The Horizontal Line in the Hierarchy:
How Managers' Backstage Interactions with Peers Become a Source of Their Authority

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Managers are delegated formal authority in organizations, but only some develop real authority to direct work while others do not. Prior explanations of managers' differing levels of authority focus on their personal characteristics, control of critical activities, or influence tactics with team members. In contrast, our paper reveals an undertheorized source of managers' varying authority: their networks of relationships with peer managers. Our findings derive from a unique dataset that included the complete communication data, including all public and private channels, of three flash organizations. In flash organizations, crowdsourced members complete one-off projects using online communication and coordination platforms. Our analysis showed that every manager engaged in backstage interactions with some peers to integrate their functions, which involved non-routine, open-ended discussions requiring new agreements and continuing repair. The managers who had more of these backstage integrative ties were able to consistently resolve their client's uncertainty and offer relevant and consequential tasks to their teams, whereas managers with fewer ended up with their teams ignoring tasks or seeking tasks from other managers, and had clients reassign work. In sum, the vertical exercise of delegated authority depends considerably on the integrative capacity building that unfolds along the horizontal lines of the hierarchy.

Keywords: Formal Authority, Hierarchy, Managers, Backstage, Linking Pins, Integration, Repair

Eras of widespread change in the technologies we use for work also result in the emergence and diffusion of new organizational forms (Barley, 2020; Barley & Kunda, 2001; Puranam, Alexy, & Reitzig, 2014). Such changes inspire organizational theorists to "develop images of organizations that are congruent with the realities of work in the new economic order" (Barley & Kunda, 2001, pg. 77). Consistent with this aim, our paper explores a new organizational form referred to as "flash organizations" or "gig projects" where clients crowdsource workers for complex projects that they complete online using communication and coordination platforms (e.g., Lix, 2021; Retelny et al., 2014; Valentine et al., 2017). "Crowdsourced" work refers to work hired on-demand through an online labor market (Howe, 2006, pg. 12), an approach that changes the speed and scale of hiring, with broad implications for task design, employment relationships, and careers (Kittur et al., 2013). As an organizational form, flash organizations relate in part to online labor markets such as Upwork or Freelancer where client managers use platforms to hire from among large online groups of workers (e.g., Gray & Suri, 2019; Rahman, 2021; Rahman & Valentine, 2020; Vallas & Schor, 2020). They also relate somewhat to open-source production (e.g., Wikipedia and Linux), where large online groups produce complex work using communication and coordination platforms (e.g., Benkler, 2002; Benkler, 2017; O'Mahony & Ferraro, 2007; O'Mahony & Bechky, 2008). Flash organizations also differ from these related phenomena on a dimension of particular relevance for organizational theory: despite the many automated platform features, they rely on formally structured managerial authority in the form of project managers or team leads to coordinate the complex and open-ended work (Lix, 2021; Scheiber, 2017).

From a classic organization design perspective, formally structured hierarchies are recognized as useful for coordinating complex work (Hayek, 1945; Williamson, 1981). Organizational design scholars argue that formal hierarchies create vertical information flows that enable organizations to mobilize coordinated responses to changing situations (Daft, 2015; Malone, 1987; Williamson, 1991; Zhou, 2013). Yet this now taken-for-granted structure also sets up "the problem common to all organizations" (Blau, 1955) – an individual having the formal authority to direct, evaluate, and sanction is not the same as an

individual having the capacity to elicit compliance with their directions (Aghion & Tirole, 1997; Wrong, 1979). Indeed, to understand formal authority, many studies have taken the generative approach of comparing people who are delegated the same formal authority and exploring why some develop real authority and others do not. Extending this classic question to flash organizations is a research imperative: formal managerial authority is a key differentiator between flash organizations and other forms of online production related to broad changes in the structuring of work in society (Benkler, 2017; Davis, 2016a; Puranam et al., 2014; Scheiber, 2017).

Prior research, conducted mostly in traditional bureaucratic organizations, offers considerable insight into the question of why some formal authorities develop real authority and others do not. Foundational research in this area explored the bases of authority that allowed managers to produce real authority beyond their formal office, such as having higher competence or charisma (e.g., Bennis, 1959; Peabody, 1962; Presthus, 1960; Simon, 1945; Weber, 1947). Many subsequent theories build on this foundational question, though they remain disconnected in their focus and methodologies. Some theories analyze the specific moments of hierarchical interaction and deference and identify the authorities' characteristics or interaction patterns that result in cooperation (e.g., Falbe & Yukl, 1992; Huising, 2015; Ridgeway & Correll, 2006; Simpson, Willer, & Ridgeway, 2012). Other relevant research focuses instead on identifying the sources of power and authority that accrue outside of those hierarchical interactions, including central network positions or control of critical workflows, but leave the moments of hierarchical instruction and cooperation implied (e.g., Brass, 1984; Ibarra, 1993; Salancik & Pfeffer, 1977a). Few studies draw on datasets or research frameworks that link these perspectives and examine both how authorities accrue unique resources *and* how their hierarchical interactions produce deference and cooperation in different situations. With these perspectives remaining disconnected, our understanding of how these various factors work together remains underdeveloped. If applied to the same group, these different theories would produce different predictions about which managers had real authority. Our paper draws on a unique dataset that allows us to consider these theoretical perspectives together and

explore the entire set of interactions over time whereby some managers, but not others, develop unique understanding and control of critical workflows and also issue instructions in ways that elicit cooperation.

We conducted this research as an inductive study of three flash organizations. We identified every decision that materially changed the project – including the means of production, processes, personnel, or task assignments – and analyzed how the managers who were involved developed the authority to secure cooperation with those instructions. Our analysis included the complete communication data, including both public and private Slack channels of all three organizations. These data also allowed us to ask how we would understand authority differently if we observed all backstage interactions — an opportunity typically unavailable to researchers.

Our results reveal that prior research downplays the prevalence and importance of interactions between peer managers in the backstage to explain differences in their relative authority. Our analysis showed that every manager engaged in backstage interactions with some peers to integrate their functions. These integrative interactions involved non-routine, open-ended discussions requiring new agreements and continuing repair. Those involved developed unique understanding and problem-solving capacity. The managers who had more of these backstage integrative ties were able to consistently resolve their client's uncertainty and offer relevant and consequential tasks to their teams, whereas managers with fewer ended up with their team members ignoring tasks or seeking tasks from other managers, and had their clients reassign work to other managers. These findings reveal that the vertical exercise of delegated authority depends considerably on the integrative capacity building that unfolds along the horizontal lines of the hierarchy.

FORMAL AND MANIFEST AUTHORITY IN ORGANIZATIONS

The structuring of organizations changes as technology changes (Barley, 2020; Davis & Sinha, 2021); this process is not deterministic, both change together through enacted cultural and political legitimation processes (e.g., Orlikowski & Iacono, 2000; Rao, Morrill, & Zald, 2000; Stinchcombe,

1968). Many scholars agree that organizational theory should similarly adapt to continue to align with empirical phenomenon of study (Barley, Bechky, & Milliken, 2017; Barley & Kunda, 2001; Puranam et al., 2014). As a society, we are creating an era of widespread change in employment relationships related in part to online labor platforms and production models (Gray & Suri, 2019; Kittur et al., 2013; Vallas & Schor, 2020), and related to the interplay between information communication technologies and "vanishing" corporations (Davis, 2016a; Davis, 2016b).

As these changes unfold, organizational theorists argue that some classically researched and theorized organizing structures, such as formal managerial authority, continue to be relevant for understanding the structuring of work (Benkler, 2017; Bourgoin, Bencherki, & Faraj, 2020; Davis, 2016a; Davis & Sinha, 2021; Malone, 2018; Scheiber, 2017; Valentine et al., 2017). Hierarchy as a template structure is recognized as offering useful coordination properties (Malone, 2018): collectives organized with hierarchy can adapt to emergently complex situations by structuring vertical information flows and specifying accountability and authority for ongoing decision-making (Adler, 2001; Argote, 1982; Chandler, 1977; Gibbons, 2000; Gulati & Singh, 1998; Zhou, 2013). Of course, such coordination requires that those who have been delegated formal authority actually produce the "probabilistic achievement" of eliciting group members' cooperation with their instructions. In this paper, we explore the changing nature of formal managerial authority by extending a classic research approach: we compare people who have the same delegated formal authority in flash organizations and explore why some develop real authority and others do not.

Foundational studies of formal authority in organizations

Our research question builds on foundational studies of authority in bureaucratic organizations, which involved structuring "formal authority" where the right to direct and discipline employees inhered in legally-defined offices and not in individuals (Astley & Sachdeva, 1984; Crozier, 1967; Weber, 1947). Yet many scholars note that an individual having the right to direct is not the same as having the capacity to elicit cooperation with directions; instead, any individual occupying a position of formal authority must

develop that capacity (Wrong, 1979). Related labels include "manifest authority" (Ewick & Silbey, 2003), relational authority: "the situational capacity to achieve obedience to commands" (Huising, 2015), or real authority: "the effective control over decisions" (Aghion & Tirole, 1997).

Early investigations exploring who developed real authority and how theorized additional "bases" that broadened the authority of an individual occupying an office of formal authority (French & Raven, 1968; Simon, 1957; Thompson, 1967). This early research identified personal characteristics, such as competence or charisma, that correlated manifest authority (Bennis, 1959; French & Raven, 1968; Peabody, 1962; Presthus, 1960; Simon, 1945; Weber, 1947). Later studies built on this research to examine who developed authority in organizations from the lens of social networks (e.g., Brass, 1984), strategic contingency (e.g., Salancik & Pfeffer, 1977b), status characteristics (e.g., Berger, Fisek, Norman, & Zelditch, 1977; Bunderson, 2003), and symbolic interaction studies (e.g., Denis, Langley, & Cazale, 1996; Huising, 2015). Table 1 illustrates these perspectives including, the sources, mechanisms, and operationalization of authority[1] in the studies.

Insert Table 1

Strategic contingency and criticality in some managers developing real authority

Both social network and strategic contingency theory cohere in predictions that power or authority comes from the control critical resources, information, and activities (Table 1). First, research on organizational social networks consistently links people's formal and network positions with others' perceptions of their power (for reviews see Borgatti & Foster, 2003; Burt, Kilduff, & Tasselli, 2013). When people are central in social networks, they have unique or independent access to information as

[1] Note, the terms authority, power, and influence are related, and definitions vary. Influence is often understood as someone "socially modifying the opinions, expectations, or decisions" of another (e.g., Anderson, Flynn, & Spataro, 2008). Power is often understood in terms of control of resources or dependence on another for resources (e.g., Salancik & Pfeffer, 1974). As Table 1 shows, many studies operationalize influence or power with evidence of achieving compliance or control over decisions. Such capacities and accomplishments are also consistent with the idea of real or manifest authority in hierarchical interactions as defined above. Keltner, Gruenfeld, and Anderson (2003) suggest that "authority is power that derives from institutionalized roles." Because our research question explores how people who are assigned formal authority develop the capacity to achieve compliance with their directions, we focus on and use the term "authority" while also drawing on literature on power.

well as the ability to influence others' interpretation of ambiguous information (Burkhardt & Brass, 1990; Krackhardt, 1990; Tushman & Romanelli, 1983). As an example, Brass (1985) found that people critical in an organization's workflow were seen as powerful whereas employees who were not critical to an organization's workflow struggled to access information and other resources. Brass and Burkhardt (1993) found that a manager's formal position predicted how powerful other people perceived them to be, as did their centrality in the communication network. Relevant to our study, where many interactions were hidden, Krackhardt (1990) found that people's accuracy in predicting their organization's communication network was related to their peer's rating of their power. He argued that people who understand the network can effectively draw together resources to solve critical problems. Marineau, Labianca, Brass, Borgatti, and Vecchi (2018) replicated and extended this result.

Social network research offers useful insight into who develops power and authority in organizations (Borgatti & Foster, 2003) but needs to be extended to more fully address our research question. Salancik (1995) summarized one of the main issues, which is that "interactions, the building blocks of networks, are too easily taken as givens… *why* interactions exist cannot be ignored when considering the role of networks in a theory of organization." He illustrates this point by suggesting that a network analysis may ignore that interactions unfold as people "plan, coordinate, or decide on their individual and collective work activities". In so doing, such an analysis risks comparing communication networks that form around well-designed or poorly designed workflows and attributing outcomes to network structure that are better explained by the workflow design (pg. 346). He further argues that in neglecting the reason for the interactions, network theories also do not adequately account for interactions that do not happen, relationships that do not form, or information that is purposefully concealed. This classic critique points to opportunity for organizational network theory to better account for the situated interactions that produce different network positions, and also how those interactions relate to key observed outcomes, such as real authority.

Many scholars similarly explored who develops power and authority in organizations and

centered the idea of critical problem-solving (Crozier, 1967; Perrow, 1963, 1970). A set of empirical studies in strategic contingency theory demonstrate that sub-units (or sometimes their managers) that can resolve their organization's critical problem or critical sources of uncertainty gain more power than other sub-units (Pfeffer & Salancik, 1974; Salancik & Pfeffer, 1974, 1977b). For example, they argue that if the automated machinery requires constant troubleshooting, the maintenance engineers have a "powerful say in overall plant operations", or if the organization is being sued, the legal department will develop increased power (Salancik & Pfeffer, 1977b). When subunits solve important problems, they contribute "critical resources, including knowledge, to the organization; in return, other participants respond to the demands of a subunit" (Salancik & Pfeffer, 1977b, pg. 4). A main argument in this body of research is that power accrues from activities, not from individuals. One implication is that a group's power depends on what their organization understands to be its critical or desired activities. Relevant to our study, where key interactions were hidden and understanding of problems was so unevenly distributed, Salancik and Pfeffer (1977b, pg. 8) argue that therefore the capacity to *define* an activity or problem as critical should be understood as a source of power. Research in this area has not yet examined how members construct shared understandings of which activities and uncertainties are critical.

Interactions involving deference and cooperation

Social network theory and strategic contingency theory have identified structural positions or strategically valued activities that are associated with some managers but not others developing real authority. However, studies in those areas do not look specifically at the interactions wherein those with or without authority issue commands with which team members comply or resist. The final two theories that we review focus more specifically on the interactions wherein real authority is manifest. Studies in status characteristics theory analyze the specific interactions where influence, power, or authority play out (for reviews see Bendersky & Hays, 2012; Keltner, Gruenfeld, & Anderson, 2003). People with certain status characteristics have real authority because other people defer to them during interactions, giving them more opportunities to contribute to the group goal. Their contributions are then evaluated more

positively, and they are given further deference. A key mechanism is thus the deferral and claiming of "action opportunities" during coordinated work (Bunderson, 2003; Simpson et al., 2012). Empirically, this research stream has focused more on personal attributes such as gender or race (e.g., Dupree, Torrez, Obioha, & Fiske, 2021; Joshi & Knight, 2015; Ridgeway & Correll, 2004; Ridgeway, Li, Erickson, Backor, & Tinkler, 2009). But the analytic framework is intended to generalize (Correll & Ridgeway, 2003): shared beliefs about competence and worthiness explain patterns of deference and evaluation. This perspective is not necessarily inconsistent with strategic contingency theory, which might predict that groups defer to those considered to have critical understanding. But both research perspectives raise open questions about how beliefs develop and come to be shared about people's capacity to solve critical problems or about what understanding is considered critical.

The final relevant theoretical perspective considers how social structures are created and maintained through repeated, meaningful interactions (Carter & Fuller, 2016; Denis, Langley, & Rouleau, 2007). Huising (2015) is relevant, though not a study of how formal managers develop real authority. That study examines how a group of professionals developed the capacity to elicit compliance from high-status clients. It is relevant because it is a rare look at how the quality of the instructions or commands themselves differed. When professionals took jurisdiction over menial tasks that gave them regular access to the clients' workspaces, they developed better understanding and closer relationships with the clients. Using these resources, they adapted their instructions to the clients to be more relevant, accommodating, and effective. A final set of studies somewhat related to the interaction lens looks specifically at tactics that managers use to influence subordinates. These studies considered whether a manager's use of rational persuasion, inspirational appeal, consultation, pressure, coalition, and ingratiation influenced members' cooperation (Falbe & Yukl, 1992; Yukl & Falbe, 1990; Yukl, Kim, & Falbe, 1996; Yukl & Tracey, 1992). As one example, Falbe and Yukl (1992) showed that any of these influence tactics could result in resistance, but that some tactics such as inspirational appeal or consultation were more likely to produce compliance. Influence tactic effectiveness depends on the

manager-worker relationship and group culture (Anderson, Flynn, & Spataro, 2008).

These theoretical perspectives offer many predictions about who develops real authority but remain disconnected. Few studies develop research frameworks that link these perspectives and examine both how authorities accrue critical resources and also whether their instructions elicit cooperation in different situations. Our paper draws on a unique dataset that allows us to consider these perspectives together and explore the entire set of interactions whereby some managers, but not others, develop unique understanding and control of critical workflows and also issue instructions that elicit cooperation.

METHODS

Research Context: Temporary Organizations and Platforms

Our research context is temporary organizations convened using crowdsourcing platforms. Many studies note the increasing prevalence of temporary organizations; several industries have come to rely on temporary groups, projects, or organizations to accomplish complex, high-value work (Bechky, 2006a; Edmondson, 2012; Goodman & Goodman, 1976; Huckman, Staats, & Upton, 2009). Scholars attribute this trend to several factors, including internet communication technologies that facilitate the assembly of temporary groups, as well as new macro-employment models where people pursue career paths that span projects, organizations, and industries (Benkler, 2017; Cappelli, 1999; Davis, 2016a). Examples of temporary groups used in different industries include innovation project teams (Dugan and Gabriel 2013), crowdsourced "flash teams" and "flash organizations" (Retelny et al. 2014, Valentine et al. 2017), "tour of duty" start-up teams (Hoffman et al. 2013), "fluid" project teams (Staats and Upton 2011), and ad-hoc virtual teams (Crisp and Jarvenpaa 2013). Temporary groups are also common in professional service industries including consulting, accounting, and law (Gardner and Valentine 2015, Weinberg et al. 2011).

Scholars have studied temporary groups and organizations to explain how members coordinate complex mission-critical work, even though they might not have worked together before (e.g., Bigley & Roberts, 2001; Meyerson, Weick, & Kramer, 1996). Bechky (2006a) introduced a theory of role-based coordination in temporary organizations. This theory explains how members of temporary organizations

arrive on scene with a shared understanding of a generalized role structure. Their shared understanding of their roles includes shared expectations about their differentiated skills and responsibilities, and they then negotiate coordinating interactions based on this commonly understood role structure (Faraj & Xiao, 2006; Huckman et al., 2009; Klein, Ziegert, Knight, & Xiao, 2006; Valentine & Edmondson, 2013). The role-based view characterizes the direct, verbal, interpersonal coordination among members of temporary groups and also emphasized that these instructions and compliance tend to unfold with a "remarkable" lack of overt conflict (Bechky, 2006a; Goodman & Goodman, 1976; Meyerson et al., 1996).

Related studies extended these ideas for temporary groups that convene and coordinate through online platforms (Lix, 2021; Lix, Goldberg, Srivastava, & Valentine, 2021; Retelny et al., 2014; Valentine et al., 2017). At the time of this research, many companies were using this model where temporary project groups were convened from larger networks of workers, coordinated through platforms. For example, a company called Gigster (www.gigster.com) created a network of software developers and solicited their participation for software development projects, coordinating work using platforms. Artella (www.artella.com) used a similar model for animated films, Catalan (www.catalan.com) for business plans, and b12 (www.b12.com) for website development.

Research setting: Three Flash Organizations Convened on Foundry

Our research setting was three software development projects crowdsourced using flash organizations. The three flash organizations were convened and managed by clients using an open-source web platform developed by computer scientists at a university in the United States. The computer scientists designed "Foundry" as an open-source software tool that could connect "requesters," or people who had ideas they wanted to produce ("clients" for the rest of this study), with "workers," or people who were paid to do expert work producing the clients' project idea. We negotiated access with the Foundry developers to study these three deployments of their platform tool. The clients who convened and ran the organizations used Foundry to hire workers from Upwork, a large online labor market. The clients used Foundry to do a platform-based "open call" hiring process typical of crowdsourcing. The clients

interfaced with the project timeline in Foundry to plan the project, when they added new tasks to WorkForce, the platform sent an invitation to eligible workers to join the project. When the workers clicked the email link, their web browser would open Foundry and display a shared project timeline. Figure 1a visualizes screen shots of this hiring process.

Insert Figure 1a and 1b Here

When a worker clicked the link to take the job and join a flash organization on Foundry, they were added to a multi-website ecosystem that centered around Foundry, including a document repository using GoogleDocs (docs.google.com) and a multi-channel chat system using Slack (www.slack.com). During the projects, the workers also used other shared web sites as they worked together, including skype.com (for video calls), github.com (for version control of code), and trello.com (for bugs and fixes).

Research cases and participants

All three clients used the Foundry platform and hired Upwork contractors to complete a new software product. Each client owned the final deliverables, consistent with Upwork.com policies on intellectual property. The clients hired managers and team members from Upwork to produce their app ideas. Everyone who was hired was paid by the hour according to their posted hourly rate. Each organization was comprised of about thirty members and had between five and seven managers. They were all introduced to their teams using the same email text because of the Foundry platform. They were introduced as "team leads" to each other and team members in emails Slack channels. Each manager was fluent in English, a proficiency tested by Upwork. They were asked to define tools and processes for their teams based on their role expertise, and so used a "mission command" coordination style characteristic of temporary organizations (Bechky 2006, Faulkner and Anderson 1987). As an example, the AmbulanceApp client said to the team leads at the start:

> We're counting on you being a part of the creative process and figuring out ways to make the product without being directed in everything. I'm happy to answer any high-level questions if you

feel like it is going to impact the project, but otherwise, feel free to come up with solutions and delegate as team leads in your relative domains.

Data Collected

Researchers have noted a need for better understanding of the dynamics of leadership groups, including how they form and evolve as they interact together around specific issues (Denis, Langley, & Sergi, 2012). Part of the lack of research is because of the difficulty in accessing relevant data that allow the observation of interactions and can capture relational dynamics as they unfold over time (Uhl-Bien, 2011). Our data and analysis allow for these kinds of insights (Table 2).

Insert Table 2 Here

First, we collected and analyzed all the archival trace data that were produced during each project. We used protocols approved by our institutional review board to ask and get informed consent from clients, managers, and workers to have the data generated during their participation in these flash organizations be collected and analyzed. The archival trace data included all the Upworker profiles and chat interactions; all the Slack chat transcripts; transcriptions of Skype meetings; all Foundry roles, tasks, and timelines; all Google Doc deliverables; and final products including the functional apps.

Slack public and private channels. As is common in some software development projects, most details of the teams' work were discussed and coordinated in their public team channel that anyone in the Slack could click into and read (see Figure 1b). So, for example, as Table 1 lists, the AmbulanceApp project involved 38 different Slack chat channels. One was called #android and was the public channel where much of the work for that team module was coordinated. Anyone from the organization, the client, and the Foundry developers could read all of the messages as they were posted in that public channel. The #android public channel chat transcript was 209 pages. Each organization's Slack channel structure was emergent, based on leader and worker activities. As Figure 1b illustrates, everyone's Slack interface also listed every member of the organization under "Direct Messages" – which were the private channels.

Anyone could send anyone a direct message or "DM". We collected the private channels by asking participants to voluntarily export and share their chat transcripts after each project had concluded. Private channels were mostly dyadic, where two people in the organization sent messages in a channel that could not be seen by anyone else. So, for example, the chat transcript between two managers in AmbulanceApp was a 21-page document. The Slack company does not allow sponsors to access private channel data, even after projects end. Participants opted in to providing their private channels and were paid for the time required to export this data. Everyone received top ratings and full payment for their work separately from providing private channel transcripts and participating in interviews.

We also created and analyzed one additional data set from this archival trace data. We created a spreadsheet that documented every task that had been assigned, including who had accomplished and been paid for each task, and who had assigned each task. Most of this data came from the Upwork payment records, and some details had to be hand-coded from Foundry or Slack task instructions. We also interviewed members of each flash organization and each client at the end of each project (Jick, 1979). These interviews were conducted by video call and were recorded and transcribed. Questions were open-ended and explored each worker's experience. We asked for descriptions of specific, concrete events before asking for interpretations (Spradley, 1979). The interviews provided insight into experiences and interpretations which were not observed in the online environment. The final data source was a set of field notes created by the first author based on participant observation with the Foundry developers supporting the clients in their deployments; participant observation is useful for understanding groups and social systems (Anteby, 2013; Bechky, 2006b; Van Maanen, 1988).

Analytic Approach

Creating the communication record and issue event record. The Slack public and private channel transcripts and skype call transcripts comprised the full communication data for each flash organization. These data sets were large and complex, and we developed different approaches to systematically document and understand patterns (e.g., counts of who spoke to whom in which channels),

and to understand the meaning and themes in those patterns (e.g., what were they talking about). Both of these related approaches involved conducting a first comprehensive line-by-line analysis of all the channels, public and private, and producing a comprehensive record of the interactions in a spreadsheet. The first author developed this approach first by coding several channels and recording interaction patterns in a spreadsheet, and then using that as a template to train a research assistant team to help scale that effort across all channels. The line-by-line coding involved reading a series of chats to understand the issue being discussed, and documenting the time stamps, speakers, target(s), and channels of each line of chat in a spreadsheet. This process involved careful interpretation because people had very different chat conversation styles; some people would type a few words each line across many lines to communicate a single idea, and other people would type a long paragraph into one chat message. Our approach adapted to this: each expressed idea was inputted into the spreadsheet, rather than each line of chat, which would have been biased by people's writing style. The first author met daily with the research assistants during this process to ensure consistent practices inputting the transcript patterns into the spreadsheet. This analysis process produced a spreadsheet with a curated, time-stamped record of all chat messages. From this, we were able to produce the communication networks as they formed and changed over time, both the private channel and the public channel networks.

Importantly, we were also analyzing the themes and substantive content discussed during the interactions that produced the communication network. In some ways, this qualitative analysis was a much more complex process because it involved reading the transcripts and understanding the issues being discussed, plans being made, and decisions or resolutions that came up as the work progressed. We systematized the qualitative analysis by first using "headings" in Microsoft Word to write high-level descriptions of issues as they unfolded, for example "Mark suggesting different UX process". We could then visualize the high-level sequence of issues as they unfolded over time by keeping the outline view in a Microsoft Word open in one of these 200+ page documents and then later by exporting the heading structure. From these two comprehensive analyses (the quantitative communication record and the

qualitative issue event record), we could then produce more conceptual analyses and memos.

Operationalizing real authority. We also conducted a systematic quantitative and qualitative operationalization of real or manifest authority, drawing on prior literature (Aghion & Tirole, 1997; Huising, 2015; Wrong, 1979). The quantitative analysis drew on the task record, which used the Upwork payment data and Foundry or Slack task instructions data, to document every task that had been completed and compensated, and who had assigned that task. Using this data set, we could analyze the share of tasks that each manager had effectively instructed each week during the project. For each project, we analyzed this in two ways. We first analyzed and visualized the share of effective instructions issued by each manager during *each week* of the project. We then analyzed and visualized the *overall share* of instructions issued by each manager during the whole project, taking out the time element to visualize overall authority. Importantly, however, we also knew that the public assignment of tasks, though in some ways a good measure of the performance of real authority, was not communicating the full story. Many key decisions had defined or changed team processes or tools in ways that mattered for the managers' ability to effectively issue these public task instructions. Therefore, we also qualitatively analyzed all the decisions that defined or changed team tools or processes.

Coding private channel practices. One of the main early insights from these various analyses was that the tone, content, and aim of the interactions in the private channels was different from those in the public channels. After we had read the transcripts and created the comprehensive issue event record, we then did another round of inductive coding where we aimed to understand the different practices used in public vs. private channels. We began with more fine-grained codes, for example "bonding over shared demographics" or "joking about public mistake", and eventually combined these into four main axial codes: making agreements, repairing, acknowledging, and joking. Consistent with common practices for coding qualitative data, we made this analytical choice based on frequency of code and theoretical salience (Charmaz, 2006; Golden-Biddle & Locke, 1993; Golden-Biddle & Locke, 2006).

Analyzing relationships. Based on the data and analysis this far, we knew from the task record

and the decision analysis that the managers ended up with substantially different levels of real authority. We also knew from our systematic coding that every manager who had developed some level of authority had engaged in those four practices in private channels (making agreements, repairing, acknowledging, and joking). We thus knew that the private channel interactions were important for understanding how the managers developed and maintained authority, especially in comparison with prior literature, but we also knew that the use of these practices, or the location of these practices did not alone explain the differences in managers' relative authority. We then considered what else explained differences in relative authority. For example, were differences explained by each managers' network of private channel collaborators or by the timing or sequencing of the issues they engaged in backstage discussions. Our final analysis, then, involved combining all of these previous analyses and tracking the content and structure of the forming and evolving backstage networks of each manager over each week of the project and seeing how they mattered for the decisions and instructions the managers were able to produce. The pacing and kinds of tasks changed over time – the last week of each project involved the most tasks and more non-routine tasks, so the path dependent nature of decisions indeed mattered for who was controlling work at the end. But it was the structuring of each manager's backstage network (over time) that accounted for most of the variation in relative authority, as our findings now illustrate.

FINDINGS

All managers in the three research cases were delegated the same formal authority, had the same access and privileges in the Foundry and related platforms, and were introduced by the platform interfaces and clients using the same language. Yet despite being delegated the same formal authority, some managers developed real authority and others did not. Differences in the managers' real authority – operationalized as share of completed tasks they directed and number of their decisions with which other people complied – did not depend on function, experience, gender, age, location, or wage. Our analysis showed that managers' differing levels of real authority depended on their network positions with their peer managers, which they constructed through backstage interactions. Every manager engaged in

backstage interactions with some peers to integrate their respective functions. These integrative interactions involved non-routine, open-ended discussions requiring new agreements and continuing repair; and the people involved developed unique understanding and problem-solving capacity. In general, the managers who had more of these backstage integrative ties developed more authority.

This pattern of results underscores the complex relational structure of delegated authority, which involves team members, peer managers, and a client. Over time, managers lost authority when they could not answer a client's question or resolve a client's concern and the client ended up reassigning work to a peer manager or promoting a team member to take over the work. Relatedly, they also lost authority when their team members either ignored the tasks that they assigned or sought tasks from other peer managers. The managers who avoided these scenarios were the ones who had developed unique boundary-spanning understanding through their integrative interactions with other peer managers in the backstage. Their peer relationships were key to their capacity to consistently resolve their client's concerns and to consistently offer tasks that were relevant and consequential to their teams. A few managers whose teams started later in their projects never developed or exercised authority because their peer managers never deferred to them, but instead immediately and publicly assigned work to them and their teams. Our findings emphasize the importance of peer managers within the relational structure of delegated authority, even though managers' authority seems to play out in "managing up" or instructing team members.

In this section, we use our longitudinal process data to illustrate why managers with more of these backstage integrative ties developed more authority than other managers. These patterns were common across cases, but played out in varying processes, similar to Morrill (1996). In AmbulanceApp, the relative authority among the group of managers was somewhat evenly shared throughout the project, and shifts in authority were gradual, even as these same patterns played out. In WorkshopApp, there was a more abrupt shift and a centralization of authority which then persisted. In StorytellingApp, the relative authority among managers was mostly explained by within-team instructions that unfolded without challenge, but also by a centralization of authority to the manager with more backstage ties. Following

the model summarized in Figure 2, we analyze and report each case in three sections: 1) summary evidence of managers' relative authority 2) characterizations of each managers' backstage interactions with peers and their integrative capacity and 3) instances of managers resolving (or not) client's uncertainty and offering (or not) team members relevant and consequential tasks.

Insert Figure 2 Here

Case 1: The AmbulanceApp Project

The AmbulanceApp project was run by a doctor. His idea was to develop a mobile app for ambulance drivers to communicate with emergency room departments (ERs) as they approached the hospital. The intent was for the ERs to display a screen in their check-in area with a map that would update in real-time, using GPS, as the ambulance drove to the hospital. The project was scoped to a fully functional prototype and web screen display in one ER. The client did not have prior experience developing mobile apps. This project was complex, and the teams were closely interdependent. Also, the integrated GPS functionality was a novel feature at the time. During this project, seven people occupied various manager roles (see Table 3). Five people were assigned manager roles at the start of the project, and two more were promoted to manager positions during the project. 1-Nima (Android) developed the most authority during the project but each of the seven managers made decisions and issued task instructions with which others complied.

Insert Table 3 Here

Case 1 Section 1: Summary Evidence of Each Manager's Relative Authority

We offer two ways to substantiate this overall characterization of the managers' authority relative to one another. The first way is with a visualization of general trends, as illustrated in Figures 3a and 3b. Figure 3a illustrates the share of *completed* task instructions issued by each manager during *each week* of the project. For example, in week one, 4-Sally (UI), assigned most of the tasks that were completed, and by week six, she gave none as illustrated by the orange area in Figure 3a. Relatedly, Figure 3b illustrates

the *overall* share of task instructions issued by each manager during the whole project, taking out the element of time to visualize overall authority. So, for example, even though 7-Chris (Android) and 6-Francis (FE) gave many instructions in week six (Figure 3a), their overall share was lower (Figure 3b).

Insert Figures 3a and 3b Here

The second piece of summary evidence is an analysis of specific decisions and task instructions that each of the managers participated in with which others complied. Table 4 summarizes the decisions made during the AmbulanceApp project that defined or changed the way that production proceeded. We will discuss below how these decisions and instructions played out, but a trend to notice in this table is which of the managers are able to offer tasks that are completed by their own team members as well as members of other teams. Also, a trend to notice in this case is that more managers agreed earlier about their respective teams' tools and processes, even before they started directing work on their teams.

Insert Table 4 Here

Case 1 Section 2: Characterizations of Managers' Backstage Interactions and Integrative Capacity

As the project began, the five managers easily deferred to each other to make decisions assumed to belong to each function, which is consistent with the Bechky (2006a) theory of role-based coordination. These involved decisions that unambiguously belonged to the different functions. For example, 1-Nima (Android) and the client decided to design the app for an Android tablet (vs. phone), because the ambulance drivers in the client's area used tablets. 5-Michael (BE) decided to host the web application on a certain server because he considered it more convenient. In this case, all five mangers started at the same time and deferred to each other during this period, although in other cases some managers started later and did not receive this early deference from peer managers. Importantly, these early decisions and peer deference usually played out in private dyadic channels or sometimes private group channels, and the different patterns of interaction as the peer managers made these agreements began to establish the backstage network as visualized in Figure 4.

Insert Figure 4 Here

Making agreements in private channels. As one example of the stage-setting agreements the peer managers made in private channels, 1-Nima (Android) and 2-Catherine (QA) discussed the cross-cutting issue of how to track bugs and made this agreement in their channel:

1-Nima (Android):	How are we going to track the bugs. Are we going to have a separate thread #android_QA maybe?
2-Catherine (QA):	we could. Not a bad idea, I don't imagine that this going to be big so tracking issues won't be a nightmare. I'll pitch the idea to 3-Levon (FE) and 5-Michael (BE) as well and see what they think
1-Nima (Android):	ok

2-Catherine (QA) confirmed the process with the other managers, and then later announced it to team members in a public channel. There was no public brainstorming or discussion about how to track bugs in the public channels, meaning that the client was never made aware that this was an ambiguous process question that was decided a certain way. Similarly, the team members did not weigh in on defining this process. As another example, 3-Levon (FE) and 4-Sally (UI) agreed to a workflow where the UI designers would complete and send screens to the front-end developers as soon as they finished them (vs. waiting until the entire set of screens was completed) so that the developers could start coding them. As their discussion ended 3-Levon (FE) stated why this agreement mattered for his team, "Each day I don't know what screens are already designed and can start work on. Now I know that they will give some screens, I can do that."

Another agreement that this set of managers made in private channels was the decision to not use Foundry for some of the project management functionality. Foundry had been assigned by the client, but the group of managers encountered some difficulties using it and decided to not use the tool as the client had instructed. The client did not know that the managers had moved some of the functionality off of Foundry until the end of the project. This example illustrates why we use the label "consequential" to describe some instructions. The client's instruction to use Foundry was not consequential – the managers could ignore the instruction without consequence. Many instructions throughout all three cases were

similarly not consequential. The capacity to issue relevant and consequential instructions was contingent and situational – managers' capacity (and in this case, the client's capacity) to issue consequential instructions depended on their understanding of their team's work and in many instances of other teams' work as well.

Repairing in private channels. Having made many agreements about tools and processes, the five managers engaged in another common and continuing interaction pattern that allowed them to develop and maintain authority. When the expected performance of a tool, process, or person failed, they quickly went to private channels to repair. For example, when a member of the Android development team encountered unexpected functionality, he began asking questions in the public channel. Almost immediately, 1-Nima (Android) sent a private message to 5-Michael (BE), asking, "Can we get someone from the back end to check whether all the data we capture from the android is included in the API for report emergency? Whoever it is can check them against the four screens." 1-Nima (Android) did not ask any BE team member to answer the question publicly, instead directed a private request to 5-Michael (BE) to decide who should take the question. 5-Michael (BE) checked on the issue himself and shared a screenshot that verified his fix with 1-Nima (Android) in the private channel.

As another example, when a question arose in the Front-end public channel, 2-Levon (FE) sent a private message rephrasing the question to 5-Michael (BE), who acknowledged the question, then said:

5-Michael (BE)	working on it. I thought it would be faster. sorry for delay. I will ping you during the day about it.
2-Levon (FE)	ok
5-Michael (BE)	it's really weird issue related to the sorting unexpected behavior from the driver for (database)
2-Levon (FE)	ok can you mention this under the (public) thread? so all are aware

They engaged in this private discussion, and after they agreed on an interpretation, agreed to share publicly. Another example unfolded when one of the Back-end team members kept making a mistake that affected the Android team. 1-Nima (Android) privately addressed the issue with 5-Michael (BE):

1-Nima (Android)	Hi. am sorry but can you make sure this doesn't happen again this is hindering our work

	why is he working on old version when I clearly told him you did changes yesterday Can you please make sure that all the changes you did yesterday and what I have mentioned is missing is on the old staging server
5-Michael (BE)	Yep, sorry for the confusion, [He] is trying to be sorting it out now.

The peer managers also repaired each other's process errors in the backstage, instead of publicly challenging each other. As an example, when 2-Catherine (QA) assigned a task to one of 1-Nima (Android)'s team members, 1-Nima (Android) wrote directly to her, "Hi can I make a small request? Please do not assign the bugs to the developers, I need to check the bug and assign it accordingly. Otherwise, they just go out of the plan." 2-Catherine (QA) led the quality assurance team and could have assigned bug fixes to anyone in the organization, and in fact later did assign but fixes to front-end and back-end team members. But 1-Nima (Android) addressed this ambiguous jurisdiction regarding her team in a private message. 2-Catherine (QA) said, "OK sure" and no longer assigned tasks directly to the android team.

Managers' different network positions. Every manager in AmbulanceApp was involved in some backstage agreements and repairs with other managers (Figure 4). Their authority relative to their team members depended on these practices. But our research question considers the variation in their relative authority: how did 1-Nima (Android) develop more real authority than 5-Michael (BE), having started with the same delegated formal authority. Since all managers used these backstage agreements and repairs, these practices alone did not fully explain differences in relative authority. Instead, the managers' different network positions that they constructed through these various backstage interactions explained which of these managers gained more or less authority than the others. We will illustrate how 1-Nima (Android) was able to consistently answer the clients' questions about difficult integration problems and consistently assign consequential tasks, whereas 3-Levon (FE), and 5-Michael (BE) the managers of the other core functions struggled to answer some of the clients' questions later in the project, even though any of them had the expertise from their core technical functions to do so. Figure 4 shows that 1-Nima (Android) constructed a central network position in backstage peer manager interactions; she had the most ties as she made backstage agreements and continuing repairs with 2-Catherine (QA), 3-Levon (FE), 4-

Sally (UI), and 5-Michael (BE). In comparison, 3-Levon (FE), and 5-Michael (BE) lost authority when they could not resolve the client's concerns about an integrative feature, and the team member 6-Francis (FE) who had developed a boundary-spanning network position between them had the understanding to solve that problem.

2-Catherine (QA) ended up with the second most authority of the managers; predicting solely based on team function, we would not have expected the QA manager to necessarily have the second most authority. But this pattern relates to an early agreement that she made in a private channel, with 1-Nima (Android) to track bugs and revisions on a Trello board, which she then launched and managed. She made agreements with the four other managers for this Trello tool to be used. The Trello board then became the de facto project management tool, and her control of that organization-wide tool enabled her to become and remain central to that cross-cutting work of assigning bug fixes. She had made the first agreement to adopt this tool in private channels with the four other managers, but she and 4-Sally (UI) only had ongoing backstage repairs with 1-Nima (Android), so similar network positions. Her managing this tool that mattered for every other team's work gave her a unique integrative capacity in the organization, especially compared to 4-Sally (UI) who only developed authority to instruct her own team and did not develop any integrative capacity to understand or assign tasks in other teams.

Team members' network positions and integrative capacity. Figure 4 also illustrates the network position of the team member, 6-Frances (FE), who developed integrative capacity through his backstage interactions with 3-Levon (FE) and 5-Michael (BE). He had ongoing private channels with each of them, wherein they made decisions about front-end and back-end respectively and repaired any frontstage problems that emerged for those teams. When the managers later struggled to answer integration questions for the client, 6-Frances (FE) had the understanding and capacity to resolve that issue and direct the work to complete a critical non-routine task at the end of the project (described in detail below). Additionally, another team member, 7-Chris (Android), also developed integrative capacity through his backstage interactions with 1-Nima (Android) and 6-Frances (FE) during weeks 3, 4, and 5. His backstage interactions with 1-Nima (Android), who had the most cross-cutting understanding

of the whole project, allowed him to develop unique understanding of the overall project progress and problems. Because of these interactions, he had a fuller understanding of problems that had arisen and how they had been resolved. As an example, he and 1-Nima (Android) had this discussion in their private channel. She began, "Hi, (the client) has requested quite a lot of changes. I have two tasks so far." 7-Chris (Android) responded, "I recommend against (one of the suggestions)." She responded, "I totally agree with you" and they ignored that instruction without consequence. His backstage repairs with 1-Nima (Android) also gave him insight into what was happening with other teams. As one example, he understood how some of their decisions mattered for the back-end team:

1-Nima (Android):	(Uploads a file with feedback from leader)
7-Chris (Android):	i dont think that's possible within the api and i think its unreasonable to add that in to the backend now
1-Nima (Android):	Yes don't bother

Towards the end of the project, 7-Chris (Android) and 6-Frances (FE) each then had two or three backstage ties with managers or people who became managers. They developed unique understanding and problem-solving capacity during these backstage integrative interactions that later enabled them to resolve the client's concerns in ways the other managers could not.

Case 1 Section 3: Instances of Integrative Capacity Mattering for Managers Resolving (or not) Client's Uncertainty and Offering (or not) their Teams Consequential Tasks

During the early weeks of the project, peer managers deferred to each other on decisions and tasks that fell within their functions. Later in the project, leading up to week 4 (Figure 3a), more problems surfaced in public channels as the project began to require non-routine and complex tasks that depended more on integration between functions. During this period, the five original managers' authority shifted. The client began to express more uncertainty in public and private channels about a few key issues. 1-Nima (Android) was able to engage and resolve his uncertainty, in part because she had the integrative capacity to solve cross-cutting problems, whereas 3-Levon (FE) and 5-Michael (BE) were less able to do so. During this period, 6-Francis (FE) and 7-Chris (Android) were also able to engage and resolve the client's uncertainty more effectively than those two original managers, so they also developed new relevance and authority. They were both promoted into formal manager positions. Their network

positions and prior interactions had positioned them to be able to resolve the client's uncertainty on key issues, whereas 3-Levon (FE) and 5-Michael (BE) did not have that same capacity, and their authority waned slightly though not as dramatically as in other cases. In this final section, we analyze four instances where the managers' integrative capacity allowed them to resolve the client's concerns and to offer relevant and consequential tasks to their teams.

1-Nima (Android) Integrating User Feedback. One main event in the project involved the teams getting a first workable prototype to the client for feedback and receiving more substantial requests for changes than they had anticipated. The client had not asked for two separate workflows on the app for high acuity and low acuity patient cases, but when he had the first working prototype and showed it to emergency medical technicians (EMTs, ambulance staff) they immediately suggested that they needed a different workflow on the app for high acuity cases. They wanted particular screens, data fields, and functionality for acute vs. non-acute patient cases. This feedback impacted the work of every team, so the changes needed to be integrated. As Figure 4 illustrates, 1-Nima (Android) had the network position constructed through backstage agreements and repairs with other managers to understand the work and status of other teams. She had the integrative capacity to help coordinate these repairs across teams.

As one example of how 1-Nima's (Android) understanding and ability to integrate across teams, she and 4-Sally (UI) had the following discussion in their private channel. 1-Nima (Android) was asking 4-Sally (UI) how her team planned to respond to the client's feedback on the high acuity cases. 4-Sally (UI) explained her team's plan and asked, "Is everything clear for you?" They realized there was some misunderstanding in what they were saying to each other and had extensive back and forth to figure out why. The issue finally resolved like this, which demonstrates 1-Nima (Android) understanding the specifics of the UI team, her team, and the back-end team and how they would integrate (i.e., through the inputted text fields).

1-Nima (Android)	(posts image) This is the update screen?
4-Sally (UI)	(posts different image) Here's the High Acuity Screen
1-Nima (Android)	thanks

	So.. it will not show the name, age (basic inform?)
4-Sally (UI)	??? Really
1-Nima (Android)	It is not there
4-Sally (UI)	I think this is mistake Sorry for this, but there were updates in last min and they need us to finish ASAP
1-Nima (Android)	I understand Should they be included and how That's what I want to know
4-Sally (UI)	The same as any item they are text input fields

This is a representative example of the many instances of 1-Nima (Android) communicating with the peer managers to coordinate and integrate their responses to this substantial request for change. With this cross-cutting understanding of how the teams were integrating their work in response to the change, she was consistently able to answer the client's questions and resolve the client's concerns. The client frequently said things to her during interactions in the private channel such as, "I always know I can count on you to make things happen" and "I trust your judgement." Other managers experienced instances where they were not able to resolve an issue for the client and he re-assigned the work to other people.

In addition to consistently answering the client's questions and resolving his concerns, during this period of time 1-Nima (Android) was also able to consistently assign consequential tasks that people on her team and other teams completed. As an example, she directly instructed in the QA public channel to a front-end team member: "Logan: can you check this issue soon 'Unable to Register user on Mobile App' (SEV 1)? I put the task on Trello." He replied "yeah" and a few minutes later asked for access to the database. She replied, "Can you ask the DB access from 5-Michael (BE)?" In that simple but representative example, she as the Android manager is directing a front-end team member in the QA channel, and also knows to connect him to the back-end manager who managed access to the database. In contrast to other managers, we did not find examples of 1-Nima's (Android) tasks being ignored or examples of her team members seeking tasks from other managers. Throughout the project, she consistently assigned consequential and relevant tasks.

6-Francis (FE) Integrating GPS Feature. Another series of events that illustrates the link between backstage network position, integrative capacity, and real authority involved the app's GPS

functionality, which was complex and cross-functional. The client would sometimes ask for updates on the GPS functionality and was usually told that it was coming. Behind the scenes, 3-Levon (FE) and 5-Michael (BE) kept putting off the work of this complex functionality while focusing on other things. During this time, 6-Francis (FE) took on work integrating the front-end and back-end, so he interacted extensively with both managers and began to understand both teams' work. He developed a unique understanding of how they were integrated, and many tasks were assigned to him because of his unique position and understanding. He engaged in backstage repairs with both team's managers (Figure 4).

The GPS functionality was novel and complicated to work out. During our analysis, we created a separate memo dedicated just to tracing these interactions across all the private and public channels. It is a 24-page memo that covers 18 days of work and 14 public or private chat channels. The first 9 days played out as a comedy of errors, with the client pursuing a series of backstage interactions with various managers trying to figure out who was managing the production of the GPS feature. He had a series of similar backstage interactions. For example:

Client:	Also; how close are we on the GPS functionality?"
1-Nima (Android):	What do you mean by how close?"
Client:	When will we be able to see the location of the app user on the clinical back end?
1-Nima (Android):	It is already done and the location is updated The backend should be receiving the location
Client:	Any way to visualize it?

They soon realized the functionality had not actually been configured yet. He asked again later and 1-Nima (Android): said, "ask 5-Michael (BE)" and 3-Levon (FE) said, "oh check with 6-Francis (FE), I think he is doing that." Eventually, the three core function managers all pointed the client to this team member as the one most likely to know what was going on with the GPS functionality. His prior boundary-spanning interactions with these managers made his understanding uniquely relevant for this moment. The client contacted him:

Client:	Hey 5-Michael (BE) said to contact you about the web app functionality I am hoping to get an update on the GPS function
6-Francis (FE):	Hi (Client), what are you after about the GPS function? At the moment in web app, we… [*technical update*]

6-Francis (FE) then chatted for a long time with the client to figure out what the client saw as the problem, and at the end of the interaction took responsibility for following-up, saying, "I'll check with android and back-end dev on how often the location is updated from android and see what we can do on web app." After a couple of days, 6-Francis (FE) returned to the client and said, "I have just tested it and it works." He fixed another failure mode and told the client about that repair too: "I have open same case in firefox [a web browser] and on chrome [a web browser] and when I change location in firefox, it updates in chrome." At this point, the client reassigned the work and authority for the GPS functionality to 6-Francis (FE) who was formally promoted to a manager in the various systems. The extensive work to complete the GPS functionality was thus directed by 6-Francis (FE) and not by any of the core managers, who lost authority at this point. 6-Francis (FE) began directing all the work related to the GPS functionality across many different teams and channels. For example, he later tagged someone he had never interacted with before in a public channel and said, "I believe you implemented this (minor GPS-related feature) for the web front end? please see the question above." He also posted public instructions about how the feature worked and then started delegating tasks to specific people on how to finish out the functionality, which they completed.

7-Chris (Android) Integrating Formal "Specs". Another instance illustrating this process involved 7-Chris (Android) developing real authority because of his integrative capacity. This example involved the formalized "specs" or a set of documented requirements to be satisfied by different components of the app. At the start of the project, the client's idea was nascent, and he did not have a lot of technical experience. Each of the five managers had iteratively defined plans with him to help him translate his ideas into specific tasks relevant for their teams, for example drawing up a napkin sketch of what the app would look like so the UI team could more formally design the screens. Because these early interactions were so iterative and open-ended and verbal, some teams began their development processes without formal specs or documented requirements that might be expected in a complex project. 7-Chris (Android) asked frequently about the lack of specs; as an example, he asked 1-Nima (Android), "Have

you got the latest specs? That will help us limit the issues we raise." She replied, "Well those are not written actually. Many things were decided on the go." He asked a few times whether they should pause and create the formalized specs, and each time the managers decided to not stop and formalize the specs.

We reported examples above describing how 7-Chris' (Android) backstage interactions with 1-Nima (Android) enabled him to develop a cross-cutting understanding of project. He developed an integrative capacity through his active involvement in backstage repairs with 1-Nima (Android). In the final weeks of the project, 1-Nima (Android) referred the client to 7-Chris (Android) on a few issues that were complex and involved integrating work between two or more teams that she did not have time to manage herself. During his backstage interactions with the client (see Figure 4 week 6), he said, "I don't have a manager for a lot of these tasks I'm picking up." He also privately offered his perspective on some of the problems that were arising: "I think for any projects that require large datasets we would need to finalize the data schema and the required functionality in advance." The client replied, "Yeah, you're stepping into a DRI role here." (Note, DRI stands for "directly responsible individual" – a term used in the software industry.) The client then joked "we'll promote you and give you a raise… 'promote' lol." The client thus reassigned authority for open-ended, hard to define tasks required to integrate the rest of the work to complete the app. The client elaborated,

> DRI is tricky now b/c there were so many other DRIs of other modules before and you can't really DRI their stuff... so in some ways it is hard to define. I think it is more like stuff that everyone brings up now (it is not supposed to be anything new, ping us if it feels new) we need someone to be able to say "I will make sure this gets done" and work with others to make sure it happens

7-Chris (Android) was thus given delegated authority for complex and undefinable integration tasks. The client formally promoted 7-Chris (Android) in the project systems. In the final week of the project, 7-Chris (Android) assigned relevant and consequential tasks to members of the android, front-end, and back-end teams, which they completed. As one representative example, he said in the public front-end channel, "hey (team member) do you have any tasks assigned to you at the moment?" The team member replied, "Not really; at the moment I have just one new feature." 7-Chris (Android) said "OK. I have assigned WEB-07 and WEB-08 to you." The team member said, "I'll look into it" and asked several

clarifying questions that 7-Chris (Android) answered. He then replied "Yep; easy; got it. Yes, got them in Trello; will fix that today."

4-Sally (UI) Issuing Consequential Tasks. As the findings so far illustrate, most of the manager's decisions were met with deference from peers and were introduced to team members without acknowledgement of alternatives. The managers developed and exercised authority without much direct challenge or conflict. Instead, in this setting, authority shifted more often through the client reassigning work, usually in backstage interactions, or through people just ignoring instructions that did not seem consequential. We conclude our analysis of instances of authority playing out with one example of a direct challenge. This final example illustrates how the backstage network was relevant to a direct challenge to authority from a team member, and again illustrates what it means for a manager's instructions to be consequential. This dynamic involved 4-Sally (UI) and someone who was hired to join her team. One of the new team members joined and asked if he could use his favorite tool, which was different from what others were using. He also then suggested that the team begin using a centralized check-in process using a cloud drive instead of checking in all of their files on the public team channel as 4-Sally (UI) had directed. He and 4-Sally (UI) had a few tense exchanges in their team public channel. She publicly asked him to focus on his tasks. He continued to push for a different team process:

> I think we need to make some meeting for the art department; and come to a consensus of conceptual things in our workflow; definitions of the words and discuss all the nuances of work; it is important that everybody understand in the same way
> (i am sorry if it is too much words and not in the right time; but this meeting can save a lot of time and exclude many questions in work process)

He posted this at 6am. By 8am, 4-Sally (UI) had posted a backstage message to 1-Nima (Android) saying that he had downloaded all of the graphic files into a personal Dropbox.

4-Sally (UI):	Hi need your advice I have discovered by a chance that (team member) has grapped [sic] all the application designs to a folder belongs to him in Drop Box ?? . Please Advice
1-Nima (Android):	see I would also inform the client, and provide my opinion and perhaps not assign any work to him
4-Sally (UI):	I stopped. (the client) is offline and not responding
1-Nima (Android):	but as off now we do not have the facility to suspend him What if you buzz (the client) on skype

4-Sally (UI):	Please give me his skype Id (receives it) ok thank you

It is unclear whether his download was done with malicious intent; it is possible that he downloaded the files to organize them or improve them, in keeping with his constant suggestions. 4-Sally (UI) wrote the above message and contacted the client with a similar message. She wrote in private channels where she already had developed relationships. The team member also then wrote in a private channel to the client, for the first time:

> wanted to write you about big respect; this project that you are
> making right now is really cool
> and i glad that can be a part of the team
> but after one and a half hour of my work here it could be that it will not be possible to do:)
> (copies screenshots of interactions with 4-Sally (UI))
> some more examples of what i really like and want to create :simple_smile: :
> (4 web site URLs of his work)
> waiting for you response and your thoughts about this situation
> (waits 5 minutes)
> also have few more things that will be good to discuss about some parts of work flow and how is everything happen) i have my own vision about somethings; it you will agree will be possible to improve a little bit workflow

This team member never received a response from the client to the above message. When the client received these messages, he went to well-established backstage relationships and started to ask people whom he already knew about how to interpret this situation. He wrote:

Client:	Who is [Slack user name]? Have a bunch of messages from them that I don't understand.
1-Nima (Android):	[Name]; a UI designer. 4-Sally (UI) didn’t approve of his work so we’re considering letting him go.

It seemed that the team member expected that his suggestions had technical superiority that would carry the day. But 4-Sally (UI) had established relationships with the other managers and client, and that position enabled her to weather the challenge to her process and her authority. Her interpretation of his ambiguous move to download the files into his Dropbox folder shaped her network’s interpretation of that move. This action became accepted as reasonable cause for his termination.

In summary, this section illustrated that many shifts in authority unfolded when managers could or could not address issues involving integration between teams. In this case, the client became involved

by reassigning work when he became uncertain about these issues. Managers' capacity to integrate work across teams generally involved backstage agreements and repair with other managers that enabled them to understand and solve cross-cutting issues. Additionally, this section also illustrates that managers' authority also depended on their capacity to issue consequential tasks that could not be ignored or challenged. The consequence of ignoring or challenging an assignment from a manager who had authority was an escalation to the client or other managers and them reassigning the task.

Case 2: The WorkshopApp Project

The second research case was the WorkshopApp project, where the client was a project manager at a consulting company. His idea was to develop a web application that would connect the company's clients to the workshops that the company offered. In addition to the web development, the project scope also included user testing and also required that the code and graphics be consistent with the company's systems and branding. This client had technical experience and had conducted web development projects before. This project was complex and required close interdependence between teams. During this project, six people were assigned formal manager roles (see Table 5). More people were assigned manager roles at the start of the project, but only four of the originally assigned managers developed capacity to assign consequential tasks that were completed. Additionally, one team member, 1-Fares (BE), was promoted to a manager position and in fact became the manager on the project who developed and exercised the most authority. The pattern of authority, though different in many ways from the AmbulanceApp, played out along similar themes: when the client's sense of uncertainty rose, 1-Fares (BE) was the person who best resolved it, in part because of the integrative capacity he had developed.

Insert Table 5 Here

Case 2 Section 1: Summary Evidence of Each Manager's Relative Authority

We first substantiate this characterization of the managers' relative authority in two ways. The first way is with a visualization of general trends, as illustrated in Figures 5a and 5b. Figure 5a illustrates the share of completed instructions issued by each manager during each week of the project. For

example, in week one, 5-Primos (UI), assigned all the task instructions, in week two about 40% of instructions, but by week three he was responsible for no instructions. Relatedly, Figure 5b illustrates the overall share of instructions issued by each manager during the whole project, taking out the element of time to visualize overall authority. So, for example, even though 1-Fares (BE) and 2-Aman (BE) began giving instructions later in the project (Figure 5a), most instructions were given in the final two weeks.

Insert Figure 5a and 5b Here

The second piece of summary evidence is again an analysis of specific decisions and task instructions that each of the managers participated in. Table 6 summarizes the decisions made during the WorkshopApp project that materially changed the way that production proceeded. A trend to notice in this table is the centralization of decisions and task instructions to 1-Fares (BE) and 2-Aman (BE). When 0-Nishant (QA) begin the quality assurance process with his team, peer managers did not defer to him, and he made no decisions related to tools, process, or tasks instructions. This table also illustrates that 4-Olga (FE) assigned tasks that were completed at the start, but lost authority over time.

Insert Table 6 Here

Case 2 Section 2: Characterizations of Managers' Backstage Interactions and Integrative Capacity

Work on this project began similarly to AmbulanceApp, in that the client and managers first deferred to each other on decisions within their respective team functions, consistent with the theory of role-based coordination (Bechky, 2006a). As is typical, 5-Primos-UI and the UI team began the project. In the second week, UX, front end, and back end began team operations as well, and each manager made decisions about tools and processes that belonged to their teams. 4-Olga (FE) began like this:

4-Olga (FE)	(File post) This is general requirements for frontend. They concern technologies of frontend, common writing code style, file structure, etc. @member1 and @member2: Please, read this document
member1	ok, I'm reading it.
Slackbot	@member3 has joined the channel

4-Olga (FE)	Hi, @member3. I am Olga, frontend team lead. Nice to meet you. Please, read the document above about Frontend workflow.
member3	noted @Olga
member1	I have read the doc. @Olga
member2	Interesting requirements. I'm ready to do like this. @Olga
4-Olga (FE)	They are for us to have the same code.

Even as the project started like AmbulanceApp and consistent themes played out (similar to Morrill, 1996), one major difference emerged. Compared with AmbulanceApp, the starting managers had fewer backstage agreements and repairs interactions with each other (see Figure 6, week 1). Some had private interactions with the client, but at this point no manager had more integrative capacity.

Insert Figure 6 Here

Managers construct different network positions. Figure 6 illustrates the evolution of the backstage network. The content of these backstage ties was similar to those in AmbulanceApp: the interactions in these private channels were characterized by agreements and repair. However, in this case there were fewer of those interactions and connections between peer managers, especially at the start. One of the original managers, 3-Denis (FE), was eventually demoted for being non-responsive and his pattern of communication was apparent at the start. As an example, 5-Primos (UI) direct messaged (DM-ed) 3-Denis (FE) at the start of the project:

5-Primos (UI)	Hi
3-Denis (FE)	Hi
5-Primos (UI)	Please let me know your role in team

5-Denius (BE) did not respond at all for two days, which was unusual for the culture and pacing of this setting. Two days later, 5-Primos (UI) wrote again:

5-Primos (UI)	Hi
3-Denis (FE)	Hi
5-Primos (UI)	May I know your role in team?
3-Denis (FE)	I am backend manager
5-Primos (UI)	ok

That was the complete set of their DMs. Additionally, 5-Denius (BE) simply never responded to 4-Olga (FE). Her attempts were spaced out over several days:

4-Olga (FE) Hi, Denis. Do you need help with the html?
..
4-Olga (FE) Client wants us to unit in htm
..
4-Olga (FE) Please, help me where can I see the pages that client shows in admin. I go to localhost:3000/admin but there is only login page

These were the only messages in their private channel. The DM thread between 2-Aman (BE) and 3-Denis (FE) was similar. The client became aware of 3-Denis (FE)'s non responsiveness. When facing a delay, 4-Olga (FE) DM-ed the client, "Hi, Client. I have some holdback in main page theme. Because I don't know what to do, I asked 3-Denis (FE) but I have no appropriate feedback. I wrote to him in private and public group." The client replied, "okay I see that, we can touch base if he doesn't respond before 9am tomorrow." The client eventually decided to demote him as a manager.

In addition to the general non-responsiveness of 3-Denis (FE), the backchannel interactions between 4-Olga (FE) and 5-Primos (UI) were also limited. These teams were all interdependent, so the lack of collaboration among the managers was unusual across cases. Work was moving forward within each team in the public channels, but the managers lacked collaborative integrative planning. Delays began to accumulate in the integration between these three teams, and this slipping performance played out in public channels. During this starting period, the client sometimes became aware of problems or delays. He messaged the involved parties. Here is an example exchange:

Client: Hey I have a question
4-Olga (FE): yes
Client: I was going through some of the pages and noticed some missing elements
4-Olga (FE): yes that was my mistake
(explains)
Client: I wanted to know if there was something that we should've given you to ensure that the mistake didn't happen
process improvement stuff lol

Those kinds of mistakes were not uncommon across any of the cases or any of the managers, but were usually caught and resolved with backstage collaborators, not first noticed and called out by the client. Thus, notable in Figure 6, is the lack of backstage ties between the peer managers. Eventually one of the team members developed the first boundary-spanning position in week 2, where he developed unique understanding and capacity compared with the client, who had been doing most of the coordination and

integration work up until that point because of the lack of communication between the peer managers.

Team member develops integrative capacity. During this period, when the teams were somewhat moving forward, but the integration was delayed, 1-Fares (BE) began helping in a boundary spanning role between the teams and began an active backstage interaction with the client and a couple of managers (Figure 6, week 2). 1-Fares (BE) engaged in backstage interactions with his manager, some back-end (BE) teammates, 4-Olga (FE), and the client, and because of his work helping out on delayed tasks, he also had the most interactions with the set of peer managers of anyone on the project. 2-Aman (BE) had ongoing interactions with BE teammates, some with the client, but few interactions with peer managers.

The private channel interactions between 2-Aman (BE) and 1-Fares (BE) were similar to those characterized in AmbulanceApp. When unexpected problems arose in the public channel, they switched to private channels to repair. As an example, 2-Aman (BE) and 1-Fares (BE) discussed:

2-Aman (BE)	Hey, What is this spa folder
1-Fares (BE)	I just explained (implying in the public channel)
2-Aman (BE)	People gonna get confused
	Everything should be under client directory
1-Fares (BE)	we will remove confusion in a few minutes once authentication is integrated
	We can just rename it, I just did not want to disturb anyone working
2-Aman (BE)	no his authentication work is not integratable
	No one has done that work yet
1-Fares (BE)	oh I see

2-Aman (BE) did not publicly call out 1-Fares' (BE) mistake, instead they quickly resolved it backstage and fixed it before anyone else noticed. 1-Fares (BE) and another BE team member frequently repaired problems together in the backstage channel like this. The team member would confirm things like "Yup its not visible." or "Its working fine." Once a similar conversation started in the public channel and 1-Fares (BE) messaged that team member, "let's do private chat, otherwise on that other channel all know we are working :smile:" and the team member confirmed "Yup :smile:" 1-Fares (BE) also frequently offered new ideas. They discussed in the private channel with 2-Aman (BE) often explaining why the ideas were not workable. They developed specific understanding of the project through these interactions and avoided broad awareness of the unexpected events that unfolded during their work.

1-Fares (BE) and the client also developed an active private channel collaboration (week 3) as 1-

Fares (BE) took on boundary spanning tasks to help with the delays between teams. He and the client began joking in the private channel about the delays between UI and front-end:

1-Fares (BE):	I think you should check the progress / messages on (public) channel… seems like finally something is up there… like the UI team have finally started using to do some real UI development instead of just only discussions that I witnessed in last couple of days : smile:
Client:	lol thanks for the updates man

Their backstage interactions which were much more candid than the public discussions. For example, the client began a discussion thread by saying, "Hey.. remember how I said that 3-Denis (FE) and 4-Olga (FE) were upsetting me?" 1-Fares (BE) replied "Yup" and the client described how he had tried resolving an integration problem that had come up between the teams. As another example, 1-Fares (BE) shared his feelings about a problem that emerged on his team.

1-Fares (BE):	so [particular page] went to hell and i was like ohhhh f****** it was fine last night and what happend when i woke up
Client:	exactly lol, I thought you'd be totally pissed

This update was not necessarily relevant to the client and did not require him to make any decisions or give any feedback. In the other cases, he might not have noticed or been informed about this problem.

1-Fares (BE) also engaged in the most interactions with the set of peer managers of anyone in the project. These interactions were important, because he developed unique understanding of cross-cutting problems and integration delays that allowed him to make suggestions to the client on how to solve problems that emerged. It was not solely the social connection between him and the client that was the source of his developing authority, he also developed strategic understanding of the cross-cutting integration problems that began to concern the client. For example, he and 4-Olga (FE) discussed:

1-Fares (BE):	And which one you want me to integrate first? So I will focus on that Do you know the status if their backend api is done already? If no, then i will talk to backend guys or find out myself
4-Olga (FE):	I don't know, you can ask them

4-Olga (FE) accepted his help, assigned him tasks that closely integrated with her team, and relied on him to be the go-between between the front-end and back-end groups. In addition to engaging in

backstage agreements and repair with 2-Aman (BE), 4-Olga (FE), and the client, he engaged more in front-stage communication with the set of peer managers than anyone else. For example, he wrote:

1-Fare (BE):	4-Olga (FE): 5-Primos (UI): Hi guys, 2-Aman (BE) asked me to help you guys with backend integration! Please let me know if you have any UIs but that needs integration with backend! I am here @Team member: Anything I can help with ?

Both 4-Olga (FE) and 5-Primos (UI) and team members started to give him tasks. As another example of how he began to connect among the set of peer managers, he asked the client,

1-Fares (BE)	let me know please to whom with hookup [sic] for this integration
Client	4-Olga (FE), team member, and 3-Denis (FE)
1-Fares (BE)	ok. Going to do that now
Client	awesome

In an interview, 1-Fares (BE) explained the integrative capacity that he developed, "By that time I was given a title of team leader, I was already using the leadership group. I wasn't supposed to take initiative on the UI side, I was a BE developer. I didn't have to participate in UI discussions, but I wanted to help."

Case 2 Section 3: Instances of Integrative Capacity Mattering for Managers Resolving (or not) Client's Uncertainty and Offering (or not) their Teams Consequential Tasks

To this point, our analysis of this case reveals that the set of peer managers developed much less integrative capacity through their interactions with each other. The client held most of that awareness throughout a lot of the project, until 1-Fares (BE) began to develop more of that cross-cutting understanding than the client or anyone else on the project. The specifics of this case differed from AmbulanceApp because fewer people at this point had developed the capacity to help integrate across teams, however the general process was similar – the client reassigned work as his sense of uncertainty arose, usually in response to integration problems, and team members ignored tasks from their managers that did not seem consequential or went to other managers to get task instructions. There were many smaller instances of these dynamics, in addition to one major instance of authority shifting that included the client privately reassigning authority to 1-Fares (BE), everyone publicly voting on the change that had

already been arranged in private channels, and then some managers struggling to assign consequential tasks after that major change.

The client re-assigns work to 1-Fares (BE). As the lack of integration between the teams played out with delays and mistakes in public channels, the client DM-ed 1-Fares (BE), "If you want to do end to end, I'll let you work on (this task)." This is an example of the client reassigning work from the original managers. 1-Fares (BE) confirmed he could finish it that day and further offered "I can help with integration if the UI side is built!" 1-Fares (BE) asked clarifying questions, and during this interaction the client kept asking him to check in with the managers, affirming their overall authority at that time, even as he reassigned some tasks to 1-Fares (BE). 1-Fares (BE) promised to talk to the managers about how he could contribute, noting to the client "otherwise I'll keep asking you questions. And I want to contribute not become a burden lol." The client approved the plan and told him to "share the burden with 4-Olga (FE)". Also, after doing another task that integrated work between teams, 1-Fares (BE) suggested a new process. The client responded, "I'd like to ask 3-Denis (FE), but I'll keep that an open option."

1-Fares (BE) continues to develop integrative capacity, client continues to reassign work. In week 3 1-Fares (BE) brought up an idea to the client of an overhaul of the plan and overall framework for the project that incorporated and integrated across all the teams' work. As an example, he sent a file to client and said, "How about the following structure? Just wanted to share early thoughts that came to the mind so to validate my understanding at bird's eye view level and it's not lost anywhere." The client replied with a smile emoji. At this point, the client still consistently responded in ways that upheld the existing plan, managers, and deadline. The backend (BE) team was using an Javascript framework known as angular[2] and 1-Fares (BE) had an idea for how all the teams could adapt their work to be consistent with the BE team's approach. When 1-Fares (BE) first approached the client with the idea of changing to the Angular approach, the client said no:

[2] Note that jquery and angular are two different JavaScript Tools, and the subject of common comparison. The Upwork.com web site says "Nowadays, both AngularJS and jQuery play a prominent role in the world of modern front-end web development" and has a web site dedicated specifically to describing when either could be used: https://www.upwork.com/hiring/development/angularjs-vs-jquery/

Client:	i count on the leads to make decisions that i ask and when i ask them to, that they tell me as a unit i was told the decision had been made you think angular is better i truly agree with that but we can iterate in a phase 2 lets get a product out the door
1-Fares (BE):	understandable. let me talk to 4-Olga (FE)

However, during this same period, 4-Olga (FE) asked 1-Fares (BE) for his advice on a particular "plug-in" to use that would fit well with the work happening in the back-end group. He answered in a way that began to introduce his idea of changing things to angular. She asked:

4-Olga (FE)	@1-Fares (BE): can you help me to choose jquery plugin for calendar? So, I will be sure, that this jquery plugin will fit the best for angular
1-Fares (BE)	For angular, we will need to do the conversion anyways, as you are using raw jquery. But let me quickly check and get back to you

He searched for a solution and came back to the public channel with a list of options. She asked, "So, which to use better?" He said that back-end could eventually convert whatever she chose and said specifically, "you can use any one (of these listed plug-ins) for now… whichever is easier for you." She responded, "ok, I will use jquery, because I am not very familiar with Angular."

A few days later, 1-Fares (BE) also started picking up a few tasks that no one had officially assigned to him and also assigned a newer UI team member some tasks. He DM-ed the client:

> I kind of took charge of UI things in absence of any new commit to githib after my last commit and I saw no new discussion is done on UI and there is no progress untill now. New person joined the team and I have put him to some work while others are away. Just sharing status with you! As I am not sure if I should have done that but I did !

The client replied, "lol thanks man" This was the first time that the client did not direct 1-Fares (BE) to check with or work with the existing managers but implicitly approved 1-Fares (BE)'s expanding authority. With his fuller understanding of the UI team's work he again brought up the restructuring with the client: "Let me first talk to Olga and see if they have done in Jquery or not. because it's a fresh development in UI anyways and in that case we should go with AngularJS." The client replied "please do

before she gets too far" which the first moment that implied he was open to 1-Fares (BE) idea that involved major change in plans for the whole project, including 4-Olga (FE) and her team.

1-Fares (BE) and 2-Aman (BE) stage public vote changing tools and process. After the client signaled openness to this new plan, 1-Fares (BE) got 2-Aman (BE)'s final approval as well. They decided to put the decision to a public vote. Both 1-Fares (BE) and 2-Aman (BE) had stronger relationships with the client and their team members at this point than did any of the other managers, who would be affected by the vote. We report the details here to illustrate the public discussion dynamic:

2-Aman (BE)	@channel Let's see who all are online
Team member	I am here.
Team member	I'm here
Team member	I vote for Angular JS
2-Aman (BE):	Ok so we have 3 votes for AngularJS @ Team member ur vote?
Team member	I'm here
2-Aman (BE)	@4-Olga (FE) do vote please
Team member	I'll use Jquery.
2-Aman (BE)	@Team member vote AngularJS or jQuery
Team member	jQuery
Team member	AngularJS
2-Aman (BE)	Ok we got 4 angular 2 jquery

Note that as the conversation unfolded, the 1-Fares (BE) was not yet formally promoted to manager. He and 2-Aman (BE) did not acknowledge that they had already discussed it and had also discussed it with the client. 2-Aman (BE) started the vote, and as it unfolded, 1-Fares (BE) voted publicly. 2-Aman (BE) teased him that he had already counted his vote (this is a continuation of the above transcript):

1-Fares (BE)	I vote AngularJS I can help in basic skeleton for AngularJS side and can start in couple of hours
2-Aman (BE)	Counted your vote @1-Fares (BE) ;)
1-Fares (BE)	Ok thanks
2-Aman (BE)	No attempt to convince here but in any form we need two way binding since form has to be rendered and user data has to be saved Coding is only about learning So Angular vs jquery
2-Aman (BE)	@4-Olga (FE) @Everyone , please vote here AngularJS vs jquery

4-Olga (FE)	Ok, but I have no experience in AngularJS
Team member	I'm same to @4-Olga (FE)
4-Olga (FE)	So, I vote for jquery.
2-Aman (BE)	Ok there is a 10, step tutorial
Team member	I agree with Aman (BE), AngularJS is better for project and easy to learn

They introduced the vote and then actively resolved concerns, telling people that Angular will be easy to learn and that "coding is learning". The vote was not unanimous in favor of angular over jquery, but the majority voted for angular. No one challenged the vote as a legitimate way of making this decision. The proposed change had implications for the work of the UI, UX, Front-end, and Back-end teams.

1-Fares (BE) immediately began front-stage communications that centered task instructions around Angular. He wrote instructions for the "new AngularJS team" – a new group comprising members from several functional groups (UI, UX, front-end, back-end) who had expertise in angular:

1-Fares (BE)	uploaded a file: "Instructions for new AngularJS team"
2-Aman (BE)	cool @1-Fares (BE). thanks let's put it on wiki in github
1-Fares (BE)	@2-Aman (BE): a new member can be given this welcome mate

For several days, he signed in and began his work by announcing in the new public Angular team channel that anyone new should describe their strength in AngularJS:

1-Fares (BE)	<@channel>: Hi All, New team members who joined, can you please describe your strength e.g. AngularJS. Just to see where we can start engaging you ASAP!

Later, when a team member was having trouble installing something, 1-Fares (BE) first asked him if he had read the Angular instruction file, even though the particular problem the team member was encountering was not related to his familiarity with angularJS.

1-Fares (BE)	Did you read this angular instruction file?
Back-end Member	No i havent
1-Fares (BE)	Please quickly through it There are things related to angularjs that i would want you to review and keep in mind always

When he had new tasks to divvy up, he would introduce them like this, no matter what domain or functionality they were related to:

1-Fares (BE)	Hi All, Is there any AngularJS dev with basic AngularJS knowledge and experience available for couple of small items right now?

4-Olga struggles to assign relevant tasks. Meanwhile, this change dramatically shifted the authority of the other managers. 4-Olga (FE) had been actively directing work up until that point and the front-end team had already done several weeks of work in the other software framework that would now need to change. After this vote, 4-Olga (FE) and her team members struggled to contribute. In an interview, she said, "It was a not-so-good experience… Sometimes I think freelancers are more… single players. Not team players." A team member said "I did the work… I was there ... and I expected more work. The project suddenly moved to AngularJS there, so I could not do that... and I can't learn it right then. I mean I was working so I don't have time to learn Angular JS." She described feeling out-of-the-loop even as the planning and discussion unfolded in public. She said in an interview:

> What are they planning to do, you know? You need to ask all the time, it's like, "What will we do? What will we do?" All the time. The most frustrating thing when the Back End developer made our work... we had one plan and in a day it appears that they have another plans, you know?

The workers were also confused about their team they after the Back-end leads started adding everyone to the new Angular channel. An private interaction between 4-Olga (FE) and team member illustrates:

4-Olga (FE)	so, you decided with 1-Fares (BE) to remake everything on angular, yes?
FE TM1	I am little bit confuse sometimes they said to work on angular some time jquery, They added me into #angularjs_ui_dev I am reading their all conversation, Can you tell me on which module do you want I should work?
4-Olga (FE)	ok, because for now I think they cannot decide clearly for us what we need to do I will ask and give feedback

Later, she said: "I have no feedback yet from them. Please, if backend ask you to do something, always tell me, because I have to know what we do as team, ok." 4-Olga's (FE) team started to ask 1-Fares (BE) and 2-Aman (BE) in the angular channel for tasks:

Front-end member	@1-Fares (BE): any task for me?
1-Fares (BE)	Do you do AngualrJS ?

1-Fares (BE) and 2-Aman (BE) continued to centralize communication to the Angular channel, which had over 900 posts by the end of the project. The next most active public channel was Back-end which had 400 posts. For example, they made this announcement:

2-Aman (BE)	these are the fixed on **ui_work** (branch of the git repository) <@channel>: Finish and commit your work in **ui_work** today; dont push anymore changes to it; I will delete the branch today;
1-Fares (BE)	Agreed!

As illustrated in this snippet, their public discussions in the Angular channel now touched every functional domain, including UX, UI, front-end, and integration.

QA team lead develops no authority. The final example of such interactions involved the QA team lead. He had started his team channel with a lot of enthusiasm and ideas for how to test the web portal. He initially wrote to his team, "We'll need all of your help!" and two of the members enthusiastically assured him he had their support. But after a few misunderstandings in the public QA channel between him and 1-Fares (BE), the public channel was quiet. He had been instructed to get the test materials from 1-Fares (BE) and was waiting for those. But 1-Fares (BE) thought he had started:

0-Nishant (QA)	I waiting till I got the final confirmation from your side so don't worry
1-Fares (BE)	final confirmation ? are you not using it since afternoon deployment?
0-Nishant (QA)	I am unable to use from yesterday
1-Fares (BE)	we told you this afternoon that its deployed

After that interaction, the QA team started to work, but 1-Fares (BE) and 2-Aman (BE) wanted to change their process instead of deferring to 0-Nishant (QA). They thought it would improve the overall process, but it added extra work for the QA team. 0-Nishant (QA) expressed frustration in the public channel. 1-Fares (BE) responded "0-Nishant (QA): cool down man. We are all a team." They exchanged a tense series of messages and 1-Fares (BE) ended with "We are trying to make our bug reporting and fixing process better! That's all." After this interaction in the public QA channel, no other QA team members ever wrote again. 1-Fares (BE) sent the client a quick backstage message about these events. The client responded, "Wait what was QA that you mentioned? I've been doing a lot of things." 1-Fares (BE)

explained, "nothing, somehow 0-Nishant (QA) did not read 2-Aman (BE) last status message when he went off about the deployment and url." The client responded, "ah." 1-Fares (BE) and 2-Aman (BE) then issued all of the QA task instructions that were completed. 0-Nishant (QA) never issued task instructions that his team members completed.

In summary, this section illustrated a shift in authority that unfolded when the original managers failed to address issues involving integration between teams. The client reassigned work when he became uncertain about those managers' capacity to deliver the project. He reassigned work to 1-Fares (BE), whose capacity to integrate work across teams arose from his backstage interactions with several managers, the client, and his teammates. After the public vote that changed the project framework, he and 2-Aman (BE) had the integrative capacity that was strategically valuable to the client and were the only managers who issued consequential tasks that could not be ignored or challenged.

Case 3: The StorytellingApp Project

The third flash organization is the StorytellingApp Project. The client in this case was a team of three podcasters. They set out to produce a card game and mobile app to complement their podcast that broadcasted personal narrative stories. Their main interest was the artistry of the game, so their close feedback and involvement focused there and were the source of most of the delays. During this project, five people occupied various manager roles (see Table 7). The first four were assigned manager roles at the project start, and all original managers developed capacity to secure compliance with instructions.

Insert Table 7 Here

Case 3 Section 1: Summary Evidence of Each Manager's Relative Authority

The managers' relative authority is visualized and substantiated in two ways. The first is a visualization of general trends, in Figures 7a and 7b. Figure 7a illustrates the share of instructions issued by each manager during each week of the project. For example, in week one, the content creation team was working, and 5-Oma (CC), gave all the instructions to her team. Their work was concluded by week

three. Figure 7b illustrates the overall share of instructions issued by each manager during the whole project, taking out the element of time to visualize overall authority. 1-Mohsen (Android) began work later, but much of the work unfolded during the final weeks, and his overall authority was the highest.

Insert Figures 7a and 7b Here

Table 8 offers the second piece of evidence substantiating managers' relative authority. This table reports an analysis of specific decisions and task instructions that each of the StorytellingApp managers participated in. Because the work was independent and modular, most of the task instructions were issued by team managers and completed by their team members. But this table also illustrates how 1-Mohsen (Android) developed authority to instruction tasks within his team and also the UI and Web teams.

Insert Table 8 Here

Case 3 Section 2: Characterizations of Managers' Backstage Interactions and Integrative Capacity

This case was similar to the others in that peer managers mostly deferred to each other on issues related to within-team processes and tools at the start. This case differed because some of the work was more sequential and modular, rather being closely interdependent. The work of content creation and user testing, led by 5-Oma (CC) and 3-Danica (UX) respectively, was independent from other teams. The work of graphics and UI, web development, and android development were more closely interdependent. All three of those managers (2-Vlad (UI), 4-Leo (Web), and 1-Mohsen (Android)) had the skills to do all the work of UI, web, and android development, so the division of labor and managers' relative authority was more ambiguous.

Managers' different network positions. As Figure 8 illustrates, the backstage network began with the independent team managers interacting with the client in private channels, but not with each other. 5-Oma's (CC) and 3-Danica's (UX) backstage interactions were all with the client. They still involved new agreements and continuing repair pertaining to their respective teams' work. But their network positions are similar so do not explain their authority relative to other managers. Their

discussions in their private channels with the clients demonstrate that they integrated work within their teams in ways that provided value to the clients and enabled them to offer their teams consequential tasks.

Insert Figure 8 Here

The work of 2-Vlad (UI), 4-Leo (Web), and 1-Mohsen (Android) was more interdependent, and of these three managers, 1-Mohsen (Android) developed a backstage network position with more ties and also more authority than the other two. The overall process played out slightly differently – again, following the case analysis exemplified in Morrill (1996). One main factor shaping the managers' differing authority was the clients' communication style. In all three cases, the managers had to iteratively help the clients communicate their plans and visions, so access to the clients was always part of the managers developing authority, especially vis a vis their team members. And most managers easily accessed the clients, as can be seen in all the network figures by the many ties to the red dots in the center, so client access was not a unique advantage for managers in other cases. In this case, the managers all had private channel discussions with the clients, but 1-Mohsen (Android) ended up with unique access to the clients that contributed to his developing authority. His unique access to the clients came from their preference to discuss their overall project concerns in long phone calls that ended up implicating the work of the other teams but did not include the other managers. Still, even though he developed unique understanding of the clients' concerns and preferences through those long conversations helping resolve their concerns, he still relied on backchannel interactions with another manager and his team to integrate and carry out the interdependent work; he had unique integrative capacity that shaped his authority.

As an example of the general concerns the clients discussed with 1-Mohsen (Android), on a phone call they expressed uncertainty related to crowdsourcing and app development in general:

Client 1	Can this really happen? Can we get this developed in four days?
1-Mohsen (Android):	What you've written up. It's pretty simple ...
Client 1:	Yeah, but the question's for ... for the actual development to happen that fast. It's surprising to me. But I guess maybe it'll only take a couple of days once the directions are clear enough.
1-Mohsen (Android):	Yeah. It depends how many android developers we do have, but I think it's just a matter of making sure the task is well communicated, so that

> people just know everything that's expected of them. I think the app is simple enough.

This is a snippet in a longer conversation about the process of crowdsourcing and app development. These clients also needed more help than the other clients with creating workflows in Foundry. And as part of these initial phone calls, 1-Mohsen (Android) also helped them decide to develop the app for Android rather than iPhone because he had more experience with Android development.

1-Mohsen (Android) developed a backstage network position with the most integrative ties, but his relationships with peer managers also differed slightly from those in other cases. In this case, more of his authority came from his unique understanding of the clients concerns and preferences, As an example, the three managers had been waiting for the clients' feedback on some of the graphics, and at the end one of 1-Mohsen's (Android) phone calls with them he was able to quickly ask for updates on when the feedback would come and report that information back to 2-Vlad (UI). His unique understanding based on his backstage interactions with the clients allowed him to enter the conversations with 2-Vlad (UI) and 4-Leo (Web) with more privileged understanding. He and the other managers developed new understanding together as they applied the clients' preferences in their planning, and he relied on their involvement to integrate work across their teams. But many of these interactions began with 1-Mohsen (Android) communicating information or asking for updates. As an example, he wrote: "I see no work progress from your side is everything fine? Can you update me what is going on?" with a smile emoji and 4-Leo (Web) responded with updating his work. Also, note that the other managers did not have ties with each other (Figure 8).

1-Mohsen (Android)'s network position also involved an active private channel with a teammate that involved continuing repair. They had discovered a social connection based on shared culture:

1-Mohsen (Android):	hey bro nice to talk to you. are you Syed [a name with religious significance]
Team Member:	yes. my full name is Syed [first name]
1-Mohsen (Android):	+1 much respect for Syeds :smile:
Team Member:	Thanks bro *(back and forth discussion of this connection)*

1-Mohsen (Android): I hope we have a good team work
Don't worry I have experience in android development and guide you
If there is any issue

They had an ongoing private channel collaboration. As an example, they developed a routine where the team member would submit work to 1-Mohsen (Android), who would review it, and say: "OK - can you share the screens on #android?" As another example, when the team member typed something personal in the public channel, 1-Mohsen (Android) said in the private channel "better to chat about personal things directly. :smile: you can delete those messages it is not good to ask in general group."

Case 3 Section 3: Instances of Integrative Capacity Mattering for Managers Resolving (or not) Client's Uncertainty and Offering (or not) Members Consequential Tasks

For the teams with more independent work, there are instances of the managers integrating work within their own teams in ways that resolved the clients' concerns and also enabled them to continue to offer their teams consequential tasks. For the teams that were more interdependent, the relevant examples illustrate how 1-Mohsen (Android)'s network position enabled him to integrate and direct work across the teams in ways that avoided concerns from the clients or challenges from peer managers or team members.

5-Oma (CC) resolves clients' content concerns, offers consequential tasks. The first example relates to 5-Oma (CC) and her backstage interactions with the client as she managed the content creation team. The clients had the idea to "crowdsource" the writing of poetic prompts that were written on the cards in the game, so they hired a large team of writers to create those prompts. They had not originally structured a formal manager to oversee this process, expecting it to be a decentralized team of writers. The clients expressed a strong ethic of respecting artistic creativity but were dismayed to discover that they did not want to use the content that was being produced. One of the clients discussed this concern with 5-Oma (CC), a writer at the time. Upon hearing the client's perception of the process breakdown, she offered to play a previously undefined role for the team of writers. She took pieces of work from each writer and wove them together into new poems, honoring the client's respect for the artistic process, but also integrating the tone and quality of the writing. 5-Oma (CC)'s was promoted to "chief poet" – a joking label between her and the clients, but one that came with right to assign work in public channels

that other team members completed.

3-Danica (UX) resolves clients' process concerns, offers consequential tasks. A related but different set of events played out involving 3-Danica (UX). A team of user testers began implementing a traditional user testing process, but the clients privately expressed dissatisfaction with the "richness" of the findings. 3-Danica (UX) had market research experience in addition to traditional user testing, so she was able to repair the disappointing performance by suggesting a process involving videotaped and transcribed focus groups playing the game and using the app. She offered, and the clients agreed, to hire and manage a larger, multidisciplinary team that the clients had not initially scoped. These two instances illustrate how backstage access to the client allowed these managers to develop their authority, especially relative to their own team members. They had less opportunity to do so relative to peer managers.

1-Mohsen (Android) resolves data privacy concerns, takes over web tasks. In contrast to the examples above, the instances where 1-Mohsen's (Android) authority grew did play out relative to the authority of the other technical managers. As an example, when 1-Mohsen (Android) helped the clients understand and repair involved their concerns over the privacy of data that might be stored on the web site, he was able to develop understanding relevant to 4-Leo's (Web) team. Someone asked a question in the public Android team channel about who "owned" or controlled the data that users created on the app and that would be stored on the web site. Immediately following the public question, 1-Mohsen (Android) and the clients sent private messages to set up a video call. During the long call, he asked open-ended questions to help translate their specific concerns into task requirements that had implications for the work of Android, web, and UI. As an example, he asked questions such as, "When you say shareable, what kind of scenarios are you looking to enable?" Neither the clients nor 1-Mohsen (Android) discussed the need to include 4-Leo (Web) in this planning session. 1-Mohsen (Android) later communicated instructions to 4-Leo (Web). 1-Mohsen (Android) and 4-Leo (Web) also then developed unique understanding as they figured out how to apply the clients' intents to their teams. Through this process, both were able to direct the work of their teams, though 1-Mohsen (Android) had the understanding and relationships to direct all of the Android tasks and many of the Web tasks, and 4-Leo

(Web) was able to assign only a few Web tasks that were completed.

1-Mohsen (Android) resolves process concerns, takes over assigning graphics tasks. A somewhat similar dynamic played out with the other peer manager, 2-Vlad (UI). 2-Vlad (UI) and his team had to wait on the clients' feedback on different graphics. The clients' delays were related to some ambivalence about the graphics and concerns on knowing how to communicate that to the various artists. They brought these concerns up with 1-Mohsen (Android) at the end of a phone call. The one-way flow of information from 1-Mohsen (Android) to 2-Vlad (UI) meant that 2-Vlad (UI) did not have opportunity to expand his role beyond the original graphics work, whereas it allowed 1-Mohsen (Android) to understand and direct graphics and UI work. In fact, he assigned some graphics tasks to his Android team member who had background and interest in UI work. The desired functionality could have been addressed by a 2-Vlad (UI) and his team. But the concerns surfaced in private channels, and 1-Mohsen (Android) directed some of the work UI work in private as well, meaning 2-Vlad (UI) was not aware. During this time, the clients participated in the public channels in ways that affirmed 1-Mohsen (Android). One of the clients posted an Energizer Bunny giphy and said, "meaning to suggest that 1-Mohsen (Android) keeps going and going" and posted another giphy with the phrase "hard work."

DISCUSSION

This paper presents new understanding of a classic organizational theory question: why do some people, when delegated the same formal authority as another, develop real authority while the others do not? We analyzed a unique data set that includes all the communication involved in three flash organizations, including all public and private channels, in a setting where all managers started at the same time with the same delegated authority. Drawing on this analysis, our study reveals that prior research has downplayed the importance of peer manager relationships in explaining who develops real authority in an organization. Managers' relative authority did not depend on their function, experience, wage, location, or gender. Instead, our results illustrated that many problems and ambiguous decisions arose when integrating work across teams, and the managers who had more and better relationships with peers had more capacity to deal with these issues. Each manager constructed a different network through

their interactions with peer managers, and those whose network positions enabled them to develop an integrative capacity were the ones who developed the most authority. Our study's emphasis on peer managers' relationships, or the horizontal line of an organizational chart, contrasts with prior research that emphasizes more of the "vertical" in explaining which managers develop real authority. These vertical relationships still mattered, because it was the client reassigning work to peer managers or team members seeking tasks from peers, where the direct losses of authority played out, but managers' capacity to avoid those scenarios depended on their interactions with peer managers.

The results also show that in every case, these critical interactions between peer managers were conducted in the backstage. Understanding this pattern is especially important in contrast to prior research, which has not had access to private channel or backstage interactions. This pattern of backstage agreements and repair is important for understanding how managers developed authority, especially vis-a-vis their team members, but because every manager engaged in backstage agreements and repairs with other managers, this pattern did not differentiate between which managers developed more authority than other managers. That difference was better explained by their network positions, which each manager constructed *through* their backstage interactions. Every manager engaged in backstage interactions with some peers to integrate their respective functions. These interactions involved non-routine, open-ended discussions requiring new agreements and continuing repair and the people involved developed unique integrative capacity. In general, the managers who had more of these backstage integrative ties developed more authority.

We structured our findings after Morrill (1996) because we found consistent themes that played out differently in each case, depending on factors such as team interdependence and client communication style. In the first case, AmbulanceApp, the manager who developed the most authority had private channel interactions with every other manger. Through this network, she was able to produce coordinated work across many teams, even in response to changing conditions such as substantial user feedback. This case was characterized by broadly shared authority, but also by some managers losing authority when they were not able to produce coordinated responses across teams when certain issues arose. The client

reassigned work to team members who he promoted to managers. In WorkshopApp, the manager who developed the most authority again had the most backstage ties and was able to develop an integrative capacity through these interactions with peer managers. He began as a team member, developed this broad integrative understanding, and convinced the client and his manager to change some of the integrating frameworks for the whole project. He was able to produce coordinated work across many teams through this understanding and network of relationships. This case was characterized by centralized authority at the end. Finally, in StorytellingApp, the manager who developed the most authority also had the most backstage ties, though this network was much simpler because some of the teams were independent. His access to the client was also particularly important because of the client's communication style, but his network position similarly enabled him to produce coordinated work across all three technical teams. In sum, these three cases reveal different paths through which powerful managers developed integrative capacity, but, in general, all cases involved managers engaging in backstage interactions that involved new agreements and continuing repair that gave them unique capacity to coordinate the project's critical activities and uncertainties.

Contributions to Research about Formal Authority

Many studies have explored the question of who develops real authority in organizations, but these theories have remained disconnected. Because of our unique data set, our study can speak to each of these literatures, while examining many of their complementary or differing predictions together.

Integrative capacity as a construct. One of our main contributions is identifying and conceptualizing "integrative capacity" as a construct. We define this construct as the extent to which someone can produce coordinated work across teams to produce a functioning or unified whole. Building on Huising (2005), we conceptualize integrative capacity as situational and probabilistic – not a static characteristic of an individual manager, but rather a property of their interactions, which are nested in relationships, nested in organizational networks. Our results show that integrative capacity depends on the quality of a manager's cross-cutting understanding, peer relationships, and often client and team relationships. In emphasizing the likely involvement of both horizontal peer relationships and

hierarchical "vertical" interactions, this idea relates to the "linking pin" position that managers occupy as described by Likert (1961). However, the linking pin concept does not theorize variation in peer relationships or explore the implications of each manager constructing a different set of peer relationships that will shape their integrative capacity and relative authority, as our results show. For the purpose of construct and discriminant validity (Campbell & Fiske, 1959; Judd, Smith, & Kidder, 1991), we note that integrative capacity is related to "relational authority," which Huising (2015) defines as an authority's (situational, probabilistic) capacity to elicit voluntary compliance with their instructions. These conceptualizations are related, but integrative capacity differs because it describes instructions and other interactions focused specifically on producing coordinated activities across specialized teams, whereas relational authority is looking specifically at dyadic instructions from authorities to targets.

This concept is also related to, but different from, the idea of "boundary-spanning" (Joshi, Pandey, & Han, 2009; Lawrence & Lorsch, 1967; Leifer & Huber, 1977; Tushman & Scanlan, 1981) and especially "boundary spanning competence" (Levina & Vaast, 2005). Levina and Vaast (2005) closely analyze the practices involved when two parties do the actual work of boundary spanning and find that to do so, they produce a new joint field that can accommodate the practices of the other. These boundary-spanning practices and new field tend to involve the creation of new "locally useful" enactments of tools and ideas (pg. 335). If we consider the ties in the network figures (Figures 4, 6, and 8), we can see that these represent managers interacting across their functional boundaries in integrating, boundary-spanning practices. In other words, each of these ties represents the creation of new understanding. And as our data revealed, in this setting, because of all of the backstage repairs that happen in these private channels, these ties also represent the co-creation of a more accurate awareness of the state of affairs across teams. Thus, the idea of "boundary-spanning competence" refers to the competence and expertise two parties construct as they produce a new joint field that accommodates both of their practices (Levina & Vaast, 2005), and our study builds on that idea to suggest that managers who have many such boundary-spanning interactions will develop a unique and valuable integrative capacity. We note that integrative capacity has similar phrasing to but is different from "absorptive capacity" which is a firm-level construct

defined as "a firm's ability to recognize the value of new information, assimilate it, and apply it to commercial ends" (Cohen & Levinthal, 1990; Zahra & George, 2002).

***Strategic contingency theory*.** Our results align with strategic contingency theory in the sense that the managers who developed the most power were the ones who best resolved the clients' concerns about critical problems and uncertainties, which is one of the main arguments of this theory. Our results also differ from and extend this body of research. Many of the strategic-contingency theory studies examined how departments or functions became powerful because they solved their organization's critical uncertainty (Pfeffer & Salancik, 1974; Salancik & Pfeffer, 1974, 1977b). Our findings suggest that in some cases this theory might overemphasize *function* as the main predictor of a manager's power or authority. In our study, across the three research cases, a manager's authority did not consistently depend on their function, even though a function's technical contribution to the overall product would be considered similar. Recall that a back-end manager ended up powerful in one case, but in another, the back-end manager ended up one of the lower ranked managers – largely because of the group process, not because of the particular technical problem solving that the back-end function offered or controlled. As another example, the QA manager in AmbulanceApp controlled a project management tool and developed considerable authority, whereas the QA manager in WorkshopApp developed no authority because peer managers did not defer to him when he started. These findings suggest that a function's ability to resolve critical uncertainty may depend on their manager's ability to bring the function's technical value to bear on problems, which may depend on their position in the peer manager network.

Relatedly, Salancik and Pfeffer (1977b, pg. 8) note that the capacity to *define* an activity or problem as critical is a source of power, though not many studies in this body of research examined how members construct and negotiate shared understandings of what activities and uncertainties are critical. In our study, some managers controlled broader awareness of many decisions and problems by agreeing, acknowledging, and repairing in private channels, and in so doing controlled what became understood as a critical problem. Our results therefore offer a new understanding of this process: the managers who developed more authority than their peers had more backstage private channels, and their position in the

peer manager network allowed them to control which activities and problems were understood as critical.

***Social network theory*.** In a general sense, our results also align with the social network theory of organizations (Borgatti & Foster, 2003; Burt et al., 2013; Ibarra, 1993). Managers' authority relative to one another did depend on their network positions. However, our results also differ from and extend this prior research in fundamental ways. First, our data allows us to account for the backstage or private conversations that happen in organizations, which is an opportunity not typically available to researchers. The private channel interactions and related network differed significantly from the public channel interactions and related network. Peer managers were more likely to interact with each other and the client in private channels, whereas team members interacted much more with each other and their managers in public. Managers' relative authority depended on private channel interactions that most people in the organization could not see, which matters because accurate understanding of the organizational network itself is a source of power (Krackhardt, 1990; Marineau et al., 2018). Predictions of managers' relative authority based on the public network would be inaccurate; the private network was more important for answering our research question.

Second, our data also allowed us to consider the content of the interactions that created the network ties. One of the main critiques of social network theory is that it abstracts and develops arguments about network structures without understanding the substantive interactions that underlie the ties and structure (Salancik, 1995). Similarly, our data reveal why certain interactions but not others mattered for explaining managers' relative authority – in our case, it was the managers' backstage interactions involving new agreements and continuing repair. Our results suggest that just as Salancik (1995) argued, an overly abstracted network theory might equally credit all ties as indicating resource and information flow, when in fact a few private channel interactions between peer managers might control more critical information than many other extensive interactions where peripheral members might attempt to conjure and make sense of critical information.

Third and relatedly, our data and results also illustrate the formation of the organizational network from start and to completion, which is rare. One pattern that this longitudinal data revealed was

the integrative capacity that different people accrued before they were formally promoted to managers. In all three research cases, the team members who were promoted to managers developed a capacity to integrate complex work in ways that solved critical problems for the client. A social network analysis that did not account for the formation and evolution of the network ties would not have seen the network positions that preceded or followed these formal changes to authority, so might over-credit access to the client, rather than recognizing why the former positions enabled the person to develop an integrative capacity that the client then drew on following their promotions.

Symbolic interaction theory. Finally, our study also contributes to the symbolic interaction perspective for understanding authority in organizations. That theory considers how social structures such as formal authority are created and maintained through repeated, meaningful interactions (e.g., Carter & Fuller, 2016; Stryker & Statham, 1985). Our results are perhaps closest to Huising's (2005) study which shows that the instructions that elicited compliance differed in quality from the instructions that did not elicit compliance. The varying quality of instructions depended on the authority's continuing access to their targets. Our findings are similar in that we found that the task instructions that various managers were able to offer also differed. In our case, however, the quality of task instructions depended on the managers' interactions with peer managers, not just on the managers' interactions with their team members. When managers were well connected with peer managers, they developed the capacity to consistently offer relevant and consequential task instructions to their teams. Otherwise, their task instructions were extraneous and ignored, or they were not able to offer relevant task instructions at all and lost authority that way. Our findings also differ from Huising's (2005) findings because that study focuses on a dyadic relationship between authorities and targets; our findings focus instead on the complex relational structure of delegated authority. The managers' continuing authority depended on certain interactions with clients, peer managers, and team members. Each tie in this relational structure mattered for continuing authority, but the variation that we inductively identified in our data, and that is downplayed in prior research, was the horizontal line, or the relationships with peer managers.

Status characteristics theory. Our study did not find dynamics relevant to status characteristic

theory. Perhaps these dynamics were at play, but our study design does not isolate any of the status characteristics that are often focal to these studies (e.g., Correll & Ridgeway, 2003; Dupree et al., 2021). Our sample of managers comes from many different countries (Tables 3, 5, and 7), where beliefs and enactments of these or other status characteristics may differ. We found many instances of people acknowledging shared characteristics based on gender, culture, or religion but not a clear pattern of any personal characteristics explaining managers' authority. This theory suggests that authority acts through members disproportionately deferring "action opportunities" to high status members (e.g., Simpson et al., 2012). Our study design does not allow us to conclude that managers' authority depended on team members' deference based on status. Instead, our findings suggest that deference came from members' limited awareness of action opportunities and alternatives.

Contributions to Research about Private Spaces

Our data revealed what managers do in private channels that explains their relative authority. In so doing, our findings conceptualize private channels as a particular kind of organizational space that is important for understanding a key organizational process. This framework builds on and extends the broad research literature examining organizational space as a resource (for a review, see Stephenson, Kuismin, Putnam, & Sivunen, 2020). Within the research on organizational space and processes, our findings contribute specifically to the stream of research on private spaces (Bernstein, 2017). This research conceptualizes private spaces as a particular resource that small groups use to mobilize social processes, often to challenge powerful groups or the status quo. For example, many studies have shown how private spaces allow small groups to mobilize organizational change because they can experiment and learn without managerial scrutiny that might impose correct behavior before new ways are discovered and scaled (Beane, 2018; Bernstein, 2012; Wiedner, Barrett, & Oborn, 2016). Other studies demonstrated that groups use private spaces to engage in cross-cutting problem-solving to mobilize change while avoiding detection or resistance from defenders of the status quo (Kellogg, 2009; Polletta, 1999; Rao & Dutta, 2012). In contrast to those studies which tend to focus on low status groups or reformers using privacy to mobilize against powerful forces or the status quo, our findings demonstrate how people who

were delegated formal authority used private spaces to produce real authority. The managers were able to make many decisions and changes without the more powerful client being aware and were also able to produce more understanding than their team members using private channels. Regarding the question of why some managers developed real authority while others did not, the most powerful managers had networks of private spaces with a variety of collaborators, and the agreements, repair, and understanding they developed across this whole network became the source of their authority. Morrill (1996) asked a different question (about conflict) but similarly looked behind the scenes of powerful groups to understand their social enactments.

Relationship to Goffman's (1959) idea of the backstage. In this paper, we use the labels "private channels" and "backstage" interchangeably but note here the distinction between these concepts in the research literature. Goffman (1959) is credited for the idea of "backstage" in his dramaturgical theory that analyzes the roles people play in everyday life. Many studies took up the idea of backstage spaces, but focused on members' use of backstage spaces for socialization of new members (e.g., Levine & Moreland, 1991; Sinclair, 1997), managing role conflict (e.g., Blackett, Evans, & Piggott, 2021; Selwyn, 2009), conducting stigmatized activities (e.g., Ashforth, Kreiner, Clark, & Fugate, 2007; O'Brien, 2011; Oliver, Porock, & Oliver, 2006) or professional learning and development (e.g., Beane, 2018; Tornes & Kramer, 2021; Waring & Bishop, 2010). Prior research shows how groups use backstage for these various social processes, but our research connects to one specific use of the backstage, which is how people use backstage spaces to mobilize team performances (e.g., Ellingson, 2003; Mair & Hehenberger, 2014). In that regard, our characterization of the tone and content of the managers' private channels is consistent with Goffman's (1959) characterization of backstage interactions. Our coding of the private channel interactions revealed them to involve new agreements, continuing repair, acknowledging, and joking, which matches Goffman's (1959) description of backstage interactions as being more familiar, informal, candid, and casual, and as involving cooperative decision-making about the performance (pg. 128). In fact, he argues that it is the presence of this tone and behavior that demarcates a backstage, rather than the specific space or region.

Goffman (1959) did not direct this theoretical lens to formal authority but doing so generates useful insight on our findings, especially around what Goffman calls a performance team. In contrast to most organizational theory papers on teams, Goffman (1959: 92) defines a *team* as "a set of individuals whose intimate co-operation is required if a given projected definition of the situation is to be maintained." He argues that "the extent and character of the co-operation that makes this possible will be concealed and kept secret." This concealing of the extent and character of the co-operation required means the team "has something of the character of a secret society." Viewing the prevalence, structure, and content of the managers' private channels through this theoretical lens suggests that the set of peer managers were the performance team, and part of their work was to project their desired definition of the situation (a smooth project performance) to the client and the actual front-line workers. The front-line workers seemed to be the audience of this elaborate backstage cooperation that allowed them to show-up to work each day and participate in what seemed like a smooth, well-run, worthwhile, work project.

Organizational space and digital platforms. Although our findings resonate with and build on this prior research, our study also differs from these studies because this work was carried out entirely online using coordination and communication platforms. Prior research on organizational space and process focuses on "physical structure, distance, workplace arrangements, and spatial scale" (Stephenson et al., 2020) — where physical structure would be walls and doors (e.g., Bernstein, 2012; Davis, 1984; Hatch, 1987) and distance would be linear distance between individuals or offices buildings (e.g., Hatch & Cunliffe, 2013; Monge & Kirste, 1980; Taylor & Spicer, 2007). When coordination and communication platforms become "the operating system" of the organization, and the work is carried out online with no in-person interaction, some of these key concepts change (Meyrowitz, 1986). For example, perceived proximity matters not just measured physical distance (Amin & Cohendet, 2004; Wilson, O'Leary, Metiu, & Jett, 2008). Our research starts to illustrate what private spaces might look like, and how they might be used when the entire organization conducts its work online (e.g., Rhymer, 2018), and why integration might be particularly important and challenging in these settings (e.g., Hu, Hinds, Valentine, & Bernstein, 2021). There are many concerns that online work environments are much

more invasive in surveilling work activities and therefore offer less opportunity for private space (Kellogg, Valentine, & Christin, 2020; Zuboff, 2019). Some research has suggested how private channels or alternative platforms become digital free spaces (Angwin, 2014; Gray, Suri, Ali, & Kulkarni, 2016; Salehi et al., 2015), though more research is needed on digital organizational space and processes.

Boundary Conditions and Future Directions

Our unique data set offered novel insight into the backstage production of managerial authority in organizations. But the research setting is an extreme case because these projects were conducted by remote teams, entirely online with no face-to-face meetings or interactions. They were also temporary and comprised of teams of freelancers hired from an online labor market. Each of these characteristics of the research setting can be considered a boundary condition that may have implications for our findings. First, the flash organizations were comprised of groups of freelancers hired from an online labor market, and our findings might be shaped by the nature of that employment relationship. Online freelancers orient towards one-time project ratings (Rahman, 2021; Rahman & Valentine, 2020), so the managers may have been more risk-averse to letting mistakes play out in public channels than full-time employee managers. These project-rating incentives might have encouraged more private channel interactions and decisions, which means our findings would overemphasize the importance of backstage peer networks in explaining authority. Still, future research can explore this boundary condition; Goffman (1959)'s argument that performance teams tend to conceal the extent of their co-operation suggests that these dynamics might be relevant in many organizations. Second, these groups were temporary and de novo. It is possible that integrating functions from scratch is more challenging in these kinds of groups, which means our findings would be overemphasizing network positions that enable integrative capacity for explaining authority. Future research can explore this question because such an overemphasis is plausible, but not clear: integrating work between groups is a noted challenge in established organizations (Henderson & Clark, 1990; Hu et al., 2021; Valentine, 2017), so may be a critical activity even in longstanding organizations (Crozier, 1969; Salancik & Pfeffer, 1977a). Finally, the digital platforms differ from the tools that managers use in traditional bureaucratic organizations (Kellogg et al., 2020;

Rahman & Valentine, 2020; Vallas & Schor, 2020), and may have mattered for the processes of authority. However, these platform features were not a source of variation in our data, so it is difficult to argue how they shaped those conceptualized processes in non-generalizable ways.

In conclusion, many studies are now recognizing and exploring the new organizational forms that are enabled by internet technologies (e.g., Lifshitz-Assaf, 2017; Majchrzak, Jarvenpaa, & Hollingshead, 2007; O'Mahony & Ferraro, 2007; O'Mahony & Bechky, 2008). Even large, long-standing organizations increasingly rely on temporary groups of employees and contractors to complete complex projects, making the questions explored in this paper potentially relevant for theories of project-based organizing as well (e.g., Dahlander & O'Mahony, 2011; Hackman & Katz, 2009). Some scholars forecast that these new internet technologies wherein people can relatively easily convene groups online will make flash organizations and other forms of temporary and online organizing a standard rather than exceptional organizational structure in some industries, and worth further empirical research among organizational theorists (Benkler, 2017; Davis, 2016a; Puranam et al., 2014; Valentine et al., 2017).

References

Adler, P. S. 2001. Market, hierarchy, and trust: The knowledge economy and the future of capitalism. ***Organization Science***, 12(2): 215-234.

Aghion, P., & Tirole, J. 1997. Formal and real authority in organizations. ***Journal of Political Economy***, 105(1): 1-29.

Anderson, C., Flynn, F. J., & Spataro, S. E. 2008. Personality and organizational culture as determinants of influence. ***Journal of Applied Psychology***, 93(3): 702-710.

Angwin, J. 2014. ***Dragnet Nation: A Quest for Privacy, Security, and Freedom in a World of Relentless Surveillance***: Henry Holt and Company.

Anteby, M. 2013. ***Manufacturing Morals: The Values of Silence in Business School Education***: University of Chicago Press.

Argote, L. 1982. Input Uncertainty and Organizational Coordiantion in Hospital Emergency Units ***Administrative Science Quarterly***, 27(3): 420-434.

Ashforth, B. E., Kreiner, G. E., Clark, M. A., & Fugate, M. 2007. Normalizing dirty work: Managerial tactics for countering occupational taint. ***Academy of Management Journal***, 50(1): 149-174.

Astley, W. G., & Sachdeva, P. S. 1984. Structural sources of intraorganizational power: A theoretical synthesis. ***Academy of Management Review***, 9(1): 104-113.

Barley, S. R. 2020. ***Work and Technological Change***: OUP Oxford.

Barley, S. R., Bechky, B. A., & Milliken, F. J. 2017. The Changing Nature of Work: Careers, Identities, and Work Lives in The 21st Century. ***Academy of Management Discoveries***, 3(2): 111-115.

Barley, S. R., & Kunda, G. 2001. Bringing work back in. ***Organization Science***, 12(1): 76-95.

Beane, M. 2018. Shadow Learning: Building Robotic Surgical Skill When Approved Means Fail. ***Administrative Science Quarterly***: 0001839217751692.

Bechky, B. A. 2006a. Gaffers, gofers, and grips: Role-based coordination in temporary organizations. ***Organization Science***, 17(1): 3-21.

Bechky, B. A. 2006b. Talking about machines, thick description, and knowledge work. ***Organization Studies***, 27(12): 1757-1768.

Bendersky, C., & Hays, N. A. 2012. Status Conflict in Groups. ***Organization Science***, 23(2): 323-340.

Benkler, Y. 2002. Coase's Penguin, or, Linux and" The Nature of the Firm". ***Yale Law Journal***: 369-446.

Benkler, Y. 2017. Peer production, the commons, and the future of the firm. ***Strategic Organization***, 15(2): 264-274.

Bennis, W. G. 1959. ***Leadership theory and administrative behavior: The problem of authority***: Ardent Media.

Berger, J., Fisek, H., Norman, R., & Zelditch, M. 1977. ***Status characteristics and social interaction***. New York: Elsevier.

Bernstein, E. S. 2012. The Transparency Paradox: A Role for Privacy in Organizational Learning and Operational Control. ***Administrative Science Quarterly***, 57(2): 181-216.

Bernstein, E. S. 2017. Making transparency transparent: The evolution of observation in management theory. ***Academy of Management Annals***, 11(1): 217-266.

Bigley, G. A., & Roberts, K. H. 2001. The incident command system: High-reliability organizing for complex and volatile task environments. ***Academy of Management Journal***, 44(6): 1281-1299.

Blackett, A. D., Evans, A. B., & Piggott, D. 2021. Negotiating a coach identity: a theoretical critique of elite athletes' transitions into post-athletic high-performance coaching roles. ***Sport Education and Society***, 26(6): 663-675.

Blau, P. M. 1955. ***The Dynamics of Bureaucracy: A Study of Interpersonal Relations in Two Government Agencies***: University of Chicago Press.

Borgatti, S. P., & Foster, P. C. 2003. The Network Paradigm in Organizational Research: A Review and Typology. ***Journal of Management***, 29(6): 991-1013.

Bourgoin, A., Bencherki, N., & Faraj, S. 2020. "And Who Are You?": A Performative Perspective on Authority in Organizations. ***Academy of Management Journal***, 63(4): 1134-1165.

Brass, D. J. 1984. Being in the right place: A structural analysis of individual influence in an organization. ***Administrative Science Quarterly***, 29(4): 518-539.
Brass, D. J. 1985. Men's and Women's Networks: A Study of Interaction Patterns and Influence in an Organization. ***The Academy of Management Journal***, 28(2): 327-343.
Brass, D. J., & Burkhardt, M. E. 1993. Potential power and power use: An investigation of structure. ***Academy of Management Journal***, 36(3): 441-471.
Bunderson, J. S. 2003. Recognizing and utilizing expertise in work groups: A status characteristics perspective. ***Administrative Science Quarterly***, 48(4): 557-591.
Burt, R. S., Kilduff, M., & Tasselli, S. 2013. Social Network Analysis: Foundations and Frontiers on Advantage. In S. T. Fiske (Ed.), ***Annual Review of Psychology, Vol 64***, Vol. 64: 527-547.
Campbell, D. T., & Fiske, D. W. 1959. Convergent and Discriminant Validation by the Multi-trait Multi-method Matrix. ***Psychological Bulletin***, 56(2): 81-105.
Cappelli, P. 1999. Career jobs are dead. ***California Management Review***, 42(1): 146-167.
Carter, M. J., & Fuller, C. 2016. Symbols, meaning, and action: The past, present, and future of symbolic interactionism. ***Current Sociology***, 64(6): 931-961.
Chandler, A. D. 1977. ***The Visible Hand***. Cambridge: Harvard University Press.
Charmaz, K. 2006. ***Constructing Grounded Theory: A Practical Guide Through Qualitative Analysis***. Thousand Oaks, CA: Sage Publications.
Cohen, W. M., & Levinthal, D. A. 1990. Absorptive capacity: A new perspective on learning and innovation. ***Administrative Science Quarterly***, 35(1): 128-152.
Correll, S. J., & Ridgeway, C. L. 2003. Expectation states theory, ***Handbook of social psychology.***: 29-51. New York, NY, US: Kluwer Academic/Plenum Publishers.
Crozier, M. 1967. ***The bureaucratic phenomenon***: Chicago] University of Chicago Press, [1967, c1964].
Crozier, M. 1969. ***The bureaucratic phenomenon***. Chicago: The University of Chicago Press.
Daft, R. L. 2015. ***Organization Theory and Design***. Boston, MA: Cengage Learning.
Dahlander, L., & O'Mahony, S. 2011. Progressing to the center: Coordinating project work. ***Organization science***, 22(4): 961-979.
Davis, G. F. 2016a. Can an economy survive without corporations? Technology and robust organizational alternatives. ***The Academy of Management Perspectives***, 30(2): 129-140.
Davis, G. F. 2016b. ***The Vanishing American Corporation: Navigating the Hazards of a New Economy***: Berrett-Koehler Publishers.
Davis, G. F., & Sinha, A. 2021. Varieties of Uberization: How technology and institutions change the organization (s) of late capitalism. ***Organization Theory***, 2(1): 2631787721995198.
Davis, R. 1984. The Influence of the Physical Environment in Offices. ***The Academy of Management Review***, 9(2): 271-283.
Denis, J.-L., Langley, A., & Sergi, V. 2012. Leadership in the Plural. ***The Academy of Management Annals***, 6(1): 211-283.
Denis, J., Langley, A., & Rouleau, L. 2007. Strategizing in pluralistic contexts: Rethinking theoretical frames. ***Human Relations***, 60(1): 179-215.
Denis, J. L., Langley, A., & Cazale, L. 1996. Leadership and strategic change under ambiguity. ***Organization Studies***, 17(4): 673-699.
Dupree, C. H., Torrez, B., Obioha, O., & Fiske, S. T. 2021. Race–status associations: Distinct effects of three novel measures among White and Black perceivers. ***Journal of personality and social psychology***, 120(3): 601.
Edmondson, A. 2012. ***Teaming: How Organizations Learn, Innovate, and Compete in the Knowledge Economy.*** San Francisco: Jossey-Bass.
Ellingson, L. L. 2003. Interdisciplinary health care teamwork in the clinic backstage. ***Journal of Applied Communication Research***, 31(2): 93-117.
Ewick, P., & Silbey, S. 2003. Narrating social structure: Stories of resistance to legal authority. ***American Journal of Sociology***, 108(6): 1328-1372.

Falbe, C. M., & Yukl, G. 1992. Consequences for Managers of Using Single Influence Tactics and Combinations of Tactics. ***Academy of Management Journal***, 35(3): 638-652.

Faraj, S., & Xiao, Y. 2006. Coordination in fast-response organizations. ***Management Science***, 52(8): 1155-1169.

French, J. R., Jr., & Raven, B. 1968. The bases of social power. In D. Cartwright, & U. Zander (Eds.), ***Studies in social power***: 259-269. Ann Arbor, Mich: Institute for Social Research.

Gibbons, R. 2000. Why organizations are such a mess and what an economist might do about it: MIT Sloan school of management.

Goffman, E. 1959. ***The Presentation of Self in Everyday Life*** Garden City: Doubleday.

Golden-Biddle, K., & Locke, K. 1993. Appealing Work: An Investigation of How Ethnographic Texts Convince. ***Organization Science***, 4(4): 595-616.

Golden-Biddle, K., & Locke, K. 2006. ***Composing Qualitative Research***: SAGE Publications.

Goodman, R. A., & Goodman, L. P. 1976. Some management issues in temporary systems: A study of professional development and manpower-the theater case. ***Administrative science quarterly***: 494-501.

Gray, M. L., & Suri, S. 2019. ***Ghost Work: How to Stop Silicon Valley from Building a New Global Underclass***: HMH Books.

Gray, M. L., Suri, S., Ali, S. S., & Kulkarni, D. 2016. ***The crowd is a collaborative network***. Paper presented at the Proceedings of the 19th ACM Conference on Computer-Supported Cooperative Work & Social Computing.

Gulati, R., & Singh, H. 1998. The architecture of cooperation: Managing coordination costs and appropriation concerns in strategic alliances. ***Administrative Science Quarterly***, 43(4): 781-814.

Hackman, R., & Katz, N. 2009. Group Behavior and Performance In S. T. Fiske, D. T. Gilbert, & G. Lindzey (Eds.), ***Handbook of Social Psychology***, Vol. 5th Edition. New York: Wiley.

Hatch, M. J. 1987. Physical Barriers, Task Characteristics, and Interaction Activity in Research and Development Firms. ***Administrative Science Quarterly***, 32(3): 387-399.

Hatch, M. J., & Cunliffe, A. L. 2013. ***Organization Theory: Modern, Symbolic and Postmodern Perspectives***: OUP Oxford.

Hayek, F. A. 1945. The use of knowledge in society. ***The American economic review***: 519-530.

Henderson, R. M., & Clark, K. B. 1990. Architectural innovation: The reconfiguration of existing product technologies and the failure of established firms. ***Administrative Science Quarterly***, 35(1): 9-30.

Howe, J. 2006. The rise of crowdsourcing. ***Wired magazine***, 14(6): 1-4.

Hu, E., Hinds, R., Valentine, M., & Bernstein, M. 2021. A "Distance Matters" Paradox: Facilitating Intra-TeamCollaboration Can Harm Inter-Team Collaboration, ***CSCW 2021: ACM Conference on Computer-Supported Cooperative Work and Social Computing***.

Huckman, R. S., Staats, B. R., & Upton, D. M. 2009. Team Familiarity, Role Experience, and Performance: Evidence from Indian Software Services. ***Management Science***, 55(1): 85-100.

Huising, R. 2015. To Hive or to Hold? Producing Professional Authority through Scut Work. ***Administrative Science Quarterly***, 60(2): 263-299.

Ibarra, H. 1993. Network Centrality, Power, and Innovation Involvement: Determinants of Technical and Administrative Roles. ***Academy of Management Journal***, 36: 471-501.

Jick, T. D. 1979. Mixing Qualitative and Quantitative Methods - Triangulation in Action ***Administrative Science Quarterly***, 24(4): 602-611.

Joshi, A., & Knight, A. P. 2015. Who Defers to Whom and Why? Dual Pathways Linking Demographic Differences and Dyadic Difference to Team Effectiveness ***Academy of Management Journal***, 58(1): 59-84.

Joshi, A., Pandey, N., & Han, G. H. 2009. Bracketing team boundary spanning: an examination of task-based, team-level, and contextual antecedents. ***Journal of Organizational Behavior***, 30(6): 731-759.

Judd, C. M., Smith, E. R., & Kidder, L. H. 1991. ***Research methods in social relations*** (6th ed.). Fort Worth: Holt Rinehart and Winston.

Kellogg, K. 2009. Operating Room: Relational Spaces and Microinstitutional Change in Surgery. ***American Journal of Sociology***, 115(3): 657-711.

Kellogg, K. C., Valentine, M. A., & Christin, A. 2020. Algorithms at Work: The New Contested Terrain of Control. ***Academy of Management Annals***, 14(1): 366-410.

Keltner, D., Gruenfeld, D. H., & Anderson, C. 2003. Power, approach, and inhibition. ***Psychological Review***, 110(2): 265-284.

Kittur, A., Nickerson, J. V., Bernstein, M., Gerber, E., Shaw, A., Zimmerman, J., Lease, M., & Horton, J. 2013. ***The future of crowd work***. Paper presented at the Proceedings of the 2013 conference on Computer supported cooperative work.

Klein, K. J., Ziegert, J. C., Knight, A. P., & Xiao, Y. 2006. Dynamic delegation: Hierarchical, shared and deindividualized leadership in extreme action teams. ***Administrative Science Quarterly***, 51(4): 590-621.

Krackhardt, D. 1990. Assessing the political landscape: Structure, cognition, and power in organizations. ***Administrative Science Quarterly***, 35: 342-369.

Lawrence, P., & Lorsch, J. 1967. Differentiation and integration in complex organizations. ***Administrative Science Quarterly***, 12: 1-47.

Leifer, R., & Huber, G. P. 1977. Relations among perceived environmental uncertainty, organization structure, and boundary-spanning behavior ***Administrative Science Quarterly***, 22(2): 235-247.

Levina, N., & Vaast, E. 2005. The emergence of boundary spanning competence in practice. implications for implementation and use of information systems. ***Mis Quarterly***, 29(2): 335-363.

Levine, J. M., & Moreland, R. L. 1991. Culture and socialization in work groups.

Lifshitz-Assaf, H. 2017. Dismantling Knowledge Boundaries at NASA: The Critical Role of Professional Identity in Open Innovation. ***Administrative Science Quarterly***, 0(0): 0001839217747876.

Likert, R. 1961. ***New Patterns of Management***. United States of America: McGraw-Hill Book Company.

Lix, K. 2021. ***Mixed-Method Approaches to Employment Relationships in Team-based Onling Gig Work*** Stanford University, Stanford, CA.

Lix, K., Goldberg, A., Srivastava, S., & Valentine, M. 2021. Aligning Differences: Discursive Diversity and Team Performance. ***Management Science***.

Mair, J., & Hehenberger, L. 2014. Front-stage and backstage convening: The transition from opposition to mutualistic coexistence in organizational philanthropy. ***Academy of Management Journal***, 57(4): 1174-1200.

Majchrzak, A., Jarvenpaa, S. L., & Hollingshead, A. B. 2007. Coordinating expertise among emergent groups responding to disasters. ***Organization Science***, 18(1): 147-161.

Malone, T. W. 1987. MODELING COORDINATION IN ORGANIZATIONS AND MARKETS. ***Management Science***, 33(10): 1317-1332.

Malone, T. W. 2018. ***Superminds: The Surprising Power of People and Computers Thinking Together***: Little, Brown.

Marineau, J. E., Labianca, G., Brass, D. J., Borgatti, S. P., & Vecchi, P. 2018. Individuals' power and their social network accuracy: A situated cognition perspective. ***Social Networks***, 54: 145-161.

Meyerson, D., Weick, K. E., & Kramer, R. M. 1996. Swift trust and temporary groups. In R. M. Kramer, & T. E. Tyler (Eds.), ***Trust in organizations: Frontiers of theory and research***: 166-195. Thousand Oaks, CA: Sage.

Meyrowitz, J. 1986. ***No Sense of Place: The Impact of Electronic Media on Social Behavior***: Oxford University Press.

Monge, P. R., & Kirste, K. K. 1980. Measuring Proximity in Human Organization. ***Social Psychology Quarterly***, 43(1): 110-115.

Morrill, C. 1996. ***The Executive Way: Conflict Management in Corporations***: University of Chicago Press.

O'Mahony, & Ferraro, F. 2007. The emergence of governance in an open source community. ***Academy of Management Journal***, 50(5): 1079-1106.

O'Mahony, S., & Bechky, B. A. 2008. Boundary Organizations: Enabling Collaboration among Unexpected Allies. ***Administrative Science Quarterly***, 53(3): 422-459.

O'Brien, J. 2011. Spoiled group identities and backstage work: A theory of stigma management rehearsals. ***Social Psychology Quarterly***, 74(3): 291-309.

Oliver, D. P., Porock, D., & Oliver, D. B. 2006. Managing the secrets of dying backstage: The voices of nursing home staff. ***Omega-Journal of Death and Dying***, 53(3): 193-207.

Orlikowski, W., & Iacono, S. (Eds.). 2000. ***The truth is not out there: An enacted view of the 'digital economy'***. Cambridge, MA: Mit Press.

Peabody, R. L. 1962. Perceptions of organizational authority: a comparative analysis. ***Administrative Science Quarterly***, 6(4).

Perrow, C. 1963. Goals and power structures. In E. Friedson (Ed.), ***The hospital in modern society***. London: Free Press of Glencoe.

Perrow, C. 1970. Departmental power and perspectives in industrial firms. In M. N. Zald (Ed.), ***Power in organizations***: 59-89. Nashville, TN: Vanderbilt University Press.

Pfeffer, J., & Salancik, G. 1974. Organizational decision-making as a political process - the case of a university budget. ***Administrative Science Quarterly***, 19(2): 135.

Polletta, F. 1999. "Free spaces" in collective action. ***Theory and Society***, 28(1): 1-38.

Presthus, R. V. 1960. Authority in organizations. ***Public Administration Review***: 86-91.

Puranam, P., Alexy, O., & Reitzig, M. 2014. What's new about new forms of organizing? ***Academy of Management Review***, 39(2): 162-180.

Rahman, H. A. 2021. The Invisible Cage: Workers' Reactivity to Opaque Algorithmic Evaluations. ***Administrative Science Quarterly***.

Rahman, H. A., & Valentine, M. A. 2020. How Managers Maintain Control Through Collaborative Repair: Evidence from Platform-Mediated "Gigs". ***Organization Science***.

Rao, H., & Dutta, S. 2012. Free Spaces as Organizational Weapons of the Weak: Religious Festivals and Regimental Mutinies in the 1857 Bengal Native Army. ***Administrative Science Quarterly***, 57(4): 625-668.

Rao, H., Morrill, C., & Zald, M. 2000. Power plays: How social movements and collective action create new organizational forms. In B. Staw, & R. Sutton (Eds.), ***Research in Organizational Behavior***, Vol. 22: 237-281. New York, NY: Jai-Elsevier Science Inc.

Retelny, D., Robaszkiewicz, S., To, A., Lasecki, W. S., Patel, J., Rahmati, N., Doshi, T., Valentine, M. A., & Bernstein, M. S. 2014. Expert crowdsourcing with flash teams, ***Proceedings of the 27th annual ACM symposium on User interface software and technology***: 75-85. Honolulu, Hawaii, USA: ACM.

Rhymer, J. 2018. Scaling the Coordination of Location Independent Organizations. ***Academy of Management Global Proceedings***(2018): 189.

Ridgeway, C. L., & Correll, S. J. 2004. Unpacking the gender system: A theoretical perspective on gender beliefs and social relations. ***Gender & Society***, 18(4): 510-531.

Ridgeway, C. L., & Correll, S. J. 2006. Consensus and the creation of status beliefs. ***Social Forces***, 85(1): 431-453.

Ridgeway, C. L., Li, Y. E., Erickson, K. G., Backor, K., & Tinkler, J. E. 2009. How Easily Does a Social Difference Become a Status Distinction? Gender Matters. ***American Sociological Review***, 74(1): 44-62.

Salancik, G., & Pfeffer, J. 1977a. Who gets power - and how they hold on to it - a strategic contingency model of power. ***Organizational Dynamics***, 5(3): 2.

Salancik, G. R. 1995. WANTED : A Good Network Theory of Organization. ***Administrative Science Quarterly***, 40: 345-349.

Salancik, G. R., & Pfeffer, J. 1974. The bases and use of power in organizational decision- making: The case of the university. ***Administrative Science Quarterly***, 19(4): 453.

Salancik, G. R., & Pfeffer, J. 1977b. Who gets power — and how they hold on to it: A strategic-contingency model of power. ***Organizational Dynamics***, 5(3): 3-21.

Salehi, N., Irani, L. C., Bernstein, M. S., Alkhatib, A., Ogbe, E., & Milland, K. 2015. ***We are dynamo: Overcoming stalling and friction in collective action for crowd workers***. Paper presented at the Proceedings of the 33rd annual ACM conference on human factors in computing systems.

Scheiber, N. 2017. The Pop-Up Employer: Build a Team, Do the Job, Say Goodbye, ***New York Times***.

Selwyn, N. 2009. Faceworking: exploring students' education-related use of Facebook. ***Learning Media and Technology***, 34(2): 157-174.

Simon, H. A. 1945. ***Administrative Behavior***. Toronto: Free Press.

Simon, H. A. (Ed.). 1957. ***Authority***. (Vol. 17): Harper.

Simpson, B., Willer, R., & Ridgeway, C. L. 2012. Status hierarchies and the organization of collective action. ***Sociological Theory***, 30(3): 149-166.

Sinclair, S. 1997. ***Making Doctors: An Institutional Apprenticeship***: Berg Publishers.

Spradley, J. P. 1979. ***The Ethnographic Interivew***. New York: Holt, Rinehart, and Winston.

Stephenson, K. A., Kuismin, A., Putnam, L. L., & Sivunen, A. 2020. Process Studies of Organizational Space. ***Academy of Management Annals***, 14(2): 797-827.

Stinchcombe, A. L. 1968. ***Constructing social theories***. Chicago: University of Chicago Press.

Stryker, S., & Statham, A. 1985. Symbolic interaction and role theory. In G. Lindzey, & E. Aronson (Eds.), ***Handbook of Social Psychology***. New York: Random House.

Taylor, S., & Spicer, A. 2007. Time for space: A narrative review of research on organizational spaces. ***International Journal of Management Reviews***, 9(4): 325-346.

Thompson, J. D. 1967. ***Organization in Action***. Chicago: McGraw-Hill.

Tornes, M. J., & Kramer, M. W. 2021. A Multi-Level Analysis of Role Negotiation: A Bona Fide Group Approach to Work Team Socialization. ***Management Communication Quarterly***, 0(0): 08933189211034583.

Tushman, M. L., & Scanlan, T. J. 1981. Boundary Spanning Individuals: Their Role in Information Transfer and Their Antecedents ***Academy of Management Journal***, 24(2): 289-305.

Uhl-Bien, M. 2011. Relational leadership theory: Exploring the social processes of leadership and organizing, ***Leadership, gender, and organization***: 75-108: Springer.

Valentine, M., & Edmondson, A. C. 2013. Team Scaffolds: How Meso-level Structures Support Role-Based Coordination in Temporary Groups. ***Organization Science***, Forthcoming.

Valentine, M. A. 2017. Renegotiating Spheres of Obligation: The Role of Hierarchy in Organizational Learning. ***Administrative Science Quarterly***: 0001839217718547.

Valentine, M. A., Retelny, D., To, A., Rahmati, N., Doshi, T., & Bernstein, M. S. 2017. ***Flash Organizations: Crowdsourcing Complex Work by Structuring Crowds As Organizations***. Paper presented at the Proceedings of the 2017 CHI Conference on Human Factors in Computing Systems.

Vallas, S., & Schor, J. B. 2020. What Do Platforms Do? Understanding the Gig Economy. ***Annual Review of Sociology***, 46(1): 273-294.

Van Maanen, J. 1988. ***Tales of the Field: On Writing Ethnography***: University of Chicago Press.

Waring, J. J., & Bishop, S. 2010. "Water cooler" learning: knowledge sharing at the clinical "backstage" and its contribution to patient safety. ***Journal of health organization and management***, 24(4).

Weber, M. 1947. ***The theory of social and economic organization***. New York: Oxford University Press.

Wiedner, R., Barrett, M., & Oborn, E. 2016. The Emergence of Change in Unexpected Places: Resourcing across organizational practices in strategic change. ***Academy of Management Journal***.

Williamson, O. 1981. The economics of organization: The transaction cost approach. ***American Journal of Sociology***, 87: 548-577.

Williamson, O. E. 1991. Comparative economic organization: The analysis of discrete structural alternatives. ***Administrative Science Quarterly***, 36: 269-296.

Wrong, D. H. 1979. ***Power: Its forms, bases, and uses***. Oxford: Blackwell.

Yukl, G., & Falbe, C. M. 1990. Influence tactics and objectives in upward, downward, and lateral influence attempts. ***Journal of Applied Psychology***, 75(2): 132-140.

Yukl, G., Kim, H., & Falbe, C. M. 1996. Antecedents of influence outcomes. ***Journal of Applied Psychology***, 81(3): 309-317.

Yukl, G., & Tracey, J. B. 1992. Consequences of influence tactics used with subordinates, peers, and the boss. ***Journal of Applied Psychology***, 77(4): 525-535.

Zahra, S. A., & George, G. 2002. Absorptive capacity: a review, reconceptualization, and extension ***Academy of Management Review***, 27(2): 185-203.

Zhou, Y. M. 2013. Designing for Complexity: Using Divisions and Hierarchy to Manage Complex Tasks. ***Organization Science***, 24(2): 339-355.

Zuboff, S. 2019. ***The age of surveillance capitalism: The fight for a human future at the new frontier of power***: Profile Books.

Table 1. Theoretical perspectives and example studies of real authority in organizations

	Sources of authority	**Proposed mechanisms**	**Operationalization of authority**
Status Characteristics			
Simpson, Willer, and Ridgeway (2012)	High status demographic characteristics (e.g., gender, race, ethnicity)	Deferring and claiming opportunities to contribute to goal, higher evaluations	Socially induced modification of an opinion or decision
Anderson, Flynn, and Spataro (2008)	Personality – culture fit	More time for power-building behaviors, more respect, more completed influence tactics	Coworker ratings of influence
Social Networks			
Ibarra (1993)	Rank, boundary spanning, network centrality	Ability to access resources and information, and mobilize broad support; accuracy of assessment of political landscape	Organizational innovations (e.g., new administrative programs) achieved
Brass (1984)	Criticality, boundary spanning, communication network position	Access to and control of relevant resources; low substitutability	Coworker ratings of influence, promotions to supervisor
Krackhardt (1990)	Accurate understanding of advice network	Ability to handle operational problems	Peer ratings of power
Strategic Contingency			
Salancik and Pfeffer (1977)	Control of scarce and critical activities, power to define what is critical	Limited alternatives to accomplish activities deemed critical → access to critical and scarce resources and likelihood that others will defer	Coworker ratings of power, budget share
Symbolic Interaction			
O'Mahony and Ferraro (2007)	Technical impact, organization-building behaviors	Community deferred to people who solved problems caused by interdependence	Descriptions of leader behaviors, membership on leadership team
Huising (2014)	Task jurisdiction	Close interactions produce better understanding and relationships, and better instructions	Compliance with commands, lack of complaints, maintained jurisdiction
Denis, Lamothe, and Langley (2001)	Cycles of coupling (i.e., particular change strategies oriented towards organizational aspirations or environmental negotiations)	Managing conflict and opposition provides opportunity to build support for restructuring resources	Accomplished change in organizational structures or practices

Figure 1a. Foundry functionality included hiring, onboarding task details, timeline

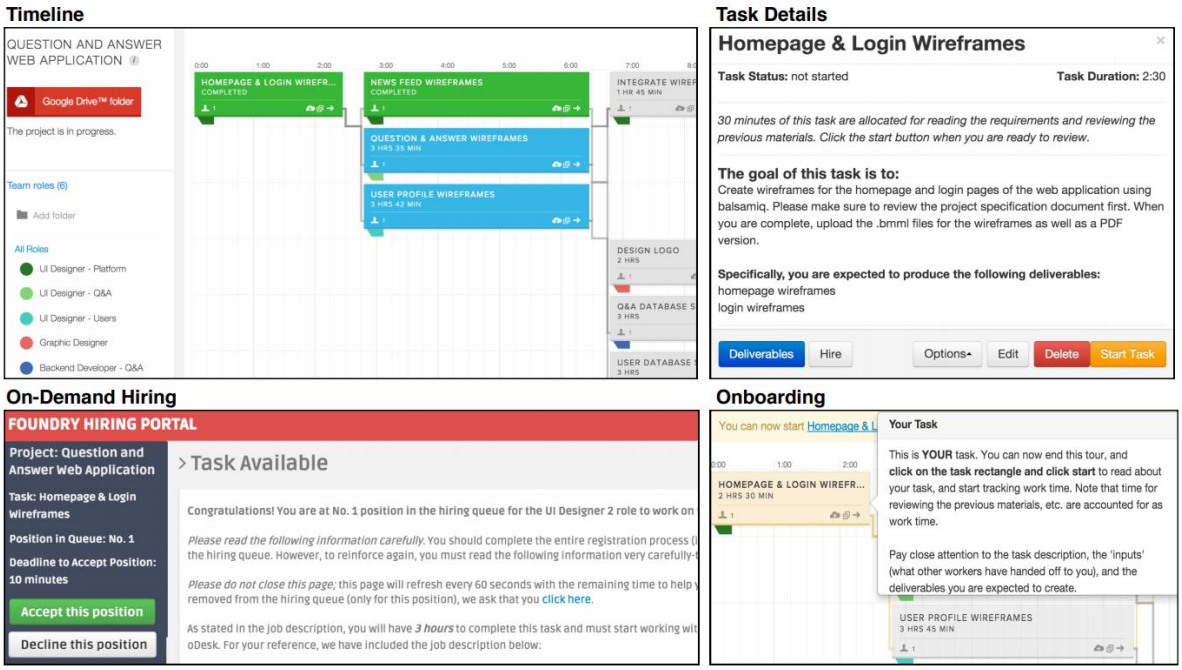


Figure 1b. Slack team channels and direct messages

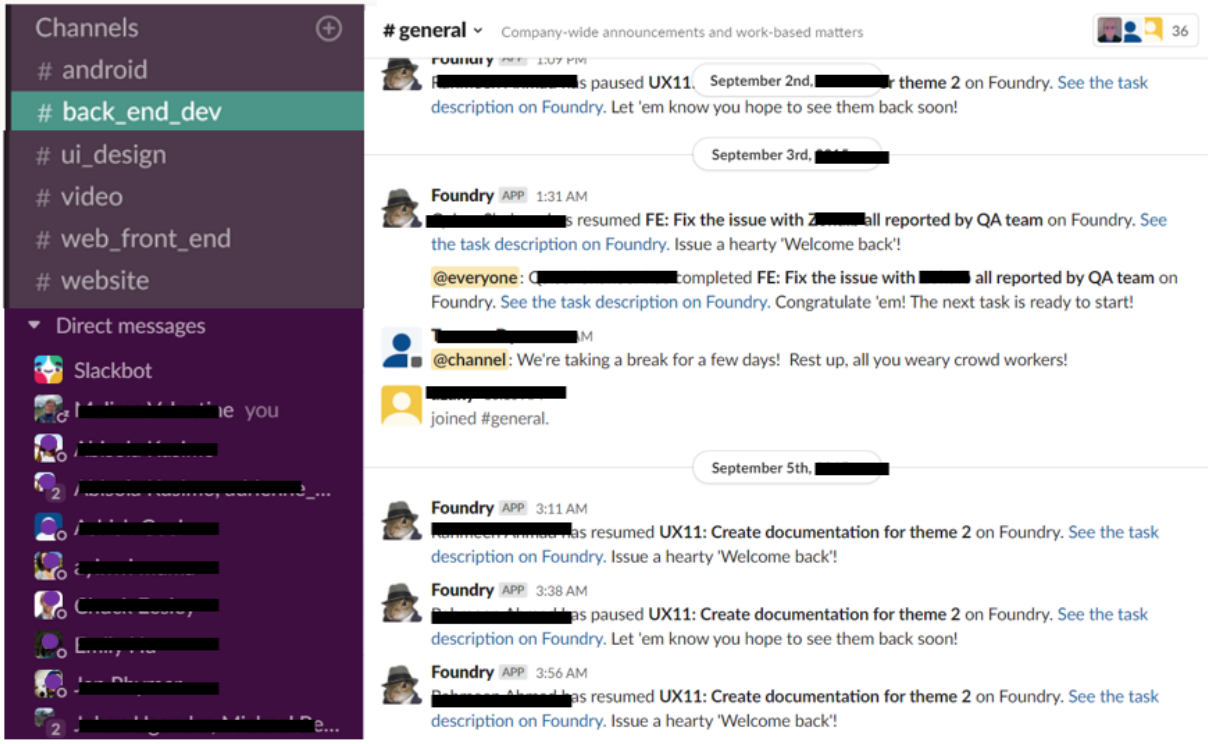


Table 2. Data collected and analyzed

	AmbulanceApp	**WorkshopApp**	**StorytllingApp**
Upwork profiles	31 workers	29 workers	37 workers
Interviews	Org leaders 25 workers	Org leader 22 workers	3 org leaders 20 workers
Slack transcripts	15 public channels 37 direct message or private channels	10 public channels 35 direct message or private channels	6 public channels 10 direct message or private channels
Archival materials	Foundry timelines Google drive Git repository Mobile app Web portal Marketing materials	Foundry timelines Google drive Git repository Web portal	Card decks Foundry timelines Google drive Git repository Web portal

Figure 2. Model of Backstage Interactions, Integrative Capacity, and Relative Authority

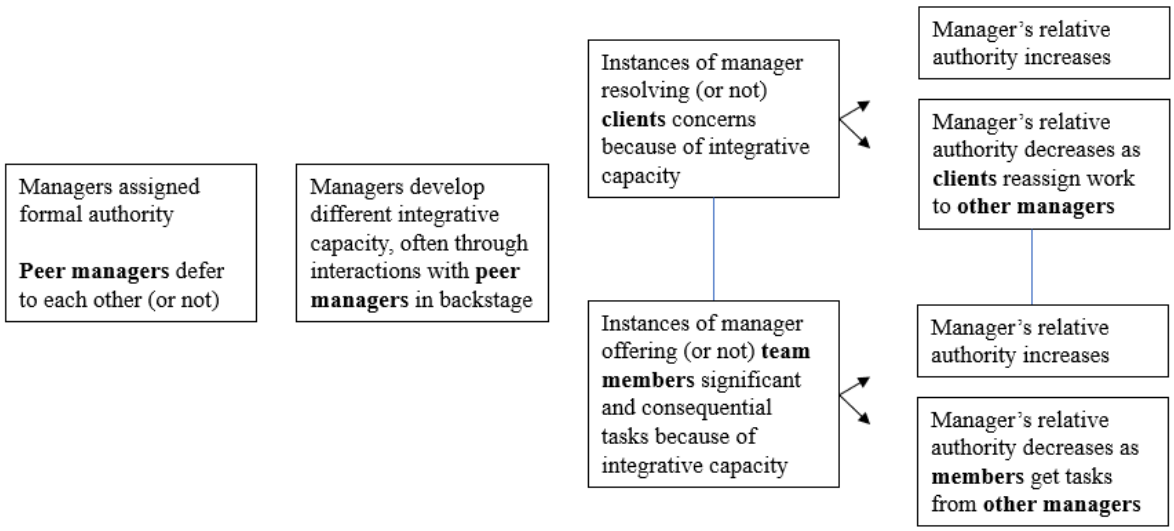


Table 3. AmbulanceApp managers ranked by authority

	ID*	Team	Location	Gender
1	Nima	Android development	Sri Lanka	Female
2	Catherine	Quality Assurance	Philippines	Female
3	Levon	Front-end development	Armenia	Male
4	Sally	User interface	Egypt	Female
5	Michael	Back-end development	UK	Male
6	Francis	Back-end development	Czech Republic	Male
7	Chris	Android development	USA	Male

Figure 3a. Percentage of completed instructions issued by each manager per week

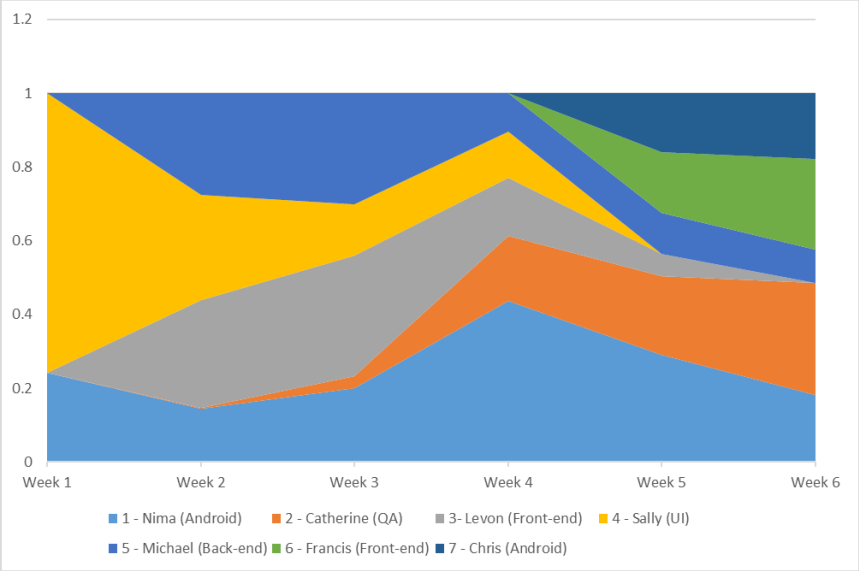


Figure 3b. Percentage of all completed instructions issued by each manager

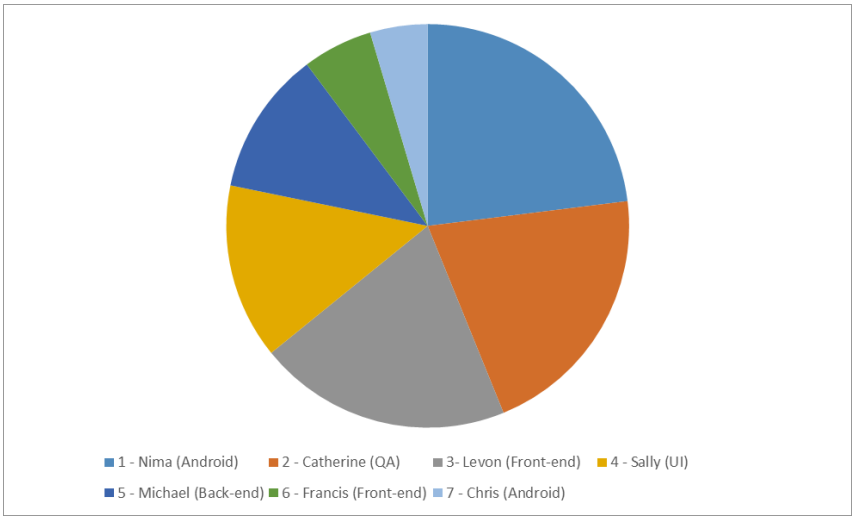
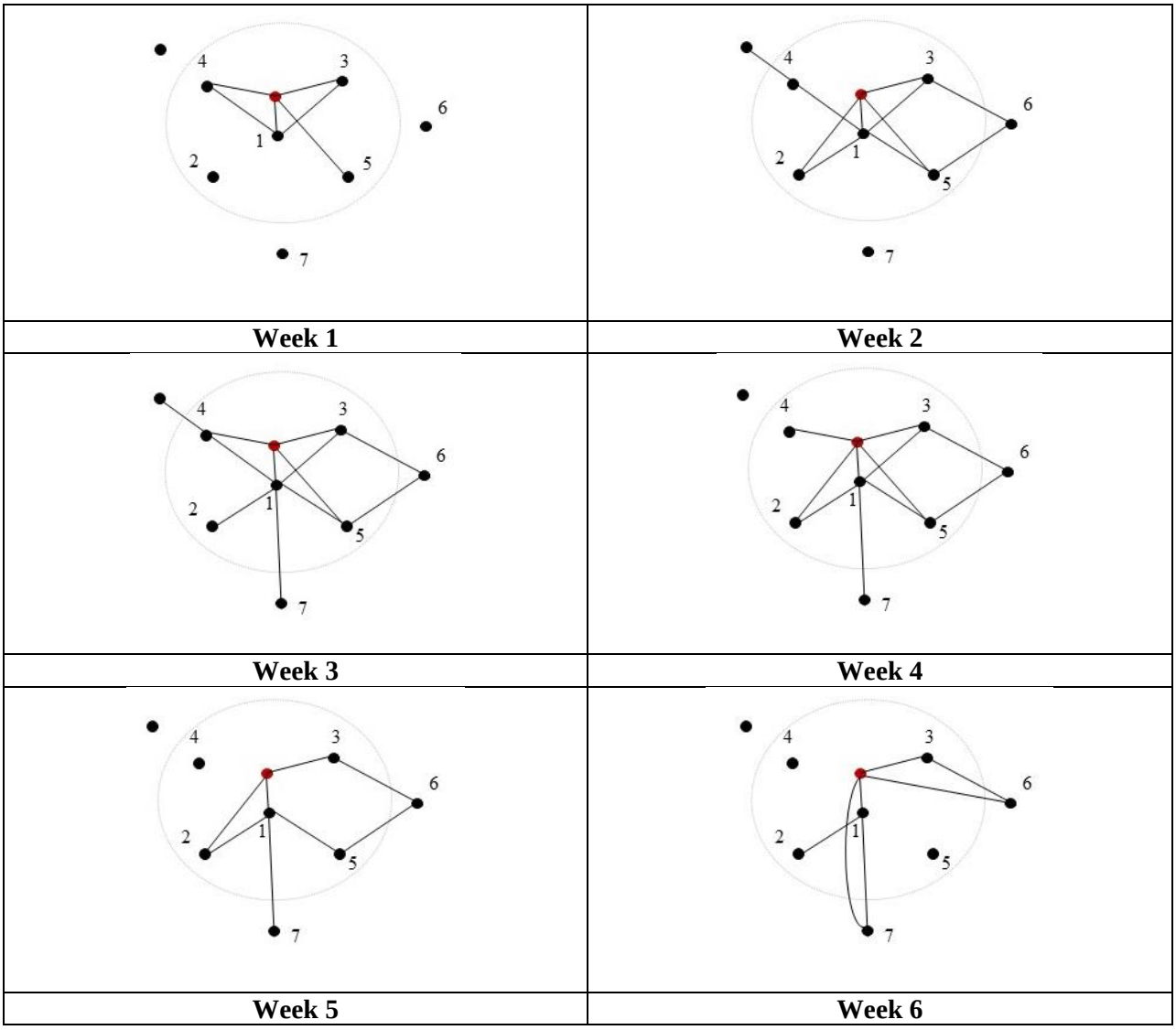


Figure 4. AmbulanceApp backstage interactions involving agreements and repair by week



Network formed by private channel interactions involving new agreements and continuing repair. Client is designated by red node in center. Managers labeled with their authority rank, corresponding to Table 3, and appear inside the gray circle. Team member nodes visualized if involved an active private channel including agreements and repair with a manager.

Table 4. AmbulanceApp: Decisions and completed task instructions by manager by week

Manager	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6
1-Nima (Android)	Tools and processes for own team Team tasks	Team tasks	Team tasks X-team tasks	Process for integrating user feedback Team tasks X-team tasks	Keep deadline Team tasks X-team tasks	Team tasks X-team tasks
2-Catherine (QA)		Cross-cutting tools and processes for fixing bugs		Team tasks X-team tasks	Team tasks X-team tasks	Team tasks X-team tasks
3-Levon (FE)	Tools and processes for own team	Team tasks	Team tasks	Team tasks	Team tasks	
4-Sally (QA)	Tools and processes for own team Team tasks	Team tasks	Team tasks	Team tasks	Team tasks	
5-Michael (BE)	Tools and processes for own team	Team tasks	Team tasks	Team tasks	Team tasks	Team tasks
6-Francis (FE)				Process for integrating GPS	Team tasks X-team tasks	Team tasks X-team tasks
7-Chris (Android)				Process for specs and integrating	Team tasks X-team tasks	Team tasks X-team tasks

Table 5. WorkshopApp managers ranked by authority

	ID*	Team	Location	Gender
1	Fares	Back-end	Pakistan	Male
2	Aman	Back-end	India	Male
3	Denis	Front-end	Mongolia	Male
4	Olga	Front-end	Ukraine	Female
5	Primos	User interface	UK	Male
-	Charlie	User research (UX)	USA	Male
-	Nishant	Quality Assurance	India	Male

Figure 5a. Percentage of completed instructions issued by each manager per week

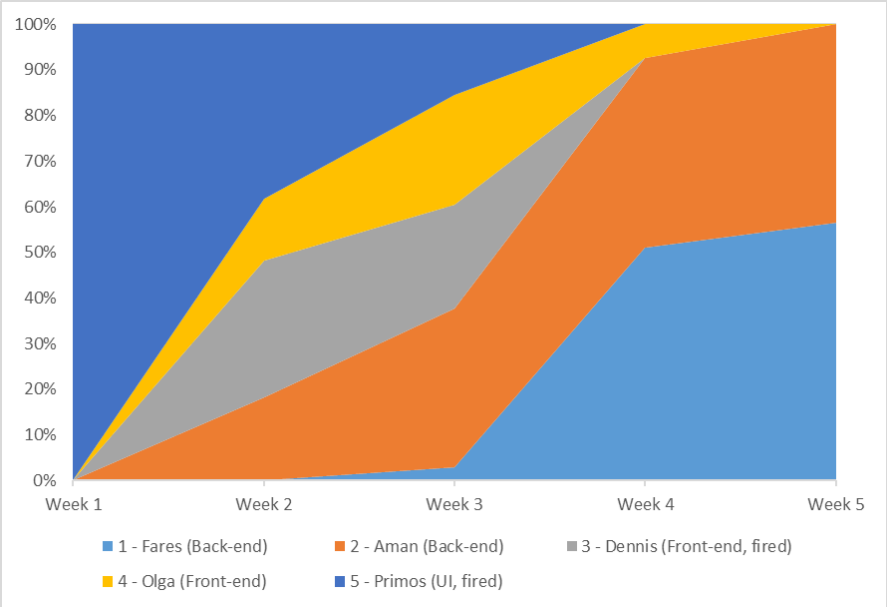


Figure 5b. Percentage of completed instructions issued by each manager

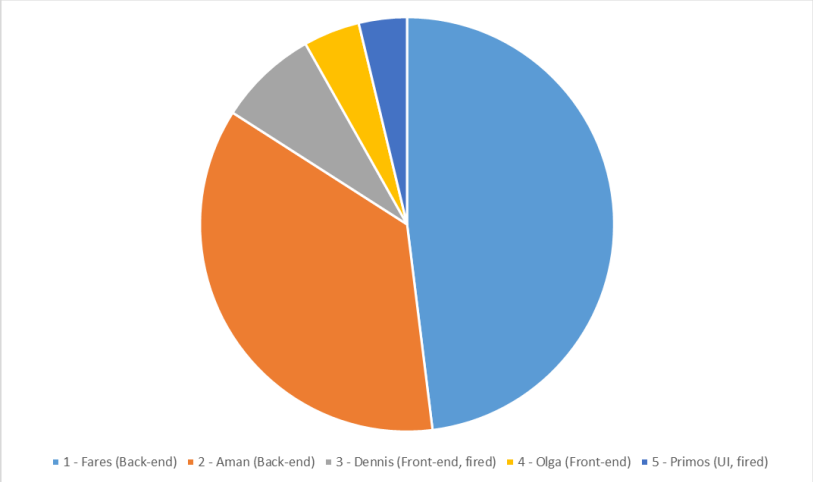
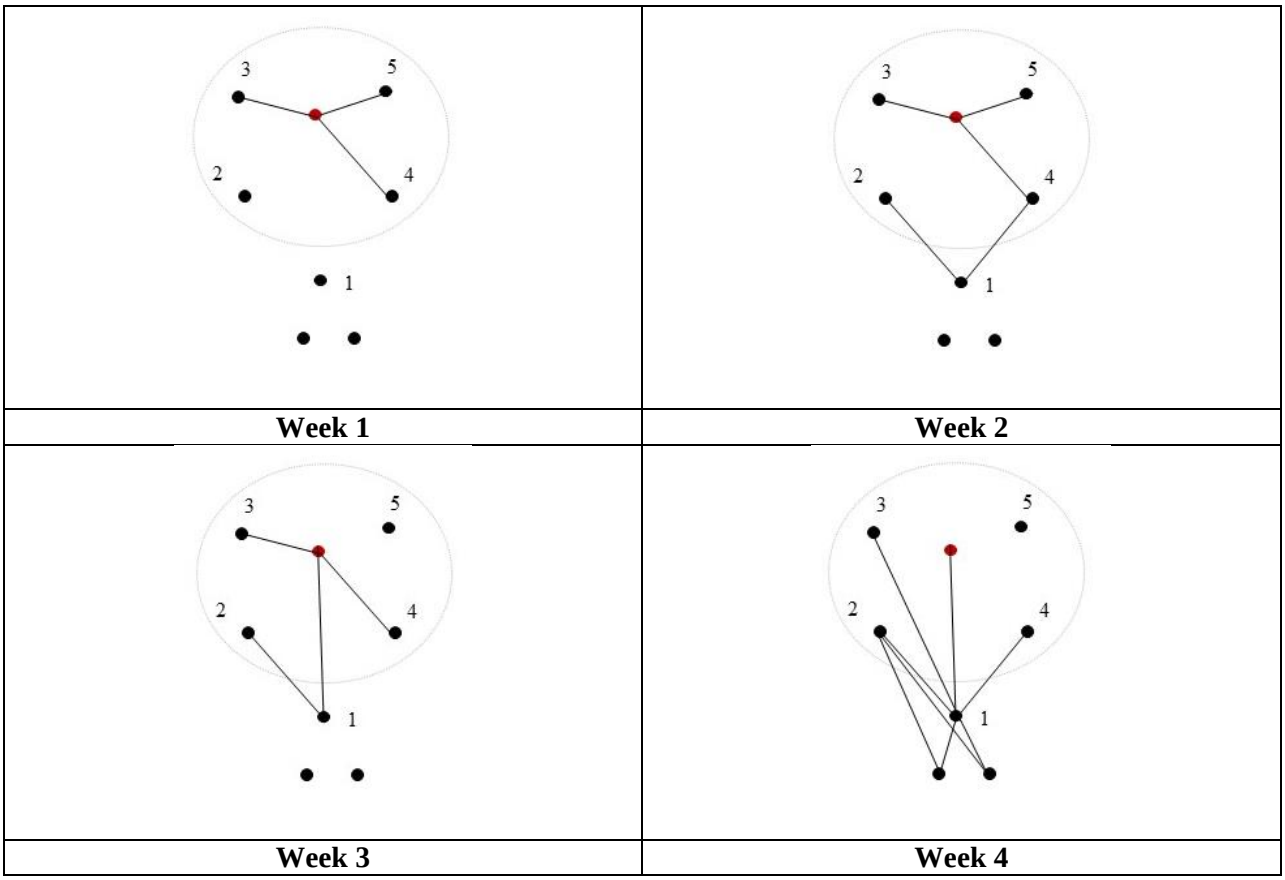


Figure 6. Workshop backstage interactions involving agreements and repair by week



Network formed by private channel interactions involving new agreements and continuing repair. Client is designated by red node in center. Managers labeled with their authority rank, corresponding to Table 5, and appear inside the gray circle. Team member nodes visualized if involved an active private channel including agreements and repair with a manager.

Table 6. WorkshopApp: Decisions and completed task instructions by manager by week

Manager	Week 1	Week 2	Week 3	Week 4
1-Fares (BE)			New cross-cutting framework Team tasks X-team tasks	Keep deadline Tools and process for QA Team tasks X-team tasks
2-Aman (BE)		Tools and processes for own team Team tasks	 Team tasks X-team tasks	 Team tasks X-team tasks
3-Denis (FE)		Tools and processes for own team Team tasks	 Team tasks	
4-Olga (FE)		Tools and processes for own team Team tasks	 Team tasks	
5-Primos (UI)	Tools and processes for own team Team tasks			
0-Charlie (UX)				
0-Nishant (QA)				

Table 7. StorytellingApp managers ranked by authority

	ID*	Team	Location	Gender
1	Mohsen	Android	Pakistan	Male
2	Vlad	UI	Ukraine	Male
3	Danica	User testing	USA	Female
4	Leo	Web	Lithuania	Male
5	Oma	Content	USA	Female

Figure 7a. Percentage of completed instructions issued by each manager per week

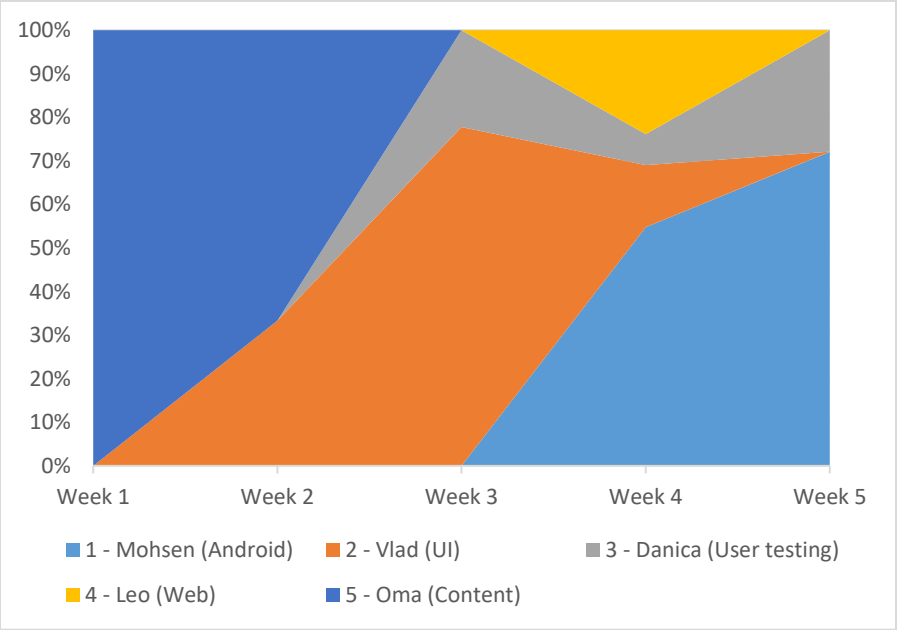


Figure 7b. Percentage of completed instructions issued by each manager

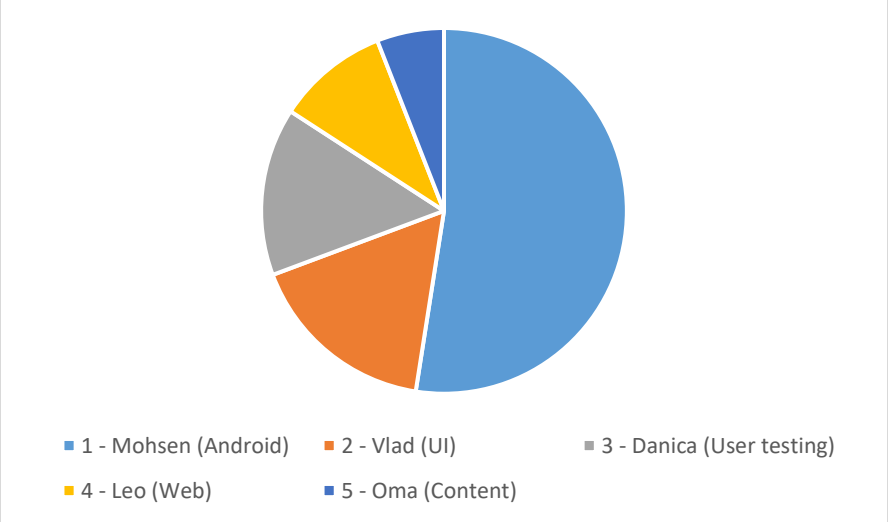
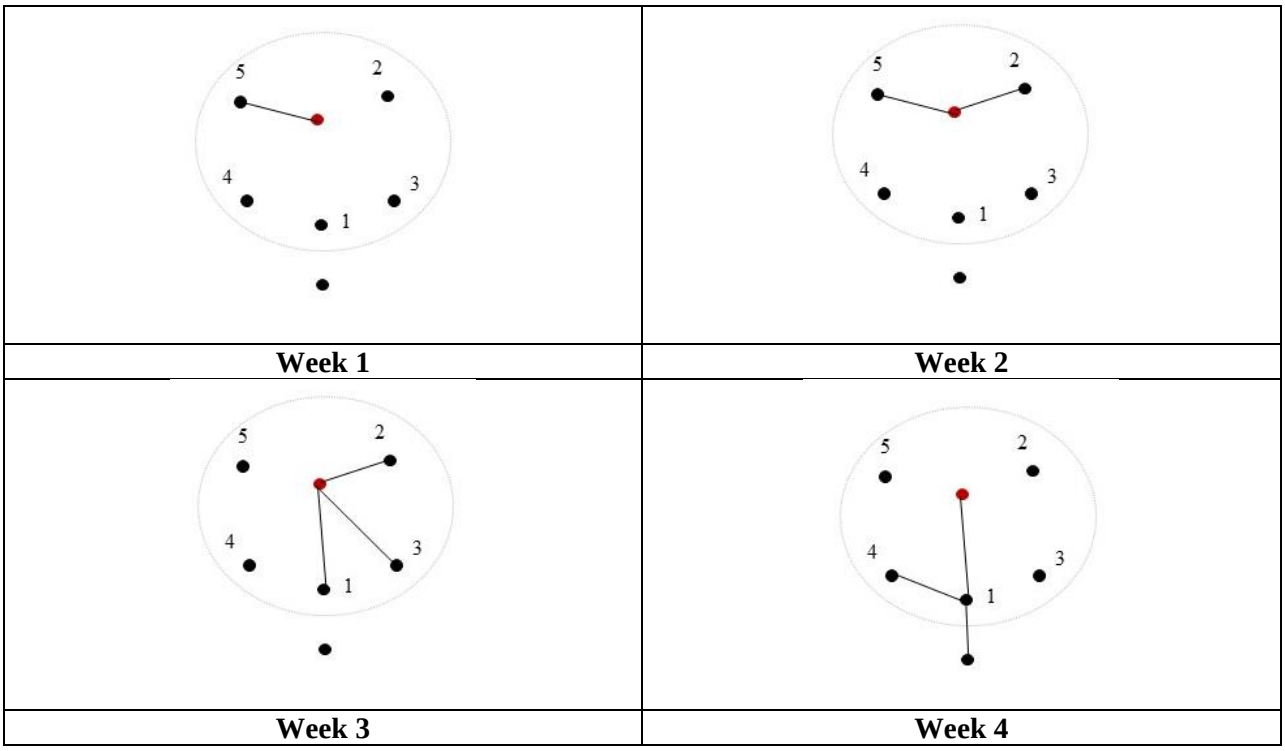


Figure 8. StorytellingApp backstage interactions involving agreements and repair by week



Network formed by private channel interactions involving new agreements and continuing repair. Client is designated by red node in center. Managers labeled with their authority rank, corresponding to Table 7, and appear inside the gray circle. Team member nodes visualized if involved an active private channel including agreements and repair with a manager.

Table 8. StorytellingApp: Decisions and completed task instructions by manager by week

Manager	Week 1	Week 2	Week 3	Week 4
1-Mohsen (Android)			Tools and processes for own team Team tasks	Integration processes with UI and Web Team tasks X-team tasks
2-Vlad (UI)		Tools and processes for own team Team tasks		
3-Danica (UX)			Tools and processes for own team Team tasks	Team tasks
4-Leo (Web)			Tools and processes for own team Team tasks	
5-Olga (Content)	Process for own team (integrate content) Team tasks			