or only available to some (Ridgeway 1982; Fiske et al. 2002; Ridgeway 2011)?

Third, it remains necessary to establish that the shifts in workflow described above are sufficient to provide the context for conspicuous forbearance mechanisms. It remains an open question whether the sorts of events that initiate changes in order-giving opportunities at GuestInn exhaust the possibilities in other organizations. Aime et al. (2014) showed that shifts in resource access during a group task predicted who would give orders and that if these orders were seen as legitimate, the group

would be more creative. Future work could build on this finding, testing whether people given access to a resource and enough time could generate the status necessary to give legitimate orders.

Fourth, individuals with the opportunity to give orders but choosing not to do so until their status is high enough contradicts recent experimental work showing that people increase their demands of others when they gain power in a game (Sivanathan et al. 2008). On the one hand, it may be that resources are more diffuse sources of power in organizations than advantageous positions in games. On the other hand, it may be that *relational embeddedness* (relative to the un-embedded nature of laboratory games) drives the difference. It would be interesting to revisit the experiments of Sivanathan et al. (2008) using a collective task to induce a status hierarchy in a group first and seeing if the effects are indeed mediated by the status hierarchy in which they are embedded. This echoes ideas raised by economists (Baker et al. 1999) that the repeated-game nature of organizational life makes it difficult for upper management to regularly exercise discretion over the task management of middle managers, a discussion to which a sociological perspective would make a strong contribution.

Fifth, the choice to use TaskFlow (as opposed to another project management system) potentially indicates that these groups rely more on shifting project-oriented formal structures than rigid hierarchies of authority (Turner 2009). The foregoing study, by connecting social psychology accounts of status and power to changes in this empirical setting, thus lays the groundwork for more rigorous theorizing of how authority, power, and status work in these sorts of organizations. It remains an open empirical question, however, whether the temporal patterns identified in the present study would be identical in more traditionally bureaucratic organizations. There is evidence that industry heterogeneity is not the driver of the results: I compared the

teams in organizations in the Software or Service industries to those known to be in ten other industries,[22] finding substantively identical results in both groups (see Appendix 2 for details). The data from an analogous project management system used by more traditional organizations could be analyzed using the methods developed here to either confirm the generality of these findings or specify ways these processes differ in large bureaucracies. Either way, the results would offer an important extension to the present study.

Finally, status regularly interacts with other social hierarchies. The present study emphasizes its interaction with authority relations as manifested in order-giving behavior but could potentially guide work on how a status hierarchy interacts with other hierarchical relations and other status behaviors. For instance, it might be extended to study the dynamics of status with changes in bullying behavior in schools (Shepherd and Paluck 2015; Chu 2019) or how shifts in non-work-related hierarchies interacts with relative status perceptions at work. To explore these spaces, we might generalize the question of the present study from "how does status change unfold when order-giving behavior changes" to "how do changes in one status hierarchy unfold when people begin to perform status behaviors on the basis of another social hierarchy?"

My hope is that the present study establishes that it is possible to obtain or generate the longitudinal observations necessary to measure status trajectories and thereby build richer dynamic theory. Furthermore, as the first study of individual status change to pay close attention to the time over which mechanisms operate, it indicates the relevant scales over which data must be collected. Finally, this study underscores the critical importance of using ethnographic data to figure out how known mechanisms fit together to account for an observed empirical pattern. Here, as in

[22]Communication Equipment, Construction, Finance, High Tech Manufacturing, Hotels and Restaurant, Manufacturing, Media, Retail, Transport, and Utilities.

many cases, such an approach exposes gaps in our knowledge, pointing the way to necessary theoretical development and associated causal studies. An advantage of supplementing status and behavioral data with ethnographic data is that the researcher will have a ready source of data from which to generate testable hypotheses about these gaps. Taken together, a set of such projects would allow us to develop an account of status that accommodates dynamics.

Chapter 3: Interdependence and the Role of Status in Decisions

Abstract

When do people rely on status–how others appear to rank members of a group–to inform their decisions instead of relying on their own perceptions? And how does the structure of work in an organization shape the importance of status in decisions? Current social psychological theory proposes two features of decisions that lead people to rely on status when making them: uncertainty about the abilities of their fellow group members and whether the success of a decision hinges on others' perceptions of the decision made. The present study argues that two features of the structure of work in an organization will increase the importance of status by changing the nature of decisions in that organization. Intensive interdependence—a deeper amount of coordination between individuals—increases the importance of status by making coordination of decisions more important and the costs of conflict higher. Dispersed interdependence—characterized by individuals having multiple coworkers with whom they coordinate—increases the ambiguity of whose judgments matter, gives people less insight into coworkers' perceptions, and increases the coherence of group status beliefs, all of which make status more relevant in local decisions. To develop and test this claim, I focus on one particular decision: whether to give direct orders to a coworker. Using detailed interaction data from more than 3,000 organizations, I demonstrate that increases in either intensive or dispersed interdependence increase the extent to which status enters into who is willing to give orders.

Introduction

There are two extant theories of what drives individuals in groups to incorporate status beliefs—their perception of how others rank people in the group—into making decisions relevant to the group (Ridgeway 2019). The most influential model stipulates that individuals are often *uncertain* about the relative ability of their fellow group members. When they make decisions that are affected by how relatively competent they believe others to be, such as whom to consult for advice, they do not have the personal perceptions on which to base the decision (Gould 2002; Lynn et al. 2009; Manzo and Baldassarri 2015). Instead, interpreting others' deferential behaviors as indicating the relative ability of the receiver, they base the decision on who others

appear to be deferring to already. The more uncertain interpersonal perceptions of relative ability—for example newly-formed groups or groups with deep divisions of labor that make ability assessments difficult—the more that individuals will rely on status, as reflected in others' deference gestures, rather than their own beliefs.

Recently, Correll et al. (2017) proposed an important extension to this model, arguing that it is not just uncertainty but *coordination* that drives individuals to factor status into their decisions. In some decisions, it is important to make the same choice as others or others' assessment of the decision is more important than the decision itself (such as when a principle delegates to an agent). In these cases, group status beliefs provide a useful coordination mechanism. Rather than making a personal assessment about others' ability, coordination of choice can be achieved by assuming that others' decisions will be based on group status assessment. Similarly, assuming that others' assessment will be similar to group status beliefs facilitates making a well-assessed decision more than individual beliefs could.

This seems to imply that the more coordination that exists in a particular setting—the more *interdependent* the setting—the more likely that decisions made in that setting will incorporate status beliefs instead of personal beliefs. If true, this is important because contemporary organizational life has become more interdependent than ever (Child and McGrath 2001; Edmondson 2012; Bechky and Chung 2018). Individuals are likely to engage in work that requires close coordination with their coworkers. Furthermore, this coordination is increasingly likely to occur across official organizational divisions, undermining the ability for formal structures to guide decisions. Even large, traditionally-bureaucratic organizations like IBM and General Motors face the challenge of finding ways to permit fluid coordination across branches of the organization chart (Kanter 1984; Adler and Heckscher 2006). Does this increased interdependence in the workplace lead to an increased reliance on status

and status beliefs in individuals' decisions compared to more isolated or modularized work?

The link between coordination and the importance of status has only been demonstrated at the level of the individual decision (Correll et al. 2017). It remains an open question whether increasing levels of interdependence at the organization level will affect the importance of status in the decisions made within these organizations. For one, this theoretical link remains to be developed. It is also challenging to empirically study such a link due to the difficulty of collecting the detailed, longitudinal interaction data in the field that would be necessary to measure (a) interdependence and (b) the extent to which status affects decisions.

The current study proposes to overcome both. To address the theoretical gap, I first lay out the theoretical claims made by Correll et al. (2017) linking coordinated decisions to status inferences, grounding those claims in an organizational context. Then, I argue that interdependence at the organizational level is constructively conceptualized as having two dimensions: how *intensively* interdependent work is and how *dispersedly* interdependent it is. *Intensive interdependence* is how deeply production involves coordination between parties. *Dispersed interdependence*, on the other hand, is the diffuseness of communication patterns in an organization, the extent to which individuals need to interact with many coworkers in the course of their work. I argue that each type of interdependence has an independent effect on the extent to which status factors into decisions made in organizations.

In order to empirically test this claim, I focus on a particular, common organizational decision: the decision whether to give direct orders to coworkers (Bernier 2019a). Such orders are requests that the recipient defer, either to the order-giver or to shared group goals (Ridgeway and Nakagawa 2017). When orders are given by people who are perceived as low status, this request for deference frequently generates conflict

(Anicich et al. 2016). As such, when someone decides to give a direct order, they consider how it is likely to be perceived by others, only giving the order if they assess that it will be perceived as legitimate (Zelditch 2001). Status beliefs often inform this assessment of potential legitimacy (Bernier 2019a).

To overcome the empirical limitations of prior work and test these claims, the present study pursues a strategy of digital forensics (Goldberg 2015), leveraging the proliferation of computer-based communication, to open a perspective on a social process traditionally difficult to study outside of the lab. I draw on continuously-collected interactions among 300,000 individuals in 3,000 teams and small organizations taken in a task-and-project-management software I refer to as TaskFlow. From terabytes of software logs, I extract metadata that allow me to separately measure communication patterns (497 million messages sent), order giving (66.7 million tasks assigned), acts of deference (28.9 million instances of seeking advice), and the exchange of work products (84.5 million attachments).

I show that the relationship between status and order giving becomes more pronounced the more interdependent—intensively and dispersedly—the work in an organization is. I use a within-organization fixed effects design to demonstrate that it is variation in each type of interdependence and not differences in organizational characteristics that drives the observed effects. In the discussion section, I discuss some implications for status research and organizational effectiveness, and point to directions for future research.

Theory

Status and Decision-Making

When does individuals' status in a group, their "relative standing in a group hierarchy based on prestige and respect" (Willer et al. 2012), shape the decisions they and others make? Prior work has indicated two conditions that will drive people to rely on indications of relative status in their decisions.

One influential model holds that it is the **uncertainty** of individuals' relative abilities on tasks that drives reliance on status. Under this model, first developed by Gould (2002), people make decisions about to whom to offer deference, acts that signal they hold the recipient in high regard (see also Lynn et al. 2009; Manzo and Baldassarri 2015). Individuals want to direct their deference to high-ability others, but lack clear indications about relative abilities. For example, in an organizational context, people may need to seek advice on how to resolve a problem, but are unsure whose advice is most likely to be correct ex ante. Under the division of labor, people may even be unable to judge the quality of received advice ex post. Facing such uncertainty, people look for who is receiving large amounts of deference from others. That is, they look at who has high status in the group. In the present example, people are more likely to seek advice from those whom others seek for advice. Under this Socially Endogenous Inferences (SEI) model (Correll et al. 2017), the more uncertain people are about the relative abilities of fellow group members, the more they are likely to rely on relative status in making decisions.

More recently, Correll et al. (2017) have argued that the need for **coordination** with others will drive people to make decisions on the basis of relative status even in the absence of uncertainty. In some decisions or decision-making contexts, the success of a decision hinges on others making the same decision. For example, in a team that

makes hiring decisions by consensus, individuals will prioritize candidates that they believe others will choose. The mechanism here is that a decision is more likely to be successful when others make the same decision. Decision makers thus consider, "on what basis will relevant others *themselves decide*?" Alternatively, coordination is important when a decision's success is predicated on others' *reaction* to the decision, such as when proposing a solution to a shared problem. This leads decision makers to consider, "on what basis will relevant others *evaluate my decision*?"

In the absence of knowledge about the perceptions of relevant others, either due to uncertainty about the perceptions of known others or uncertainty about which others are relevant, individuals will assume that the relevant others believe what most people seem to believe. That is, individuals will assume that their relevant others will make their decision on the basis of status. In the consensus hiring example, if there is not adequate discussion about relative preferences before putting the matter to a vote, people will assume that others are assessing candidates on the basis of whatever status signals are available. In the case of a proposed solution, lacking evidence for what others may think of alternative solutions, people may choose a high-status solution even if they believe another would be better, a sentiment captured in the aphorism "nobody ever got fired for buying IBM" (i.e., for choosing the well-known, high-status, but expensive, brand). The more uncertain someone is about the perceptions of relevant others or the more uncertain he or she is about who the relevant others are, the more that person will rely on status beliefs to inform his or her decisions. Additionally, the more that rewards or costs are thought to hang on the successful coordination of the decision with others, the more relevant status will become.

Correll et al. (2017) refer to the need for a decision to be coordinated with other decision makers the *interdependence* of the decision. In their formulation of the idea,

interdependence is treated as a binary feature of particular decisions: a decision is either interdependent or it is not. However, one potential implication of the theory is that the more interdependent a decision is, the more likely it is to be affected by status. As work is in general becoming more interdependent, this raises the question of whether these shifts in the workplace are making interpersonal status more important in general by increasing the amount that workplace decisions are interdependent.

Changing Nature of Work

Many observers over the past sixty years have pointed out that organizations engage in increasingly complex environments or productive strategies, characterized by many different and connected parts. This trend in nature of work has led analysts to point out many different, though related, organizational responses. Burns and Stalker (1961) argued that organic organizations—those characterized by loosely-coupled networks of workers rather than well-defined roles and routines—were better suited to operating in dynamic and complex environments. Girard and Stark (2003) described how an early web development organization was characterized by heterarchy: each occupational community engaged in the work was oriented to a different value system. Work, they argued, necessitated a series of provisional settlements as people from different occupations resolved the differences between their communities' goals.

Edmondson (2012) focused on the way that temporary teams have become more prevalent in organizations. She argues that this requires "coordinating and collaborating without the benefit of stable team structures," a fluid social process she refers to as "teaming." Okhuysen and Bechky (2009) theorize how coordination works, developing a set of three integrative conditions—accountability, predictability, and common understanding—necessary for coordinated work in complex settings.

Adler (2001) argued that these trends are part of a broader increase in firms relying on trust, as opposed to hierarchies or markets, to coordinate highly interdependent and fluid work, echoing an observation made by Powell (1990) about the relationships between organizations. Later, Adler and Heckscher argued that even large traditionally-bureaucratic organizations have had to find ways to facilitate more interdependent work than old bureaucratic models could accommodate (Adler and Heckscher 2006; Heckscher 2007).

Although they differ in their focus, these accounts share the implicit or explicit assumption that work in organizations has become more complexly interwoven and overlapping over the past several decades. People are less likely, these authors agree, to be spending their time on tasks that do not require regular interaction and coordination with one or more coworkers. Rather, the individuals in such organizations must coordinate their work with others in the organization.

Variation in Two Types of Interdependence

Complexity of work is often described in terms of its level of interdependence—the degree to which work in one part of the organization depends on and is depended on by others parts of the organization. Interdependence at the individual level varies in at least two different dimensions: how *intensively* interdependent a given individual's work is with others and how *dispersed* the set of individuals with whom his or her work is interdependent. Each of these will have a separate impact on the importance of status in an organization, but through different mechanisms. Figure 10 depicts the proposed pathways linking the two types of organization-level interdependence to the relative importance of status beliefs in decision-making, each of which I describe below.

Intensive interdependence exists when one's work involves the regular,

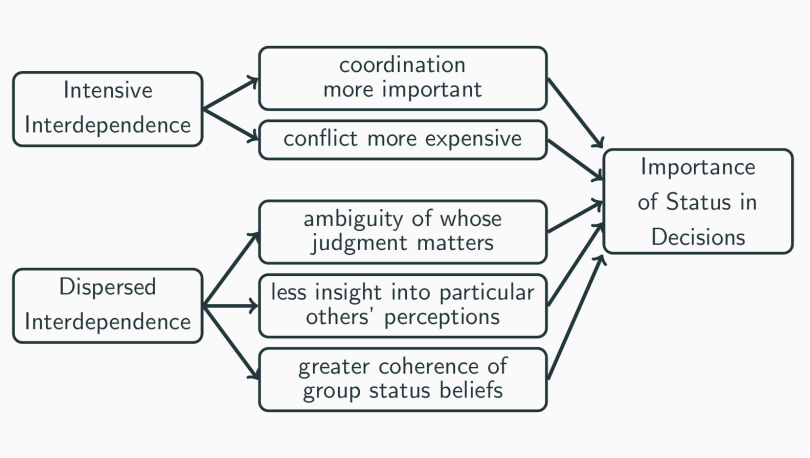


Figure 10: Five theoretical pathways linking intensive and dispersed interdependence to the importance of status in decision-making.

bi-directional exchange of work products such that one's outputs are another's inputs and vice versa. This is a task-level version of what Thompson (1967), looking at organizational *design* called "reciprocal interdependence." As he pointed out, relative to "pooled" and "sequential" interdependence, reciprocal interdependence requires ongoing mutual adjustment, a continual coordination that cannot be entirely planned in advance. The intensity of interdependence in an organization, then, drives a greater need for individuals to coordinate their efforts with one another; the success of any given individual's efforts is contingent on them being compatible with the efforts of relevant coworkers. By tying individuals' outcomes to the successful coordination of their decisions with others, intensive interdependence increases the extent to which individuals will rely on status, rather than personal beliefs about ability or quality, to inform their decisions. Furthermore, the costs of interpersonal conflict and disagreement are higher in intensively interdependent contexts: if more people's work relies heavily on coworkers, then avoiding conflict with coworkers becomes even more important. We would thus expect that people in intensively interdependent work environments to be more sensitive to relative status.

If intensive interdependence measures how deeply one's work is intertwined with the

work of others, **dispersed interdependence** considers with how many others it is intertwined. Digital technologies have lowered the cost, relative to face-to-face interaction, of regularly communicating with a wide variety of others. Partially as a result of such technologies and partially as a result of the increased complexity of contemporary work, people in many organizations interact with many others in the course of their day-to-day jobs. This dispersion of interaction will lead individuals to rely on status in decisions through two mechanisms. First, the more coworkers an individual regularly interacts with, the more people whose perceptions need to be taken into account. When a person works primarily with one or two other people, they may be able to build up a rough approximation of the others' beliefs. However, keeping track of multiple others' individual beliefs increases with the number of others tracked. As a result, the more people with whom an individual interacts, the more likely he or she is to assume that his or her interlocutors believes what everyone else believes; that is, the more likely they are to use relative status beliefs to inform their beliefs about their coworkers' beliefs. More dispersed interdependence leads to more uncertainty about the perceptions of others, and thus more reliance on status in decisions.

Second, people interacting with a broad set of coworkers are also necessarily less deeply interacting with any given person than if they had the same level of interaction with a single person. As such, they will have less information about the relative abilities of coworkers than had they been more regularly interacting with a smaller number of people. In the face of such uncertainty, interpersonal status acts as a substitute signal of relative ability (Gould 2002). The more dispersed a person's interpersonal communication, then, then more important status will be in informing his or her interpersonal decisions.

Finally, as more people in an organization have a broader set of regular contacts, it

becomes easier for shared status beliefs to develop; people are more likely to be aware of what other people think. Individual-level perceptions of collectively-held status beliefs are likely to converge as people have more accurate information about what others think everyone else thinks. When individuals make decisions on the basis of what they believe are shared status beliefs, they will therefore make decisions that more accurately reflect average perceptions of relative status.

Gaining Empirical Traction: The Decision to Give Orders

The foregoing indicates that increased interdependence—both intensive and dispersed—will increase the importance of status in individual decisions. Intensively interdependent contexts mean that decisions are more likely to hinge on coordination with or the reaction of particular other individuals. In dispersedly interdependent contexts, the greater number of people with whom individuals must coordinate will also lead individuals to take status signals into account as opposed to their own, personal, assessments. Testing this proposition is difficult: it requires variation in the interdependence of contexts across intensive and dispersive dimensions, measurements of relative status that might impinge on decision-making, and particular decisions that could be more or less affected by relative status. In order to gain empirical traction, the present study focuses on one common organizational decision: the decision to give direct orders to coworkers.

Who gives direct orders to others in a group has been a frequent outcome of interest in research on status. In one common approach, researchers construct a group task work setting, giving a group a shared objective to work on (e.g., Heinicke and Bales 1953), and observing how certain behaviors change as indications of status change. As Ridgeway and Nakagawa (2017) point out, giving a direct order in a group task setting constitutes a request for deference to either a group goal or to the order giver.

Who can give orders in a group is thus a matter of who can speak on behalf of the group. Giving orders is also a direct claim on the time of a coworker. Insomuch as orders are followed, those who are able to give orders are those who decide the direction in which the efforts of a group are oriented and how members of a group allocate their time.

Giving orders to coworkers is thus an important outcome in its own right: it determines who is able to directly guide the group. It also has some empirical advantages over other decisions when it comes to testing the effect of interdependence on the status-sensitivity of decision making. We might, for instance, be interested in whether people defer more to shared perceptions when making product design decisions. We would need to measure not only group-level decisions, but individual perceptions as well, to measure the extent to which individuals had or had not factored the group perceptions of an idea into their decisions. The discrete nature of order giving as an outcome—whether a given person in a given situation decides to give a direct order or not—makes it more directly observable than most decisions.

The decision to give orders, however, does have some difference from other organizational decisions that warrant consideration. First, unlike a design or hiring decision, it is a decision about an interpersonal action, as opposed to an impersonal but coordinated decision. Prior theory linking interdependence and decision-making has focused on impersonal decisions (Correll et al. 2017). There is nothing about the theory developed above that indicates that it should apply only to interpersonal or impersonal decisions. We might expect that interpersonal decisions are more sensitive to status beliefs overall, however, because there is already some coordination built in. When making a decision about an interpersonal behavior like giving orders, the reaction of the other party to the decision is much more likely to matter. As argued above, the structural context can impose additional coordinative pressures through

interdependence, but this means there will always be some baseline level of interdependence in the decision to give orders.

This baseline interdependence is related to a second difference of order-giving relative to many other organizational decisions: the decision carries higher potential of triggering interpersonal conflict. Giving an order is a request for deference (Ridgeway and Nakagawa 2017) and potentially interpretable as an assertion of relative rank (Skvoretz and Fararo 1996). When the recipient disagrees with the relative social rank implicitly asserted by giving a direct order, even when the order was authorized as part of an official position, he or she may disobey or directly challenge the order giver (Anicich et al. 2016). This potential for conflict, combined with the baseline interdependence of a decision to give orders, means that relative status is almost always a consideration in whether to give an order.

When someone decides to give an order, like any other behavior, people who observe the order make an assessment of its legitimacy, asking "is it okay that this person is taking this action?" Especially for order giving, observers draw on inferences about what peers of the potential order giver and peers of the potential order receiver seem to think about the action (Dornbusch and Scott 1975; but see Zelditch 2001 for a more thorough review). If observers anticipate that others would approve, an anticipation they make by the amount of deference their coworkers direct to the individual in question, they are more likely to express approval as well. Even when the structure of the work enables a person to give orders to his or her collaborators, these orders only increase group success when the person is highly regarded by the rest of the group (Aime et al. 2014).

This effect is not limited to *observers*, however. Individuals limit their own actions on the basis of perceptions of others' deference to them (Anderson et al. 2006). That is, individuals assess the legitimacy of their own actions on the basis of inferences about

others' perceptions of them. Bernier (2019a) demonstrated that relative status does indeed shape individuals' decisions on whether to give direct orders to coworkers; people with lower interpersonal status will engage in what he terms "conspicuous forbearance," avoiding giving direct orders in order to increase their status in the eyes of coworkers.

When individuals make a decision about whether to give an order to a particular coworker, they do so on the basis of their status in the eyes of their coworkers. The question, then, is whether working in a more interdependent context increases this relationship between people's status and their willingness to give direct orders to coworkers. The foregoing analysis indicates that we would expect that it would. The more *intensively interdependent* work is in an organization, the more that individuals have to lose if conflict occurs with coworkers, leading them to become even more sensitive to relative status when deciding if giving an order would be acceptable (**Hypothesis 1**). *Dispersedly interdependent* organizations, relative to organizations where most people work with a small number of others, will also lead to order giving being more status-sensitive (**Hypothesis 2**). In such organizations, individuals are more uncertain about their coworkers' perceptions of them and have more relationships where potential conflict could disrupt their work, both of which will increase the extent to which they are sensitive to their relative status when deciding whether to give orders.

Data

To test these hypotheses, I draw on hundreds of millions of interpersonal interactions taken in thousands of organizations in a task and project management system pseudonymously referred to as TaskFlow. TaskFlow is a piece of software used in teams and organizations to facilitate task-related communications and coordinate

work. Appendix 1 uses participant observation and interview data collected for another project to describe in more detail the way that TaskFlow fits into day-to-day work at organizations where it is used. TaskFlow is meant to replace email communication for task-related interactions. Like email, people send one another messages, communicate about task due dates, assign tasks to one another, add or remove people from ongoing conversations, and send digital files to one another. Unlike email conversations, however, each of these actions is recorded as a distinct type of interaction, allowing patterns in each type of interaction to be disambiguated from others despite the fact that I lacked access to the verbal content of messages.

The sample used in the analysis are the interactions taken in 3,023 organizations. All measures are calculated using data aggregated into four-week windows. In order to focus the analyses on individuals whose work patterns are well-reflected in TaskFlow, I remove all individuals who send and receive fewer than four messages in each four-week period. Because the measures of the relationship between status and order-giving are unreliable when there are only a few people in an organization or team, I then removed any organizations that had fewer than 16 employees with the minimum level of activity during a four-week period. Finally, to allow for estimating within-organization models, I then dropped any organization with fewer than four periods with 16 or more active employees. The resulting dataset comprises 76,237 organization-periods of data across the 3,023 organizations. It contains over 497 million communications, 66.7 million orders, 84.5 million attachments, and 28.9 million add-to-conversations sent from one coworker to another.

Measures

Individual-level Measures

For each 4-week period of observation, I estimated the relative status and order-giving behavior of each individual, for a total of 2.9 million person-periods of observations.

Status: Status, the relative prestige a group has for a particular member, is measured at the individual level for each 4-week period by summing the number of times a person is added to a conversation by a co-worker other than someone to whom they give orders. Because organizations differ in local norms of asking advice, I follow Bernier (2019a) in normalizing the status measure by the mean rate at which people are added to conversations in the organization. A measure of 1 indicates average status in an organization; greater than 1 is above-average status and below 1 is below-average status.

This is equivalent to using degree centrality in a weighted, directed network where edge weight is defined by the number of add-to-conversation actions taken from one person to another. Interpreting this as status relies on the assumption that this action is interpretable as an interpersonal form of deference (Bothner et al., n.d.; Podolny 2001). Drawing on ethnographic data collected for a related project and in the conversations with TaskFlowCo's user experience research team, I confirmed that this feature tends to be used in a way that lets it act as a reasonable proxy for acts of deference. When people add someone to a conversation, the two most commonly reported reasons are to "ask for advice" or "to make him or her aware/seek their approval." Both reflect deference in the sense of signaling the relatively higher worth of the person added. In the case of asking for advice, the person making the request is admitting their inability to solve the problem and signaling their sense of the other person's greater relative ability (Blau 1955; Blau and Schoenherr 1971). Adding someone to "make them aware" or "seek their approval" are more classically

deferential in the sense of Shils (1968). That is, it serves to symbolically place the added person in a superordinate position, the person doing the adding effectively saying "you and your perspective are important to this conversation."

Giving Orders: Order giving is operationalized in individuals' use of the "assign task" feature of TaskFlow to assign a particular task to a particular coworker. Each public and explicit directive given to coworkers reflects a public claim on a coworkers' time. These claims are public in the sense that both assigner and assignee know that others may witness it. A picture of the assignee appears next to the task throughout the software and is, by default, visible to other coworkers and a record of who assigned the task to whom is tracked in the communication thread attached to the task (see Appendix 1 for more details on the TaskFlow software). In conversations with TaskFlow users and with TaskFlowCo's user experience research team (who have talked to thousands of users at hundreds of organizations), it was clear that people take the decision to assign a task to a coworker seriously and interpret assigning a task as giving an order. One respondent, for instance, expressed hesitance in assigning tasks so as not to "be seen as bossing people around." To measure intensity of order giving, I sum the number of tasks each individual assigns to coworkers during each four-week period.

Organization-level Measures

Those with More Status Give More Orders

For each organization, j, in each period of time, t, I fit a linear model,

$$orders_{ijt} = \beta_{0jt} + \beta_{1jt} status_{ijt} + \epsilon_{ijt} \quad (1)$$

across all individuals, i, using their normalized status, $Status_{ijt}$ and the normalized

number of orders, $orders_{ijt}$ they gave during period t. The coefficient estimate, $\hat{\beta}_{1jt}$ can be interpreted as how many more orders, expressed as a standard deviation, that an individual gives when he or she has one standard deviation greater status.[23] It measures how sensitive individuals are to their relative status when deciding to give direct orders to their coworkers.[24] By estimating $\hat{\beta}_{1jt}$ for each organization j and time period t, I am able to test whether variations in the interdependence of work within organizations affect the importance of status in order-giving decisions therein, ruling out the possibility that specific characteristics of the organization, such as production technology or specific market, drive both interdependence and status-sensitivity. I estimate 74,526 $\hat{\beta}_{1jt}$; one for each organization-period of observations.

Intensive Interdependence. Over the course of the study periods in the focal organizations, individuals sent 84.5 million digital attachments to one another. These attachments, which include documents, spreadsheets, power point presentations and digital design assets among others, are material work products which are produced and exchanged in the course of research, design, and production. In more interdependent contexts, the exchange of these products is *mutual* (Thompson 1967): a person might generate a document which is sent to a coworker who either contributes to the document and sends it back or uses the content of the first product to generate another. In less interdependent contexts, people may still send work objects to one another, but will tend to do so in non-mutual patterns, such as the serial dependence of a production line (Thompson 1967).

Thus, to measure intensive interdependence of work in each organization, j, during each four-week window, t, I calculate the amount of reciprocity in the exchange of

[23] An alternative specification estimates the mean difference in status between those who regularly give orders to co-workers and those who do not. This relationship—the mean status difference between regular order givers and others—shows substantively similar results to the main specification.

[24] That this relationship is driven by the effects of status on the decision to give orders rather than giving orders' effect on relative status is supported by Bernier's (2019b) finding that beginning to give orders does not increase an individual's status.

these attachments. As recommended by Squartini et al. (2013), I measure reciprocity as the fraction of attachments sent in each organization, j, in each period, t, which have an attachment sent from the receiver back to the sender. Formally, taking w_{ikt} as the number of attachments that person i sends to person k in period t,

$$intensity_{jt} = \frac{\sum_i \sum_{k \neq i} min(w_{ikt}, w_{kit})}{\sum_i \sum_{k \neq i} w_{ikt}} \tag{2}$$

such that $intensity_{jt} = 0$ when all attachments in organization j in period t were sent from individuals to individuals who sent no attachments back. When $intensity_{jt} = 1$, it means all dyads send an equal number of attachments in both directions, reflecting work processes that are highly intensively interdependent, requiring the frequent back-and-forth exchange of work objects to complete task work.

Network-level measures such as $intensity_{jt}$ are highly dependent on the size and degree distribution of the networks on which they are calculated, making comparisons between networks and of networks over time problematic (Squartini et al. 2013). One solution is to define an appropriate null model for the network to separate the portion of $intensity_{jt}$ which is due to these general features of the network from that due to differences in how work is conducted in a particular organization at a particular point in time. I extend the maximum-likelihood estimation technique developed by Squartini and Garlaschelli (2011) to weighted, directed networks in order to estimate null models, $intensity_{0jt}$, as a function of the number of individuals in an organization-period, N_{jt}, the total attachments sent by each individual, s_{ijt}^{out}, and the total number of attachments received, s_{ikt}^{in}.

For each organization, j, in each time period, t, solve the system of 2N nonlinear equations:

$$\sum_{k \neq i} \frac{x_i y_k}{1 - x_i y_k} = s_i^{out} \qquad \forall i$$

$$\sum_{k \neq i} \frac{x_k y_i}{1 - x_k y_i} = s_i^{in} \qquad \forall i$$

Then, $intensity_{0jt}$ is estimated using eq. 2 but substituting the expected value of w_{ik} for all pairs of individuals (i, k),

$$E(w_{ik}) = \frac{x_i x_k}{1 - x_i x_k} \tag{3}$$

All analyses are then conducted using the null-adjusted measure of reciprocity,[^fn.null]

$$intensity^*_{jt} = intensity_{jt} - intensity_{0jt}$$

Dispersed Interdependence is the extent to which the average individual in an organization receives communications from a wide array of others as opposed to having more focused interactions with a handful of coworkers. That is, to what extent do individuals in an organization have *dispersed*, as opposed to concentrated, patterns of interaction.

I measure the dispersion of communication in each organization, j, during each four-week window, t, using the inverse of the average Herfindahl-Hirschman concentration index of the TaskFlow communications received by each individual in the organization. The intuition is that the degree of dispersed interdependence of work will be reflected in the diversity of senders whose messages populate an individual's inbox. If the majority of messages come from 1 or 2 people, then the focal individual will have a high concentration score; if most people in an

organization have this communication pattern, then the overall concentration score for the organization will be high and the level of interdependence low. If most people regularly receive messages from a larger number of coworkers, the concentration will be much lower and the level of interdependence higher. The concentration index varies from 0 to 1, so I subtract it from 1 to yield a measure of diffuseness that varies in the same interval. Formally,

$$dispersion_{jt} = 1 - \frac{1}{n_{jt}} \sum_{i \in P_j} \frac{\sum_{k \in P_j} w_{kit}^2}{(\sum_x w_{xit})^2} \tag{4}$$

where P_j is the set of individuals in organization j, n_{jt} is number of people active in organization j in period t, and w_{abt} is the number of communications from person a to person b in period t.

As with the measure of intensive interdependence, I calculate a null model estimate using the approach derived from Squartini and Garlaschelli (2011). I estimate $dispersion_{0jt}$ for each organization, j, in each period, t, based on the number of active individuals, N_{jt} and the number of total messages each sends and receives, using the expected values of pairwise communication under the null model (as expressed in eq. 3). I then conduct all analyses using null-adjusted measures of dispersed interdependence, $dispersion^*_{jt}$.

Analysis and Results

Prior work has tended to conceptualize interdependence as an organization-level feature. For instance, work building on Burns and Stalker (1961)'s "organic organization" concept classifies organizations or parts of organizations as more or less organic. Analytically, however, between-organization variation limits our ability to test the hypotheses proposed above: there are many other organization-level

features—such as industry, age, or production technology—that may shape both the level of interdependence and the importance of status in order-giving decisions. The analyses reported here, on the other hand, leverage variation *within* organizations over time to test whether changes in intensive and dispersed interdependence drive changes in the importance of status in the decision to give orders to coworkers.

Figure 11 shows the marginal distributions and pairwise correlations of the two interdependence measures, the two control variables, and their zero-order relationship to the estimated relationship between status and giving orders, $\hat{\beta}_{1jt}$. The measures of intensive and dispersed interdependence are roughly normally-distributed with long right and left tails, respectively. All results are robust to truncating observations to organization-periods within two standard deviations of the means of each measure. Communication intensity is normally-distributed, with a truncated right tail reflecting a decision to only count the first 50 communications sent each period between two individuals. Group size is heavily skewed towards smaller groups. Finally, dispersed interdependence is correlated with both control measures while intensive interdependence is not. This reflects the fact that the measure of dispersed interdependence reported in this analysis uses a simpler version of the normalization algorithm that does not as effectively normalize for degree (group size) and degree distribution (communication intensity).

Interdependence and the Relationship Between Status and Giving Orders

In order to estimate how the relationship between status and order giving changes with the level of intensive interdependence of an organization (Hypothesis 1), denoted γ_1, I fit three within-organization fixed-effect models:

$$\hat{\beta}_{1jt} = \gamma_{0j} + \gamma_1 intensity_{jt} + \gamma_k X_{kjt} + \eta_{jt} \tag{5}$$

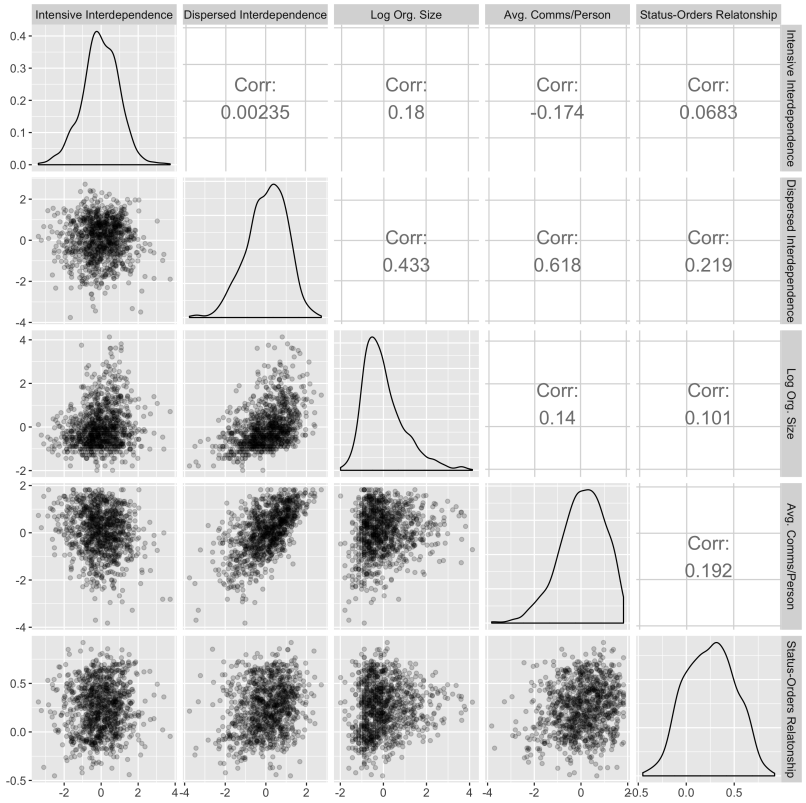


Figure 11: Marginal distributions and pairwise correlations of the two interdependence measures (intensive and dispersed), the two organization-period control variables (log group size and TaskFlow communication intensity per person), and the estimated relationship between status and giving orders ($\hat{\beta}_{1jt}$).

where $\hat{\beta}_{1jt}$ is the relationship between status and order giving in each organization, j, in period t as estimated in eq. 1, γ_{0j} is the organization-specific intercept, and X_{kjt} are controls for the number of active TaskFlow users in the organization in the specific period, t, and the average intensity of communications sent by members of the organization in the same period.

I used a similar models to test Hypotheses 2,

$$\hat{\beta}_{1jt} = \gamma_{0j} + \gamma_2 dispersion_{jt} + \gamma_k X_{kjt} + \eta_{jt} \tag{6}$$

Finally, to confirm that intensive and dispersed interdependence have independent effects on the relationship between status and giving orders, I also estimated

$$\hat{\beta}_{1jt} = \gamma_{0j} + \gamma_1 intensity_{jt} + \gamma_2 dispersion_{jt} + \gamma_k X_{kjt} + \eta_{jt} \tag{7}$$

All models were estimated using normalized values of attachment reciprocity, communication diffuseness, and the status-orders relationship, such that the γ_1 and γ_2 coefficients can be interpreted as the number of standard deviations that the relationship between status and order giving increases for each standard deviation within-organization increase in either intensive or dispersed interdependence. They were estimated using fixed-effects at the organization level, such that each organization has an independent intercept, γ_{0j}, using the *plm* R package (Croissant and Millo 2008) using White standard errors. Estimates for eq. 5, eq. 6, and eq. 7, as well as models without the X_{kjt} controls, are reported in Table 1.

Table 1

	Estimated Status-Orders Coefficient, Normalized				
	(1)	(2)	(3)	(4)	(5)
Intensive Interdependence	0.0533		0.0484		0.0486
	(0.0062)***		(0.0062)***		(0.0061)***
Dispersed Interdependence		0.1577		0.1170	0.1172
		(0.0096)***		(0.0120)***	(0.0120)***
Log Org. Size			0.0932	0.0488	0.0392
			(0.0098)***	(0.0112)***	(0.0112)***
Avg. Comms/Person			0.0787	0.0266	0.0327
			(0.0072)***	(0.0078)***	(0.0077)***
Org. Fixed Effects	Yes	Yes	Yes	Yes	Yes
Groups (Organizations)	2,969	2,969	2,969	2,969	2,969
Observations	74,694	74,694	74,694	74,694	74,694
R^2	0.0023	0.0144	0.0131	0.0156	0.0174
F Statistic	164.9657***	1,046.4890***	317.8043***	377.8761***	317.6399***

Note: *p<0.05; **p<0.01; ***p<0.001

Model 1 shows the results of testing Hypothesis 1—that the importance of status increases with intensive interdependence—without controls for the intensity of communication at the organization. Even when controlling for communication intensity (Model 3), there is a robust relationship between the level of intensive interdependence in an organization and the relationship between status and order giving in that organization: when an organization's intensive interdependence increases by a standard deviation, the relationship between status and order giving increases by 0.049 standard deviations.

Model 2 and 4 show a similarly robust relationship between the dispersion of communication in an organization and the strength of the relationship between status and giving orders, offering strong support for Hypothesis 2. When controlling for the log of number of people in the organization and the average number of communications sent per person (model 4), a one-standard-deviation increase in the level of dispersed interdependence in an organization is associated with that organization exhibiting a 0.117-standard-deviation higher $\hat{\beta}_{1jt}$.

Model 5 shows that the effects of intensive and dispersed interdependence predicted by Hypotheses 1 and 2 are independent of one another. Indeed, the coefficient on the normalized measure of intensive interdependence is within 0.4% of Model 3 when controlling for the dispersed interdependence. Similarly, the coefficient on dispersed interdependence changes less than 0.2% from Model 4 when controlling for intensive interdependence in Model 5. The effects, within organizations, of increased dispersed and increased intensive interdependence on increasing the importance of status appear to be independent of one another.[25]

Robustness Checks

Here, I give a brief overview of some potential objections to the analytical strategy above and the tests conducted to address them.

1. Ignored variation of $\hat{\beta}_{1jt}$ in the estimation of eq. 5, eq. 6, and eq. 7.

One issue with estimating the stages of the model separately is that there is variance in the estimates of β_{1jt} that is ignored when using the mean estimates, $\hat{\beta}_{1jt}$, to estimate γ_1 in eq. 5, eq. 6, and eq. 7. To address this concern, I fit all three models 1000 times using bootstrapped samples of β_{1jt} drawn from the distribution of each $\hat{\beta}_{1jt}$. The results were substantively identical.

2. *Organization size* is positively related to β_{1jt}, intensive interdependence, and dispersed interdependence.

The normalization strategy based on Squartini and Garlaschelli (2011) removes the mechanical link between organization size and the measures of interdependence, but

[25]To confirm the linearity of the models, I estimated a smoothed spline relationship for the relationship between each form of interdependence and the status-order-giving relationship in the organization when controlling for non-linear splines of organization size and communication intensity. Both were estimated using generalized additive models (using the mgcv R package Wood (2017)). The positive relationships estimated in Table 1 were clearly linear over the support of both types of organizational interdependence.

organization size is also related to β_{1jt} in that $\hat{\beta}_{1jt}$ in periods of time where an organization had more people are estimated with a larger number of pairs of $orders_{ijt}$ and $status_{ijt}$. Including the log of organization size in the models of eq. 5, eq. 6, and eq. 7 is meant to control for potential confounding by organization size, but there is no guarantee that the relationship between it and the three quantities of interest is linear.

To rule out correlated measurement error in the key variables driven by organization size, I ran a permutation test. For every individual, i, I randomly sampled without replacement from the full set of *pairs* of $orders_{ijt}$ and $status_{ijt}$, across all organizations, j, and time periods, t. By keeping the observed status and observed number of orders given by a person i in period t linked to one another, but shuffling them across organizations, the expected value of $\hat{\beta}_{1jt}$ under resampling is equal to the *population mean* of the relationship between order giving and status rather than the *organization-period mean*. That is, each resampled organization-period will have $E(\hat{\beta}_{1jt}) = \bar{\beta}_1$.

With $E(\hat{\beta}_{1jt}) = \bar{\beta}_1$ instead of $E(\hat{\beta}_{1jt}) = \beta_{1jt}$, the relationship between $\hat{\beta}_{1jt}$ and the measures of interdependence should disappear in eq. 5, eq. 6, and eq. 7. If these relationships maintain their magnitude and significance, however, it will be an indication that the γ relationships are, indeed, driven by organization size.

Figure 12 show the coefficient estimates from 100 random permutations of pairs of $orders_{ijt}$ and $status_{ijt}$, summarized as the grey boxplots. Both coefficients' estimates under permutation are tightly clustered around zero, confirming that organization size is not driving the effects observed in the reported models (shown in black for comparison).

3. *Intensity of communications* in an organization is positively related to β_{1jt} and dispersed interdependence.

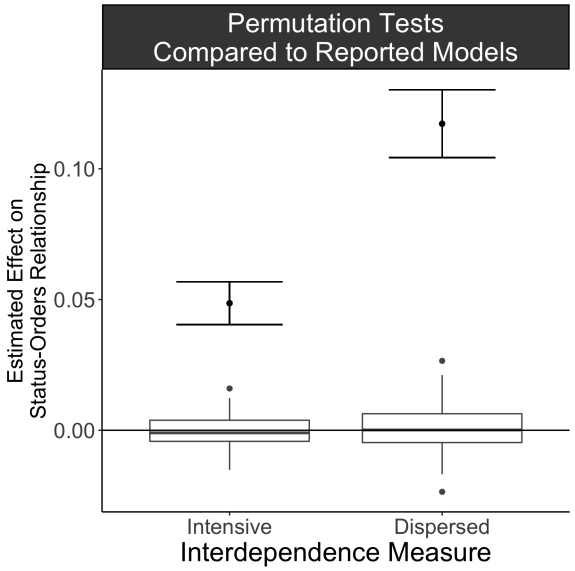


Figure 12: Magnitude of coefficient estimates $\hat{\gamma_1}$ and $\hat{\gamma_2}$ from eq. 7 from 100 permutation tests that resample pairs of $orders_{ijt}$ and $status_{ijt}$ across all individuals (grey box plot) and the corresponding coefficient estimates and 95% error bars from the reported model (black). As expected if organization size does not drive the relationships, the permuted estimates are all tightly clustered around zero for both types of interdependence.

Similar to organization size, as the number of communications sent per period by the average person in the organization increases, β_{1jt} and dispersed interdependence both increase as well. It is more difficult to design a permutation test to address this concern. However, if the reported relationsips result from correlated measurement error driven by the larger number of observed communications in some organization-periods, then they should disappear when down-sampling all organizations to have the same number of communications per person. For each organization, j, in each period, t, I randomly sampled $16n$ communications, where n is the number of people in the organization and 16 is the lower bound of communications-per-person in the sample, from the full set of communications sent in organization j in period d, without replacement. I then recalculated the dispersed interdependence measure from the resulting communication network.
Normalizing the down-sampled dispersed interdependence measure would be computationally expensive: normalizing the full set of organizations once takes

approximately 24 hours on a four-core machine. I performed two different tests to get around this limitations. First, I ran 100 down-sampling permutations. For each, I estimated $\hat{\gamma_2}$ from eq. 7 using a non-normalized measure of dispersed interdependence. The $\hat{\gamma_2}$ from every permutation was strongly significant and of equal or greater magnitude as the reported model. Second, for ten permutations, I calculated null models for a random sample of 15% of the organizations in the sample and estimated eq. 7 using these reduced samples. The resulting estimates of $\hat{\gamma_2}$ were all strongly significant and of equal or greater magnitude of the estimates in the reported model. The effects of dispersed interdependence on the role of status in the decision to give orders is not being driven by the overall intensity of communication in an organization.

Discussion and Conclusion

Summary of Findings

The foregoing analyses demonstrate that increasing the amount of intensive interdependence, measured as the reciprocal exchange of work products between coworkers, or increasing the amount of dispersed interdependence, measured as the inverse concentration of communications received by members of an organization, increased the effect of status on individuals' willingness to give direct orders to their coworkers. Furthermore, the effect of each type of interdependence on the importance of status is independent of the other. Increasing interdependence—either more intertwined communication patterns of an organization or the reciprocal interdependence of production activities therein—increases the extent to which status shapes who gives orders to coworkers.

A number of alternative explanations are ruled out by the within-organizations design

of the statistical tests. While organizations' industry, production technology, age, location, employee composition, or degree of formal structure might account for variation in the importance of relative status, these do not change quickly enough to account for the results reported above. Rather, the importance of status in authority relationships changes as the degree of intensive and dispersed interdependence change within an organization.

Intensive interdependence makes it more important to coordinate with fellow coworkers: the success of one person's work is more likely to depend on it being well-received by coworkers and the costs of conflict in case of disagreement are increased. The experience of this intensive interdependence leads individuals to a greater consideration of their coworkers' perceptions of the decision whether to give direct orders when making requests of others' time.

The intertwined patterns of work that characterize dispersed interdependence create greater ambiguity for an individual in which of his or her coworkers' perceptions are most important to take into account, give that individual less access to the perceptions of any given person with whom they coordinate, and increase the likelihood that status beliefs will be shared in the group. As dispersed interdependence increases, these changes lead individuals to be more likely to take into account the whole array of potential alters' perceptions by paying attention to general status perceptions in their decision whether to give orders to their coworkers.

Limitations

Order-giving decisions. The theory developed at the beginning of this paper links the interdependence of a work environment to decision-making in general. However, the analyses focused on a particular type of decision: whether to gives direct orders to coworkers. As mentioned earlier, two features set the decision to give orders apart

from other decisions. First, it is an *interpersonal* decision—it is about an interaction with another peroson—as opposed to an *impersonal* decision, such as what brand of shoes to wear. The interpersonal nature of decision means that there is already some inherent coordination in one of the two senses described by Correll et al. (2017): the reaction of the the order receiver to the order matters to the success of the order giver. The second feature of order-giving decisions heightens this coordinative nature: when orders are judged by their receiver as illegitimate, conflict often results (Anicich et al. 2016).

This raises the question whether these two features of decisions—interpersonal and having a high risk of resulting conflict—are scope conditions for the types of decisions that will be affected by increased interdependence. It is certainly reasonable that risk of conflict would *moderate* the results demonstrated in the foregoing analyses: people making decisions with high risks of conflict are likely to be more sensitive to *any* bases of coordination if only because the costs of getting wrong are higher. It is not as clear, however, why impersonal decisions would be less likely to consider *the decision-relevant status hierarchy* (i.e., the status ranking of the object in question, rather than the people involved in the decision) than interpersonal decisions when interdependence is high. The present study shows that *interpersonal status rankings* becomes more important in *interpersonal decisions* as interdependence increases. Correll et al. (2017) demonstrated that *impersonal status rankings* become important in *impersonal decisions* when the decision maker must coordinate with others. While it is beyond the scope of the present study to develop this idea further, there is important theoretical and empirical work to be done bridging the role of status in impersonal and interpersonal more broadly.

Status as aggregate deference. The present study focuses on status as inferred from patterns of deference behavior, taking these as an indication of the relative

status of individuals in the eyes of their coworkers. The results showed that order-giving decisions become more sensitive to the amount of deference expressed to an individual when organization-level interdependence increases. However, it is not clear what effect this has on whether decisions are more or less based on other indicators of status. Organizations—especially the complex organizations theorized here—are sites of multiple overlapping and competing bases and indicators of relative status that compete with people's perceptions of what one another thinks. People interpret specific status characteristics, such as observed relative skill and ability, professional accreditation, and formal hierarchical rank, as indicators of differences in ability. People rely on diffuse status characteristics such as gender, race, and economic class when there are no relevant specific characteristics available (Berger et al. 1980). Does interdependence increase people's reliance on diffuse and specific status characteristics to guide their decisions, or does it only affect the extent to which they respond to what other people seem to believe? Resolving this question is beyond the scope of the present study, but answering it in future work will be important to fully unpacking the implications of interdependence in organizations.

Interdependence as a proxy for informality. Another potential concern is that one or both measures of interdependence are acting as a proxy for the informality of work in an organization. If the formal hierarchy becomes more or less relevant as the nature of the work being done in the organization fluctuates—if, for instance, an increase in dispersed interdependence leaves people less able to rely on the organizational hierarchy to guide order-giving decisions than when dispersion is lower—then we would see the same effects from a different mechanism. Rather than interdependence causing people to rely on status, it would be specifically the unavailability of a clear formal hierarchy to shape order-giving behavior that leads people to rely on status. However, if we assume that interdependence changes more frequently and more readily than the extent of the formal hierarchy, then the

within-organization specification of the models should rule out this explanation. In that case, the role of formal hierarchical relationships in the relationship between status and order-giving would be stable over time and fall out of the within-organization models.

Implications for the Study of Status

Testing the specific mechanisms linking interdependence to the importance of status in decision-making is beyond the scope of the present study, which has demonstrated that expected empirical patterns do, indeed, characterize behavioral patterns in real organizations. However, in connecting the proposed mechanisms back to prior work on which they were derived, several areas for potential future research are indicated.

Correll et al. (2017) showed that manipulating the importance of coordinating a decision increased the extent to which individuals made decisions on the basis of status. However, their work focused on manipulating the importance of coordination in a particular decision. The mechanism proposed here is that intensive interdependence increases the importance of coordination and costs of conflict *on average*, and that these, in turn, create a social context where people are more sensitive to relative status on average. It is unclear from the results above whether intensive interdependence is directly changing the coordination pressures of the decision to give orders or if it is generating a shared social context of coordination that has an effect even on decisions whose level of coordination has not changed. Whether the effects demonstrated above reflect a generalized impact of interdependence on decision making or operate by shaping the context of particular decisions remains an open question.

The idea that dispersed interdependence increases the importance of status by making it more ambiguous for individuals to determine whose judgments will affect

them has been supported by Zelditch's work (e.g. Zelditch and Walker 1984; Zelditch 2001). That line of work argued that in complex work environments, individuals' work is evaluated by many different coworkers. This leads to ambiguity of whose opinion matters most, leading to an increased importance of what ones peers appear to think of any given decision. However, the lack of an appropriate experimental setting forestalled further development of these ideas (Berger et al. 1983, 36). The foregoing has shown that ideas derived from Zelditch's theory are predictive of relationships observable in the field. It has also demonstrated the viability of drawing on software-interactional data to advance our understanding of legitimacy.

Future work could further refine the theory presented here. For example, I have proposed three potential mechanisms linking dispersed interdependence and the importance of status in order-giving decisions: increased ambiguity of whose judgment matters, less insight into particular others' perceptions, and greater group coherence of status beliefs. Exploring these pathways will require innovative experimental settings or even richer sources of software interaction data.

Implications for Organizational Effectiveness

In their study of innovation, Burns and Stalker (1961) argued that organizations can more effectively innovate when they operate organically—when they have fluid and flexible practices of coordination. They argue that organic operation can only be successful to the extent that nothing inhibits people from asking for additional effort, which "depends on the ability to suppress differences of status and of technical prestige" (p. 252). That is, organic organizing requires flattening social hierarchies.

Relatedly, work groups are more successful to the extent that team members exercise authority when their relative knowledge, skills, or resources are most important to the group task (Aime et al. 2014). This success is mediated by whether teammates also

see the exercised authority as legitimate. To the extent that interdependence makes it less likely that low-status individuals can directly exercise authority, then interdependent teams may be hampered if status perceptions diverge from the distribution of skills in the group. We might expect that highly interdependent teams would suffer lower performance when such divergences increase.

The fact that status differences might undermine the performance of interdependent teams may account in part for the fact that such teams often simultaneously do away with formal markers of status such as titles, offices, or formalized roles. Indeed, there is some evidence of suppressed status differences in the data: overall status inequality, operationalized as the organization-period-level Gini coefficient on the individual-level status measure, has a *negative* relationship with both intensive and dispersed interdependence. More interdependent organizations are also flatter organizations, at least in terms of task-related status. It might seem that suppressing status distinctions would keep status differences from undermining the functioning of distributed authority rights. However, we know that even without formal markers, relative status usually diverges from relative differences in ability (Gould 2002; Lynn et al. 2009; Manzo and Baldassarri 2015) and biases associated with status characteristics such as race, gender, and age can drive further divergences (Ridgeway 2011; Correll and Ridgeway 2003). And to the extent that interdependence increases the rate at which people in an organization incorporate others' perceptions of one another into their decisions, we would expect interdependence to drive greater distortion by shifting individuals' attention from indicators of ability to indicators of status.

Furthermore, if people suspect that their own status characteristics are biasing their coworkers' perceptions of them, they may become less likely to exercise authority rights in interdependent organizations. Increasing interdependence will drive them to

be more likely to make decisions on the basis of what they think everyone else thinks about them (Anderson et al. 2006). Similar to the observation made by Freeman (1972) about democratic organizations, people with traditionally-disadvantaged status characteristics may find it more difficult to exercise authority in more interdependent organizations. As the importance of status in their decision to make direct requests increases due to increasing interdependence, they may become more likely to assume that others will assess them on the basis of status characteristics, and therefore less likely to make direct requests.

Team and organization designers as well as managers must therefore be more cognizant of the role that informal status plays in allowing interdependent work to be successful. Principles of inclusion may be as important for effectiveness as they are for equity in an increasingly interdependent workplace.

Conclusion

This paper has proposed and, to the extent permitted by the data, demonstrated that two types of interdependence in the structure of work—intensive and dispersed—lead individuals to be more responsive to status—the relative amount of deference their coworkers offer each other—in making decisions. The new organization types associated with interdependence—whether organic, heterarchic, conversational, collaborative, or post-bureaucratic—seem to offer the promise of *less* hierarchically-oriented workplaces. Paradoxically, the interdependence that makes these organizational forms alluring may also make them *more* sensitive to the informal social hierarchies of status.

Conclusion

Taken together, the results of the previous three chapters tell a story about authority and status in contemporary, complex organizations. Organizations like GuestInn use *distributed authority rights* to foster commitment and encourage employees to flexibly take on work. However, not everyone is willing to exercise their rights. Unless they have high enough status, individuals hesitate to make direct requests of their coworkers, instead engaging in a conspicuous form of forbearance. Furthermore, the *interdependence* that distributed authority rights facilitates increases the extent to which status factors into this decision—whether to make direct requests of one's coworkers.

In this conclusion, I first restate the findings from each chapter in turn. I then end by discussing three avenues for future research based on the interrelationship between these three studies.

Negotiating Provisional Role Relations

In Chapter 1, *Negotiating Provisional Role Relations in the Shadow of Hierarchies*, I set out to address limitations in existing theory about coordination in organizations with ambiguous role relations. Emergent coordination—coordinating work without having explicitly defined how it will be done—had been studied primarily in environments where generalized role structures and occupational communities are well-established. Drawing on four months of participant observation and interviews conducted using a longitudinally-oriented data-driven protocol, Chapter 2 described how people in one organization, GuestInn, coordinated with one another when pre-existing role structures were too ambiguous to guide them.

Often, this ambiguity in roles and role structures was by design. GuestInn's upper

management used an institution, locally referred to as "ownership," to foster commitment in employees and facilitate flexible reallocation of work responsibilities. I argue that "ownership" at GuestInn is, as upper management intended it, a form of normative control—an attempt to exert organizational control and encourage employee commitment by manipulating features of organizational culture (Kunda 1992). The institution prescribes a particular way that employees should approach their work, backed by the centralized control of membership rights. People who are not as flexible or committed as "ownership" entails could be fired.

The analysis in this chapter contributes to theories of emergent coordination by showing how people used the institution of normative control, *ownership*, to coordinate when role structures are ambiguous. Lacking developed role relations, employees of GuestInn used ownership to continually negotiate *provisional role relations* for coordinated work. Ownership provided a conceptual basis on which individuals discussed who would do what and how they would coordinate over time. This allowed them to (a) construct their own roles, (b) coordinate without developing shared understanding of one another's work, and (c) trust that accountability would be enforced in negotiated relations.

This chapter also refines our understanding of normative control in organizations, showing how it shapes coordination among employees. First, mechanisms that support normative control, such as the *vertical* control of membership rights, come to provide accountability for *lateral* emergent coordination. Second, tools of normative control provide the basis for coordination between people, removing the need for deeply shared understanding of one another's work. The chapter also refines theory on the role of formal hierarchies in organizations with distributed authority rights: people's ability to negotiate *lateral* coordination without deep shared understanding is facilitated by the shadow cast by *vertical* membership rights over the negotiations,

without directly involving nominal superordinates.

Finally, this chapter introduced the concept of *generalized authority rights*, where organization-backed rights to give direct orders to coworkers are decoupled from formal position and nominally granted to all employees. The right to make requests of coworkers at GuestInn was not tied to official position to enable the "discharge of [the position's] duties" (Weber 1978, 196), nor were they embedded in the seniority hierarchy of particular occupational communities (Stinchcombe 1959; Bechky 2006; Van Maanen and Barley 1984). Rather, the obligations of ownership offered *generalized* rights, rights that could (nominally at least) be exercised by anyone who depended on the owned work entity, regardless of his or her official rank or position.

Hierarchies in Motion

The fluidity of coordinative processes and authority rights detailed in Chapter 1 sets the context for exploring the dynamics of status and order-giving in Chapter 2, *Hierarchies in Motion: Towards a Dynamic Account of Status Change*. In that chapter, I used TaskFlow data to measure the status trajectories of 5000 individuals as they first began to give orders to their coworkers. Combining these trajectories with GuestInn ethnographic data, I developed a dynamic process model, based on previously-demonstrated mechanisms, of how individuals' status changes unfold in relation to order-giving behaviors. I found that, contrary to behavioral interchange accounts of status hierarchy *emergence* (Skvoretz et al. 1996; Fişek et al. 1991), individuals' status does not increase once they begin to give orders. Rather, the data showed a clear pattern of status increase for up to 20 weeks *before* individuals first regularly give orders. Their status stabilized as soon as they begin to give orders.

To account for this empirical trajectory, I proposed a process model of the interaction between alters' and ego's perceptions. When shifts in the pattern of work create

opportunities for focal actors to give orders to a coworker (Aime et al. 2014), the prospect of actually giving an order entails a novel behavior on the part of these focal actors. As such, they must assess (Tost 2011) whether their coworkers would view order giving as legitimate (Zelditch 2001), relying on alters' perception of the focal actors' status to guide their assessment (Anderson et al. 2006; Anderson et al. 2012). If the focal actors are already high status, they will begin to give orders. If they are lower status, however, they will handle the opportunity either by working harder or making indirect and deferential requests of their coworkers. Either way, this *conspicuous forbearance* will increase coworkers' assessment of a focal actor and hence his or her status over time (Willer et al. 2012). Finally, when focal actors assess that they have sufficient status to give orders legitimately, they will begin to give orders. Their order giving undermines the mechanisms driving status growth (Willer et al. 2012) and their status stabilizes.

As mentioned in the introduction to this dissertation, models of status change in existing groups are missing in work that has been focused on either status structures emerging from individual actions in groups of strangers (Skvoretz et al. 1996) or the effects of static status structures on individual action (Sauder et al. 2012). The dynamic account developed in Chapter 2 shows the importance of focusing on both action—an individuals' behaviors—and structure—the overall pattern of their coworkers' deference behaviors—and of exploring the way mechanisms relevant to each group interact with one another and over time. In particular, the analyses shows that accounts focused on status hierarchy *emergence*—how a group of strangers stabilizes into a hierarchy of relative deference and influence—may not be good models of change over longer periods of time (Bendersky and Shah 2013). The approach can thus be considered a model for studying status dynamics more broadly.

Finally, the model developed in Chapter 2 links laboratory constructs of power and

power-use to order-giving behaviors in the field, thereby offering a field validation of lab-demonstrated mechanisms linking power and status. By theorizing order-giving behavior in organizations, the model presented in Chapter 2 also lays the groundwork for more rigorous theorizing of authority in less-hierarchical organizations (Lee and Edmondson 2017), like GuestInn where authority rights have been decoupled from official position. This updated understanding of authority in informal contexts is increasingly necessary as growing complexity induces more collaboration outside formally-defined structures of authority and organizations are designed to rely less on formal structures of authority.

Interdependence and the Role of Status

While Chapter 2 focused on the *dynamics* of the order-giving decision, Chapter 3, *Interdependence and the Role of Status* used the decision to give orders to gain empirical traction on the effect of *interdependence* on decision-making. The chapter argued that two features of the structure of work in an organization will increase the importance of status in decision making in that organization by changing the nature of decisions therein. Intensive interdependence—a deeper amount of coordination between individuals—increases the importance of status by making coordination of decisions more important and the costs of conflict higher. Dispersed interdependence—characterized by individuals coordinating with multiple coworkers—increases the ambiguity of whose judgments matter, gives people less insight into coworkers' perceptions, and increases the coherence of group status beliefs, all of which make status more relevant in local decisions.

Using TaskFlow interaction data from tens of thousands of people in more than 3,000 organizations, I demonstrated that increasing the amount of intensive interdependence, measured as the reciprocal exchange of work products between

coworkers, or increasing the amount of dispersed interdependence, measured as the inverse concentration of communications received by members of an organization, increased the effect of status on individuals' willingness to give direct orders to their coworkers. Furthermore, the effect of each type of interdependence on the importance of status was independent of the other. Increasing interdependence—either more intertwined communication patterns or the reciprocal interdependence of production activities therein—increases the extent to which status shapes who is able to give orders to their coworkers.

I argued that intensive interdependence makes it more important to coordinate with fellow coworkers: the success of one person's work is more likely to depend on it being well-received by coworkers and the costs of conflict in case of disagreement are increased. The experience of this intensive interdependence leads individuals to a greater consideration of their coworkers' perceptions of their decisions.

The intertwined patterns of work which characterize dispersed interdependence create greater ambiguity for an individual in terms of which of his or her coworkers' perceptions are most important to take into account, gives that individual less access to the perceptions of any given person with whom they coordinate, and increases the likelihood that status beliefs will be shared in the group. As dispersed interdependence increases, these changes lead individuals to be more likely to take into account the whole array of potential alters' perceptions by paying attention to general status perceptions in their decision.

In the chapter, I demonstrated the effect of intensive and dispersed interdependence on individuals' decisions about whether to give direct orders when making requests of others' time. It remains an open empirical question if these processes would apply to other decisions as well.

Directions for Future Research

In each of the chapters, I describe specific future research interventions that build on that chapter's analyses. Additionally, the combination of the three chapters' analyses yield new questions and potential research directions. I will close by briefly mentioning three of them.

The Difference Between Power and Ownership

The *structural opportunities* in the model developed in Chapter 2 approximates *power*, having access to a valued resource that gives a structural opportunity to make direct requests of coworkers. One implication of Chapter 1 is that, at least in organizations with *generalized authority rights* like the ones that GuestInn maintains through the ownership institution, structural opportunities sometime open up not because individuals control a valued resource but because they *need access* to it.

How do patterns of status change differ among different structural opportunities—e.g., between control of a resource, change in a formal position, and or an ownership-supported need for a resource? For example, *conspicuous forbearance*, where individuals gain status by not exercising authority when they have the opportunity, is theorized in Chapter 2 as based on a mechanism of status increase that comes from power non-use (Willer et al. 2012). When the structural opportunity for order giving comes from exercising a generalized authority right over the owner of a particular piece of work, simple non-use of power cannot sufficiently explain the observed increase in status. Rather, nascent order-givers may have to engage in more proactive behaviors—such as indirect asks and trying to do the work themselves—if they lack the status necessary to directly exercise their authority right by making a direct request.

Separating the different types of structural change is not possible with the anonymized and content-free TaskFlow metadata used in this study: with these data, it is impossible to see when ownership or formal authority positions change or are evoked. Additionally, simply linking TaskFlow data to records of formal managerial relationships would not be sufficient. I had such linked data from GustInn, and used them in Chapter 1 to establish (a) that changes in formal authority were not driving empirical trajectories and (b) the status increases associated with formal promotions could happen before (1/3rd of the time), concurrent with (1/3 of the time), or after (1/3 of the time) the promotion became official. To specifically identify where changes in ownership relationships enter into the status change model from Chapter 2, I would need TaskFlow data from organizations where there is some record of ownership. For example, TaskFlowCo itself tracks work entity owners in TaskFlow, though the data would be unstructured and require manual coding to use in analyses. Doing this across multiple organizations to create a large enough sample for analysis would be prohibitively time-consuming.

However, some alternatives to TaskFlow have a more structured record of who own which work entities. These alternatives tend to be used primarily in software development organizations; they would lack the breadth of the TaskFlow organizations. However, they would have historic records of who owned particular work entities at particular points in time. It is possible that a researcher could gain access to data from these systems from a number of organizations that use them, either by directly approaching the organization that makes the software, as I did with TaskFlowCo, or by directly approaching the organizations themselves, as I did with GuestInn. A more publicly-available alternative also exists: open source software development communities frequently use these alternative tools to track their projects. These communities have more porous membership boundaries than the organizations studied in this project—people more regularly enter and exit. How this affects the

model developed in Chapter 2 would have to be considered. However, the open data access across a wide variety of projects that open-source communities afford may prove fruitful for continuing to develop the ideas raised in this project.

Interdependence, Ownership, and the Role of Status

The argument in Chapter 3 is that the two types of interdependence increase the importance of status in decision-making through five causal pathways. The findings in Chapter 1 raise another potential pathway that warrants investigation: distributed authority rights.

In Chapter 1, I argued that individuals were more likely to rely on ownership and negotiate provisional role relations during periods of time or in parts of the organization where role relations were more ambiguous or more out of step with the structure of work. When the level of dispersed interdependence—where individuals tend to work with many other coworkers—increases in an organization, the new relationships that it entails are less likely than previous relationships to have established the role relations they use. In an organization like GuestInn, the institution of ownership and provisional role relations are available to help navigate ambiguous new relationships like these. In an organization like GuestInn, increases in dispersed interdependence may increase the extent to which ownership and distributed authority rights are used as the basis for order giving relative to formal position or routines. Because, as mentioned above, requests based on ownership often entail *needing access* instead of *having power*, such requests may be more sensitive to the relative status of the potential order giver. As such, dispersed interdependence would have an impact on the importance of status in order-giving decisions not because of increased ambiguity of whose judgment matters, decreased insight into others' perceptions, or greater group coherence of status beliefs, but because *the basis*

for the potential order had shifted to a basis that is itself more sensitive to status.

This raises two questions. First, to what extent does dispersed interdependence increase the importance of status in the decision to give an order through the mechanisms proposed in Chapter 3 rather than via its impact on the justifications the order giver has available to make the request? The data described above that would potentially allow investigation of the role of ownership in status dynamics could also prove useful to address this question. If one could pin down whether requests shift from formal bases to a basis in ownership as dispersed interdependence increases, it would allow us to determine if changes in the nominal justification of decisions is actually a confounding mechanism between dispersed interdependence and the role of status in decision-making.

Second, when someone makes a decision whether to give an order, does the justification available to him or her shape how sensitive he or she is to status? Prior work has shown that when people have a sense of power, they are more likely to engage in behaviors that reflect a self-perception of high status (e.g., Anderson and Berdahl 2002). However, while a *personal* attribute, like holding a formal position, may create such a sense of entitlement, it less clear that something *relational*, like the abstract and generalized right to make a request, would have the same impact on individuals' sense of self. While it is beyond the scope of this project, it would be useful to revisit laboratory studies on the impact of power and formal position on individuals' behavior and self-assessed status, to comparatively test relational interventions. For instance, by comparing the behavioral and self-assessment outcomes of telling participants, "you the manager," versus, "you are allowed to ask a collaborator to work on a task when you need them to," an experiment may be able to get traction on elaborating the mechanism linking relational rights and status in decisions such as order giving.

Formalization and Institutionalization

Finally, the papers in this dissertation focus on *dynamics in social structures.* In Chapter 1, the focus on coordination when role relations are ambiguous uncovered the way that people fluidly negotiate and renegotiate provisional versions of these structures. In Chapter 2, the focus was on moments when individuals' patterns of relations to their coworkers changed from not giving direct orders to regularly giving direct orders. While Chapter 3's theoretical argument did not focus on change, in the chapter I analytically leveraged period-to-period variations in the structure of work to separate the impacts of interdependence from differences between organizations.

However, these fluid, relatively informally social structures were also frequently in the process of formalization. At GuestInn, role relations fluidly negotiated by means of ownership were regularly crystallized as formalized routines or materialized into software systems to manage the relations between two parties. The bundles of role fragments that individuals carved out for themselves were often institutionalized into job descriptions as parts of the organization sought to formalize its operations. The dyadic order-giving relationships that underwent change in Chapter 2 settled into regular patterns after the transition. Some such transitions that had unfolded informally at GuestInn were later formalized into managerial positional relations.

This points to two interesting directions for future research. First, how do informally-negotiated relations become formalized? Second, in a setting like GuestInn, where informal negotiations continue alongside the crystallized formalizations of prior negotiations, how do these shape one another? When both informal and formal bases of authority are available, how do people differently mobilize them as resources, and how do they differently enable or constrain action?

Organizations like GuestInn that are undergoing gradual formalization as they explore nascent production and market opportunities will continue to be fruitful sites

to explore these questions. Formalization processes can play out over several years, and might not be apparent during short windows of observation. Data-driven, longitudinally-focused interview protocols, like the one I developed in Chapter 1 will be invaluable for designing adequate data collection strategies to investigate processes of formalization. Online collaborative communities, such as open-source software or wiki-like communities, often begin informally and implement more formal rules and material controls as they grow. Furthermore, these communities often have rich historical interaction data. The code and configurations for their formalized and materialized controls are often publicly available, too. As such, these communities present a ready site to investigate how decisions to formalize are made as groups formalize their interactions and how different formalization choices change the nature of subsequent participation. Research on such processes could build from the theoretical seeds planted in this dissertation to develop theories of formalization as a dynamic process that interacts with status differences and social processes of coordination.

Appendix 1: TaskFlow Software

The TaskFlow software is used in thousands of organizations and teams within organizations to track and communicate about task work. The following description draws from the author's experience with TaskFlow, observation of its use in the field, and extensive coversations with TaskFlowCo's user experience research team and their research with hundreds of other TaskFlow users and TaskFlow-using organizations.

TaskFlow Overview

The most relevant features of TaskFlow for the present analysis are presented stylistically in Figure 13. Tasks are the atomic unit in TaskFlow, each representing a discrete unit of work. They contain a name and a description of the task, have an optional assignee and an optional due date, and contain a single thread of communication messages. Tasks remain open until marked "complete." Any user can mark any task they can see as complete. Any user can add or remove themselves or others in their organization as "followers" from any task they are able to see. They can also reference other users in a task comment using an "@ mention" (similarly to Twitter), which will automatically add that user to the list of task followers. All tasks have a conversation thread which tracks the history of messages sent related to the task; many organizations use the TaskFlow software to replace task-related emails. Finally, any user within a given organization can delete any task they can see.

TaskFlow has three primary interfaces. The "project" view is a structured list of tasks related to a given project. Each user also has a "to-do list" comprising all the tasks that are currently assigned to them. Finally, a "notifications" stream alerts users of changes or comments made on any of the tasks which they are following. The to-do list and notifications stream act as personalized *attention rules* (Cyert and

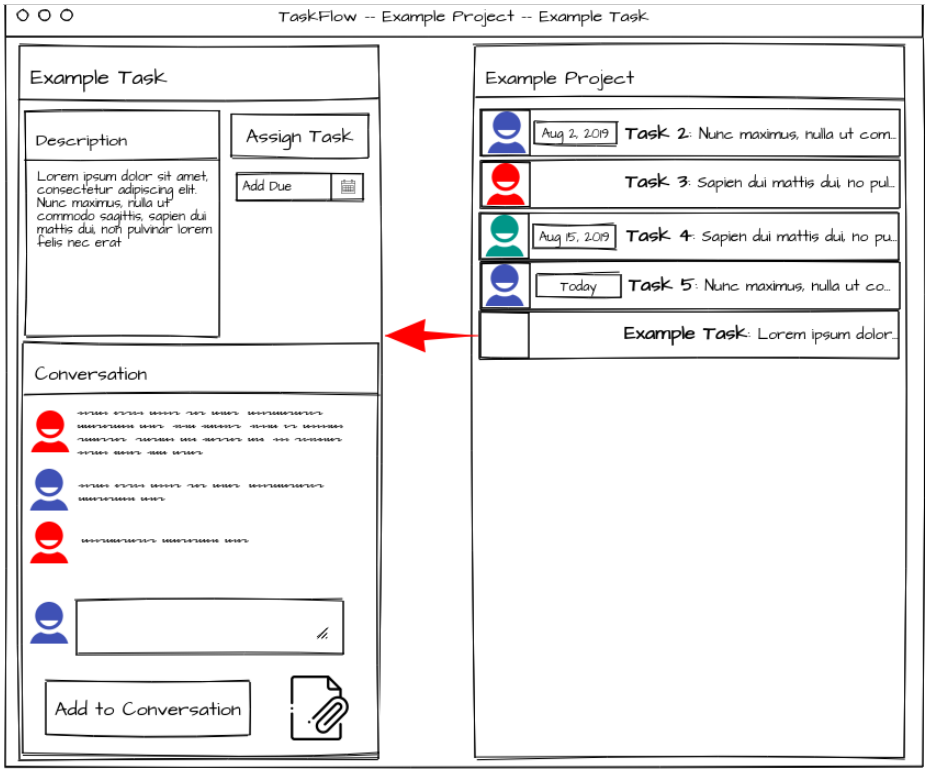


Figure 13: Stylized mockup of an example task and example project in TaskFlow.

March 1963), directing user attention to the items of work they need to complete and giving easy access to the comment history related to each task. The system allows any user to assign a task to any other user, even an intern to a CEO. Each task appears with a thumbnail of whomever the task has been assigned to, which makes assigning a task a highly public act. Full transparency is also the default in TaskFlow; unless a task is explicitly set to private, every person in the same organization is able to access it, read it, and even edit it.

Analyses in the main text are based on (1) comments entered in the task conversations (indications of co-working), (2) adding new individuals to these conversations (deference), and (3) assigning the task to a particular alter (giving orders).

The Use of TaskFlow

How TaskFlow is used in practice is perhaps best illustrated by an adbridged vignette from my fieldnotes of 2017-11-06 to 2017-11-08:

> On Monday, Vinod (VP of Data Science [DS]) informed the DS team that the executive team had requested that we incorporate old spreadsheet-based underwriting forecasts into our analyses. Because this would be a one-off task, we decided that I should take on the task. I created a task in TaskFlow during the team meeting in the Data Science Backlog project, moved it to the top of the priority queue, assigned it to myself, and added Edgar (the longest-tenure member of the team) to the task because he was most familiar with the old spreadsheet models I'd be working with. He and I met that afternoon so he could show me what needed to be done, and I took notes in the description of the task. I worked on the task the rest of Monday, Tuesday and into Wednesday.
>
> Tuesday morning, I met with Colin (Head of Growth) for an hour to discuss two tasks that he wanted the DS team to perform. During our meeting, I created both tasks in TaskFlow, populated the descriptions on the basis of our conversations, and added both tasks to the "to be prioritized" section of the Data Science Backlog project. Neither were assigned to anyone. Later that afternoon, the DS team had our weekly prioritization meeting, where we determine the priority order of the tasks in the Data Science Backlog project. We decided that one of the two tasks Colin and I had scoped would be top priority after currently-assigned tasks.
>
> Wednesday morning, I checked my notifications stream while waiting for the spreadsheet-analysis code to run. I saw that Vinod had assigned me a

new task about GuestInn's relationship with an outside data vendor. I replied on the task's comment stream that Akram is more familiar with that vendor, and @-mentioned Akram to add him to the conversation. A few minutes later, Vinod reassigned the task to Akram.

Wednesday afternoon, I finished my work on Monday's forecast task. I added a comment to the task detailing what I'd done and included links to relevant code and files. I then marked the task complete. Unsure what to work on next, I opened my To-do List in TaskFlow. My only other task was something I couldn't work on until after a meeting later that week with Colin and Edgar: I had @-mentioned both in a question comment last week, and the discussion in the task had resulted in us scheduling a meeting. I opened up the Data Science Backlog and saw the task Colin and I had created yesterday at the top of the priority queue. I assigned it to myself and began to work on it.

This sort of workflow is indicative of my days working both at GuestInn and when I interned at TaskFlowCo. I would go back and forth between the work I was performing on a task and the task entry in TaskFlow: referencing the description for guidance, reaching out to co-workers for input in the comments thread, recording progress or reference information in the comments of the task, responding to incoming questions or tasks in my own notifications stream, and turning to the shared Data Science Backlog queue when deciding what to work on after completing a task. The notifications stream replaced my email inbox at both GuestInn and TaskFlowCo: all asyncronous project-and-task-related communication came to me via notifications in TaskFlow. According to TaskFlowCo's UXR team and the company's blog, the way I used TaskFlow as part of the data science team follows a pattern common across established engineering and data science teams.

Other teams use TaskFlow in a more centralized fashion, with one project manager doing most of the task creation and task assigning. At GuestInn, this is how many of the city housekeeping and conceirge teams used TaskFlow. I have also seen IT teams and even bicycle shops use TaskFlow in this way.

Less formally-established teams (such as temporary project teams) also frequently use TaskFlow in a more ad hoc manner. Looking through early projects at GuestInn and during my time interning at TaskFlowCo when it had only 50 employees, temporary teams often create a TaskFlow project to track and coordinate their work. Sometimes, these projects are administered collectively as in the Data Science Backlog in the vignette. Other times a formally-designated project lead or administrator will handle task creation and assigning. Most often, however, these projects exist between these two extremes—formally they are adminstered collectively, but informal leads often emerge in these teams and begin to create and assign the majority of tasks. This informal leader emergence was apparent in both the traces of old TaskFlow projects at GuestInn and in interview accounts of these projects and temporary teams.

Finally, some teams use TaskFlow in a mostly individual-oriented (rather than team-oriented) way. Sales teams, for instance, might track their incoming leads as tasks in TaskFlow, pulling necessary indiviudals into the conversations in those tasks as they work a lead towards a sale. If they are in charge of their own lead-generation, sales persons on these teams might create and assign their own tasks to themselves. When leads are collectively generated, then sales persons might pull leads from a shared queue, assigning to themselves leads they are pursuing.

Across all of these modalities, there is still a layer of ad hoc requests coming into individuals' notifications steam, just like the persistent trickle of emails into an inbox. For example, the task that Vinod assigned to me while I was working on the analysis task, or the comment requests I had sent Colin and Edgar.

Appendix 2: Hierarchies in Motion Results Across Industries

Table A1 shows the distribution over industries of individuals in the Transitions sample. Two industries are the most over-represented: Internet and Software account for 29.8% of the sample and Services account for 17.7%. Nearly a quarter (24.3%) of indiviudals work in organizations for which TaskFlowCo lacked industry information. The remaining 28.2% are spread across the other ten industries.

Industry	Percent of Individuals
Communication Equipment	0.4%
Construction	0.3%
Finance	1.0%
High Tech Manufacturing	0.9%
Hotels and Restaurant	3.1%
Internet Software & Services	29.8%
Manufacturing	2.9%
Media	9.2%
Retail	5.3%
Services	17.7%
Transport	0.8%
Utilities	0.8%
Not Identified	24.3%

Table A1: Industry Shares of Transition Sample, based on TaskFlowCo's internal classifications.

To test whether the over-representation of Internet & Software and Services is driving the results, Figure 14 reproduces Figure 3 from the main text for each of the two largest industries, for individuals in Unknown industries, and for individuals in the other ten industry groupings. The characteristic trajectory of Figure 3 holds in each industry grouping, indicating that the empirical pattern is not unique to work in the Software or Services industries.

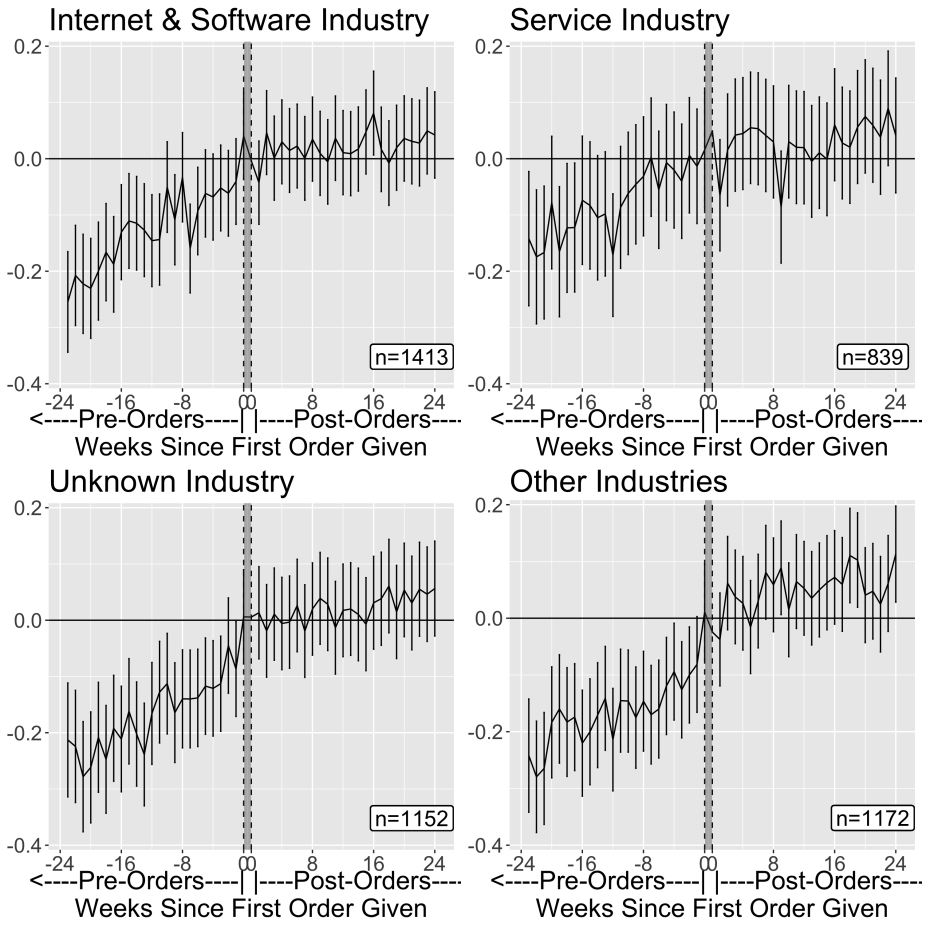


Figure 14: Average within-individual status trajectories for individuals in Internet and Software organizations, Services organizations, Unlabeled Organizations, and All Other Industries (Communication Equipment, Construction, Finance, High Tech Manufacturing, Hotels and Restaurant, Manufacturing, Media, Retail, Transport, and Utilities). All four groups of industries exhibit the same pattern as Figure 3: increasing status for up to 20 weeks before first giving orders and no status increase after giving orders. This indicates that the main trajectory is not unique to the Software or Services industries that make up the plurality of the sample.

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