Backstage Repair Work as an Occasion for Producing Authority

Organizations delegate authority to managers, but managers must cultivate their authority in order to exercise it. Prior research has identified the activities and relationships through which managers cultivate authority, but has backgrounded the question of how their formal offices might shape their authority-producing activities and relationships. In this paper, we argue that managerial offices give occupants increased opportunity to be involved in the activities that produce authority. We illustrate this argument with an analysis of the complete communication data of three temporary (flash) organizations. We identified every decision that changed tools, processes, or personnel and analyzed who developed the authority to secure cooperation with those decisions and how. We observed that authority was often produced as a side effect of repair work, where both small and large mishaps prompted a switch from public to private channels to repair the situation. Managers were much more likely to be involved in these private interactions, and it was during this backstage repair work that they developed trusting relationships and unique understanding about how to solve strategically-relevant problems. Our findings reveal that managerial positions provide opportunity for backstage repair work, an undertheorized occasion for producing authority.

Keywords: Formal Authority, Managers, Symbolic Interactionism, Repair Work, Backstage

INTRODUCTION

How do managers produce real authority, when their claims to power begin only in the rules of bureaucracy? This question in one form or another has threaded a century of organizations research. Early threads pointed out that managers embodied a new "rule-based" legal authority and explored how managers exercised authority based on their formal positions (Weber, 1947; Astley and Sachdeva, 1984). But the picture of managerial authority that consistently emerged was that managers still needed to develop and maintain the legitimacy of their authority through the competence and relationships they developed – despite having the formal "right" to authoritatively direct other people (e.g., Follett, 1940; Bennis, 1959; Presthus, 1960; Peabody, 1962). Related threads added to this picture by showing that much power and authority accrue outside of formal hierarchies, following different actors' strategic capabilities and informal networks (e.g., Salancik and Pfeffer, 1974; Fernandez, 1991; Brass and Burkhardt, 1993; Huising, 2014). Prior research has thus importantly foregrounded the activities and relationships that produce authority and has implicitly backgrounded the notion that formal office explains authority outside of the occupants' activities, competence, and relationships (e.g., Pfeffer, 1981a; Brass, 1992; Denis, Langley, and Sergi, 2012).

However, in this paper we argue that the organizations research literature currently underplays the importance of formal managerial offices in shaping the way that different actors produce power and authority in organizations. What is missing is explicit recognition and theorizing about how occupants of managerial offices have unique access and opportunity to engage in the activities through which strategically valuable understanding and relationships develop. Our argument draws together and extends two theoretical treatments of managers enacting formal delegated authority. The first relevant theory frames managerial roles as a powerful coordination mechanism (Hayek, 1945; Chandler, 1977; Gibbons, 2000). Managerial roles set up ultimate accountability for complex work

where the required inputs and processes are unknown; the manager is then expected to flexibly improvise production and help adapt the group's approach to unforeseen contingencies (Galbraith, 1977; Argote, 1982; Conner and Prahalad, 1996; Gulati and Singh, 1998). In practice, this means many managers spend considerable time responding to crises, "putting out fires," or taking on the tasks and accountability that fall through the cracks (e.g., Kanter, Stein, and Jick, 1992; Greening and Johnson, 1996; Valentine, 2017). Our argument then considers how formal managerial offices that structure ultimate accountability play out in organizations, given what is known about impression management (Gardner and Martinko, 1988). Impression management research shows that team leaders and members cooperate to foster a particular impression of their performance for various audiences (e.g., Elsbach, Sutton, and Principe, 1998; Arndt and Bigelow, 2000). Impression management work sometimes involves backstage spaces wherein the team mobilizes their public performances (e.g., Goffman, 1959; Sinclair, 1997; Lewin and Reeves, 2011). Our paper brings these two ideas together – that managers face ultimate accountability for contingencies and that team members cooperatively manage others' impressions of their performance – to propose that managers are more likely to be in private backstage interactions where problems are identified, acknowledged, and repaired. We further propose that involvement in this backstage repair work supports the development of the strategically-valuable understanding and relationships that produce authority.

We developed these ideas in the context of an inductive study of three remote, temporary (flash) organizations, where we collected and analyzed the complete communication data, including both public and private channels. Through this analysis, we identified every decision that materially changed the project – including the means of production, processes, or personnel – and analyzed how those involved had developed the authority to secure implicit or explicit cooperation with those decisions. We observed that authority was often produced as a side effect of repair, where both small

and large mishaps frequently prompted a switch from public channels to private messaging in order to repair the situation. During this backstage, private repair work, managers developed relationships and unique understanding about how to solve strategically-relevant problems that later manifested frontstage as authority. The managerial positions mattered for the effective exercise of authority because managers were more likely to be "in the room" when repair work began and were therefore more likely to develop needed understanding and relationships. Notably, some team members also produced authority beyond what was afforded them by their initial assignment, also because of their involvement in backstage repair work. This research proposes that formal managerial positions provide increased likelihood of access to and involvement in the backstage repair work that produces authority, an undertheorized occasion for producing authority.

THEORY

Formal authority in organizations

The modern structuring of "formal authority" means that the right to issue directions and the right to sanction employees inheres in legally-defined offices and not in specific individuals (Weber, 1947; Astley and Sachdeva, 1984). Yet when any individual takes on a position of formal authority, they must cultivate the capacity to actually exercise these rights in a meaningful way (Wrong, 1979; Aghion and Tirole, 1997). This struggle is seen as "the problem common to all organizations" – creating the conditions under which managers will be accepted as authoritative and their decisions obeyed (Blau, 1955). Early investigations into this question focused on discovering the additional "bases" that broadened the authority of an individual occupying an office of formal authority (Simon, 1957; Thompson, 1967). Researchers identified various characteristics, such as competence or charisma, that correlated with people in formal offices developing real influence (Simon, 1945;

Weber, 1947; Bennis, 1959; Presthus, 1960; Peabody, 1962). Empirical studies in this vein of research explored which bases of authority explained real authority in different organizational cultures; for example, welfare workers attributed legitimacy as the important base of authority, police officers looked to "authority of person" as the more important, and school employees emphasized professional competence as a base of authority (Peabody, 1962). This set of studies importantly argued that real authority cannot be explained solely by formal office or hierarchical commands.

Many relevant streams of research continued this general critique that formal offices do not explain the real exercise of authority in organizations. The "power and politics" research tradition, for example, critiqued early studies as overly concerned with "vertical" authority – meaning between superior-subordinate – and overly concerned with interpersonal authority (Perrow, 1970; Salancik and Pfeffer, 1974). This research instead used political analyses to understand how authority is produced, particularly in terms of coalition building (March and Simon, 1958; Cyert and March, 1963; Stevenson, Pearce, and Porter, 1985). According to this theory, organizations should be understood as coalitions of subunits that negotiate, compete, and cooperate with each other (Pfeffer and Salancik, 1974; Salancik and Pfeffer, 1974). Within this coalition-building and competition, subunits acquire power and authority to the extent they actively solve the organization's most relevant problems – e.g., if the organization is being sued, the legal department will develop increasing relevance and power (Salancik and 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 and Pfeffer, 1977b, pg. 4). This research demonstrated how strategic relevance increases different groups' power and authority, but it left behind the question of formal authority. Questions that remain open given this shift in focus include the extent to which formal authority matters in defining problems, defining solutions, and

shaping what is accepted and recognized as relevant (e.g., Kaplan, 2008).

Another set of studies also critiqued the early focus on using formal authority to explain real manifest authority in organizations, instead arguing that power and authority should be understood in terms of people's structural positions in social networks (Brass, 1992; Brass and Krackhardt, 2012). These studies emphasized that social structure emerges out of repeat interactions and demonstrated that those interactions may not align with formal organizational structures (Fombrun, 1986; Krackhardt, 1990; Fernandez, 1991). Instead, when people become central in social networks based on repeat interactions, they develop power because they have unique or independent access to information as well as the ability to influence others' interpretation of ambiguous information (Tushman and Romanelli, 1983; Burkhardt and Brass, 1990; Krackhardt, 1990). Studies in this area report inconsistent results on whether formal authorities are central actors and more likely to have manifest authority or power (e.g., Fernandez, 1991; Brass and Burkhardt, 1993). These studies theorized how network structure can produce authority, but they do not yet account for how formal offices might play out in the construction of networks overtime. To address our research question, social network studies would need to consider whether and how people in positions of formal authorities constructed their social networks differently than others and with what consequences.

A final set of relevant studies also critiqued the early focus on individuals occupying formal authority offices, arguing that this focus failed to account for the ways that authority is produced through people's ongoing interactions and practices (e.g., Follett, 1940; Denis, Langley, and Cazale, 1996; Morand, 1996; Huising, 2014). This alternative focus on interactions relaxes the focus on individuals or positions as "containers" for authority and instead emphasizes that group members produce and perform authority through the ways they defer to and influence each other (Denis, Langley, and Sergi, 2012; Simpson, Willer, and Ridgeway, 2012). This theoretical tradition would

argue that two people in the same formal positions would produce vastly different power and authority from their positions, depending on their status characteristics and the activities and relationships that they pursued; these factors will then influence whether organizational members defer to them during ongoing interactions. Huising (2014) is a key example of research that explains how people produce authority through their ongoing activities and relationships. That paper developed a theory of relational authority to explain how low-status professionals developed the capacity to elicit voluntary compliance from higher-status clients. 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. Huising (2014) analyzes professionals attempting authority based on their low-status, professional expertise, so it does not address our research question, but it illustrates how closer relationships and better understanding produced authority. And that paper further explains why and how power and authority accrues outside of formal "rights" to direct, instruct, and sanction.

In sum, early studies in organizational theory importantly noted the difference between formal authority and manifest authority and sought to understand how managers broaden the base of their "rights" to direction and sanction. But this early research was critiqued for being too focused on formal office and missing why and how power and authority develops outside of formal offices. The related research addressing this deficiency has advanced important concepts related to the particular kinds of understanding, relationships, and problem-solving capabilities that actually produce real authority. And yet, our understanding of authority relations in organizations remains incomplete because we have left behind the question of whether and how people occupying formal offices might have unique positional access and opportunity to develop the strategically-valued understanding and

particular kinds of relationships that we now understand to produce manifest authority.

Impression management, backstage spaces, and formal authority

Our current study reports an inductive analysis of every decision made in three different project-based temporary organizations. We found that formal managerial offices were consequential for the effective exercise of authority, but in ways not yet accounted for in prior literature. To develop new theory to connect our results to prior literature, we now draw on and extend theories of impression management to interpret our results. Most studies of impression management focus on the psychological processes of presenting a desired self in public organizational settings, which is different from our focus (e.g., Gardner and Martinko, 1988; Dutton, Dukerich, and Harquail, 1994; Bolino, et al., 2008). Managerial authority in these accounts might arise from managers fostering impressions of their charisma (e.g., Gardner and Avolio, 1998) or fairness (e.g., Greenberg, 1990). In contrast, our interest in impression management and authority relations returns to Goffman's classic descriptions of how teams foster certain impressions through "backstage" activities (Goffman, 1959; Goffman, 1967). This original theory of impression management considers any dyad or small group in any social setting and their social tendencies to cooperatively "play their part" and "keep a particular narrative going." Note that Goffman (1959, pg. 79) refers to these dyads or groups as "performance teams" but this theory is not focused on formal teams or bureaucratic authority per se.

This theory proposes that the backstage interactions of "performance teams" are important for their ability to foster a particular impression among their audiences (Goffman, 1959, pg. 106). For example – in private areas, team members can be socialized in ways that might not be comfortable to public audiences (e.g., Sinclair, 1997), or can relax in ways that ease role conflict and uphold group boundaries (e.g., Van Maanen, 1991), or can avoid scrutiny while planning their public performances (e.g., Lewin and Reeves, 2011). Related research in organizational theory supports this idea that

interactions in private spaces are of a different nature than observable interactions in public spaces where people are concerned about fostering a particular impression (e.g., Bernstein, 2012; Bernstein, 2017; Anteby and Chan, 2018). We draw on this research to build our main theoretical contribution. Our overall argument is that managers – by virtue of their formal positions – are more likely to be in the backstage spaces where problems are aired and repaired, and that substantial authority is actually produced during backstage repair work, even when it is performed in frontstage activities.

METHODS

We aim to develop new theory using an extreme case approach (Eisenhardt, 1989; Edmondson and McManus, 2007). Our research setting offers access to full sets of managers and team members from the moment they start working together until their projects are complete, including all public and private interactions. These features of our research setting are well-suited to developing new insights into how authority is produced.

Research Setting

We collected data from three "flash" organizations. Flash organizations are temporary organizations, similar to those described in prior research (Goodman and Goodman, 1976; Meyerson, Weick, and Kramer, 1996; Bechky, 2006a), but with the additional characteristic that they are convened and coordinated using online software platforms (Retelny, et al., 2014; Valentine, et al., 2017). At the time of this research, many companies and research groups were organizing flash organizations. For example, a company called Gigster (www.gigster.com) created a large pool of software developers and solicited their participation for software development projects, coordinating work using online 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.

The three flash organizations we studied were comprised of people working as freelancers on one of the largest online labor markets in the world, Upwork (www.upwork.com). The 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 "WorkForge" 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 were interested in this phenomenon so negotiated access with the WorkForge developers to these three deployments of their platform tool. The clients who convened and ran the organizations used WorkForge to hire expert workers from Upwork to join their projects. Based on the WorkForge developers' typical workflows, eligible workers received an invitation email. Then, when they clicked the email link, their web browser would open WorkForge and display a shared project timeline. Figure 1 visualizes screen shots of this hiring process.

Insert Figure 1 Here

When a worker clicked the email link to take the job and join a specific flash organization on WorkForge, they were added to a multi-website ecosystem that centered around WorkForge, including a shared document repository using GoogleDocs (docs.google.com) and a multi-channel chat system using Slack (www.slack.com). WorkForge's first web page after the log-in displayed a project timeline. Clients could add a "task block" to the timeline and indicate in that block what kind of role expertise was needed to accomplish that particular task. WorkForge would then automatically issue an open call to the Upwork labor market for people with that role expertise. 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

Each organization was comprised of about thirty members who completed projects over the course of five to seven weeks. Each organization completed a software product (see Table 1). The first flash organization (StoryApp) was run by a client who had a storytelling podcast and wanted to develop a card game and mobile app that extended the podcast. The second (TraumaApp) was led by a client sponsor who was a doctor-in-training who had an idea for a mobile app and web portal that connected ambulances with emergency rooms. The third (WorkshopApp) was sponsored by a product lead at a large consulting firm who had an idea for a web portal that connected their clients with relevant workshops. The funding for the projects was provided by the WorkForge developers. Each client sponsor owned the deliverables, consistent with Upwork.com policies on intellectual property.

Insert Table 1 Here

The clients hired managers and team members to produce their app ideas. Everyone who was hired was paid by the hour according to their posted hourly rate. Each organization had between five and seven managers (see Table 2). They were all introduced to their teams using the same email text (because of the WorkForge platform), so they all began their work with same formal delegated authority. They varied by location and demographics. Each manager was fluent in English, a proficiency tested by the online labor market.

Insert Table 2 Here

As Table 2 reports, we assigned Manager IDs based on total hours. Thus, Manager A in each project was the person who earned the most in the project, controlling for wages which differed by location.

Data and Analysis

Researchers have noted a need for better understanding of the dynamics of leadership groups, including how they form and evolve as they interact together and with team members around specific issues (Denis, Langley, and Sergi, 2012). Part of the lack of research is because of the difficulty in accessing relevant data. Relatedly, these kinds of processual and interactional questions cannot be studied with traditional methods, but require "richer methodologies" that allow the observation of interactions and can capture relational dynamics as they are happening in situ (Uhl-Bien, 2011; Huising, 2015). With these issues in mind, we analyzed three main data sources for each flash organization (reported in Table 1).

First, we collected and analyzed all of the archival trace data that were produced during each project. Clients and workers consented to participate in these organizations as part of a research study using protocols approved by our institutional review board. The archival trace data included all of the Upworker profiles and chat interactions; all of the Slack chat transcripts; transcriptions of various Skype meetings; all WorkForge roles, tasks, and timelines; all Google Doc deliverables; and final products including the functional apps. Each organization's Slack channel structure was emergent, based on leader and worker activities, and most work was coordinated in the Slack chat channels. We collected the private channels by asking participants to voluntarily export and share their chat transcripts only after each project had concluded. Participants opted in to providing their private channels and were paid for the time required to export this data. All workers received top ratings and full payment for their project work separately from providing their private channel transcripts and participating in interviews.

Our second data source consisted of interviews with the members of each flash organizations and with each organization leader at the end of each project (Jick, 1979). These interviews were

conducted by Skype and were recorded and transcribed. Questions were open-ended and explored each worker's experience working in a flash organization. We asked for descriptions of specific, concrete events before asking for interpretations (Spradley, 1979). The interviews provided insight into experiences which could not be observed in the online environment.

The final data source was a set of field notes created by the first author based on participant observation in these three WorkForge deployments (Schein, 1993; Bechky, 2006a). Participant observation in a group is important data for understanding complex social systems (Van Maanen, 1988; Bechky, 2006b; Anteby, 2013). The notes were taken in WorkForge development meetings, initial meetings with leaders, and throughout the entirety of both projects. One theme described how difficult it was to keep track of everything that was going on, given the glut of information produced each day. This observation would not have been richly experienced had we relied only on archival data, rather than experiencing the volume of information as it was being generated in real time (Ancona, Okhuysen, and Perlow, 2001).

We conducted inductive and iterative analysis of this set of qualitative data, consistent with current practices for theory development (Golden-Biddle and Locke, 1993; Charmaz, 2006; Golden-Biddle and Locke, 2006). First, we conducted line-by-line analysis of all Slack transcripts, transcribed interviews, and field notes. We analyzed all public channels, private channels, and direct messages. These files represented the majority of the interactions whereby work in the organizations was accomplished. We had observed the communication as it unfolded, but this later coding analysis was systematic and comprehensive. This line-by-line coding involved following links to other web platforms in the online ecosystem, for example following links to the WorkForge project timeline, or to a GoogleDoc folder with draft images. The first phase of coding was open-ended and was intended to be exhaustive, with each piece of data being analyzed and coded. The main insight that emerged

from this round of coding was how many consequential interactions were conducted in private channels. During the second round of coding, we reanalyzed the data a second time, focusing on understanding the differential use of private and public channels. We began to understand that the interactions in the private channels were producing decisional power and authority. We conducted a third and final round of coding focused specifically on identifying all of the decisions that materially changed the flow of resources in an organization. We then inductively analyzed who had participated in that decision, what the nature of those interactions were, and where they occurred. The unit of analysis for this study can be understood as decisions that changed the flow of resources, including changing the means of production, process of production, personnel, or task allocations. The main findings offer an interpretive process theory based on this decisional analysis.

This comprehensive coding also allowed us to produce data analysis and visualizations that support and provide additional insight into the interpretive theory. Tables 4-7 each visualize the decisions made in each organization that materially changed production, including who was involved in the decisions, as well as when those decisions were made and where. As complements, the Figures visualize the pattern of backstage interactions with clients, other managers, and team members that produced the authority that secured implicit or explicit cooperation. We did a simple count analysis to produce Figures 2, 4, and 7 based on the backstage interactions that each manager had with the client for each week of the project. We used the manual coding of the Slack transcripts to develop these visualizations. We learned that we had to code the transcripts by topical issue, rather than by a raw count of lines. Managers and members had different habits for how they typed into the Slack interface. For example, one manager emphasized a point by typing one word per line for many lines, whereas another typed a long paragraph with many capitalized words to emphasize a point. Our analysis thus coded by issues rather than simple line counts. For each issue, we coded who

introduced it, whether it involved a query or an instruction, to whom the comment was directed, and who participated in resolving it. Next, we created a custom network visualization of the full set of backstage interactions, intending to highlight the managers' evolving relational network, which is the second layer circle of each network. To visualize these networks, we used the manually-coded data to create a two-mode network where one row represented one issue in the conversation, and the columns indicated the members who were affiliated with that issue. We calculated an affiliation matrix where each cell reported the number of interactions for each dyad. When an interaction included more than one dyad, a tie was added to each cell representing each possible dyad within the group. These matrices were used to visualize the networks in Figures 5 and 8.

FINDINGS

We analyzed how different managers produced manifest authority in three flash organizations and observed that real "manifest" authority was produced almost as a side effect of backstage repair work. Every day during these projects, various people, processes, and tools performed in unexpected and often not ideal ways (as predicted in Brown and Duguid, 1991; Suchman, et al., 1999). Such mishap, both small and large, usually prompted a switch from public channels to private messaging in order to repair the situation. This private, backstage repair work produced relationships and project-specific competence and understanding that later manifested frontstage as authority for those involved in the repair. Table 3 summarizes the differential resources that developed during backstage repair work and the related implications for the authority that managers were able to produce.

Insert Table 3 Here

We report the findings by case. Our intent in structuring the findings in this manner is to mirror Morrill (1996), which used different organizational cases to show that executive conflict

management played out in every organization, but did so differently depending on the authority structures and communication networks that executives navigated. Similarly, we demonstrate a clear pattern across our three organizational cases: in every case, managers and team members engaged in backstage repair work in ways that produced authority. But, we also show that they navigated different client styles and different levels of interdependence with peers in ways that also influenced their resulting authority relations. We are thus conceptualizing backstage repair work as a "pragmatic action pursued in the workaday world" that partly explains who produces real authority and how – but argue that the relationship between backstage repair and the production of real authority plays out differently given different organizational characteristics (Morrill, 1996, pg. 6).

Case 1: The StoryApp Project

The clients for the StoryApp Project 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. They did not have prior experience developing games or mobile apps. This case was in some ways was the simplest in terms of how authority was produced and exercised, because the teams were mostly independent. Table 4 Row 8 reports that the managers publicly allocated tasks to their own team members, which in some ways can be seen as the most expected exercise of their formal authority. But such an interpretation of Table 4 row 8 misses two important issues related to managers' capacity to effectively issue those instructions. First, these public instructions were never challenged or even substantively questioned, which is interesting because the decisions were not unambiguous, and the managers were neither objectively more experienced nor more highly rated in the online labor market than the team members. Second, even though these public instructions dictating the "correct" future actions were

subjective, they still moved considerable resources in terms of how paid work was allocated among team members.

Insert Table 4 Here

To understand the managers' capacity to issue ambiguous yet conflict-free public instructions as seen in Table 4 row 8, we can look at a key pattern that emerged before those instructions were offered. When the expected performance of some tool, process, or person started to slip in a public space, each manager immediately and fluidly slid into backstage private channels to discuss how to repair the slip or failure. In this case of the StoryApp project, the managers' backstage interactions were typically with the clients or with their own team members (see Figure 2). But it was during this backstage repair work that managers produced authority, especially as compared with their team members. The early decisions made during backstage repair work changed the means of production and work processes in ways that made the managers' own expertise and relationships more relevant, which affected their and the clients' later decisions about how to allocate tasks. Most team members were not aware of the clients' views of the failing performances or of the backstage repair work. This case reveals the authority-producing path dependence of early decisions, which were made during backstage repair interactions.

Insert Figure 2 Here

Patterns of backstage repair work

We begin with three examples of StoryApp managers' backstage repair work, which always began in response to some failing performance in the public spaces. The first failing performance related to the process of content creation. The clients had the idea to "crowdsource" the writing of tpoetic prompts that were written on the cards in the game, so they hired a large team of writers to

create those prompts. The clients expressed a strong ethic of respecting artists and artistic creativity, but they were soon dismayed to discover that they did not want to use the content that was being produced. One of the clients was discussing with a writer in a private channel their dilemma of not "believing in" managing the artistic process. 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 fromeach 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. This "promotion" to "chief poet" – a joking label between her and the clients, but one that came with right to assign work – was not publicly announced, so the poorly performing writers had little chance to adjust. She assigned future writing and integrating work to herself and a few writers whose work aligned with the clients' vision, and the three of them ended up doing more work than all the other team members combined. This backstage repair to the process and related allocation of work happened entirely without public discussion or conflict. A similar proposed process, fail, and backstage repair played out in the graphics team, where the manager and one team member ended up earning 90% of the budget spent on graphics (Table 4, Week 3, Rows 7-8).

A related but different set of events played out involving manager D in Week 3. A team of user testers began implementing a traditional user testing process, but the clients privately expressed dissatisfaction with the "richness" of the findings. Manager D had extensive experience in market research in addition to traditional user testing processes, so she was able to repair the disappointing performance by suggesting a more extensive 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. Team members who had begun the more traditional user testing were not aware of the clients' disappointment, because the issue was

surfaced and repaired backstage. Thus, in a practical effort to satisfy the client, and based on her own experience and expertise, Manager D grew her role and allocated significant resources to new team members that she hired and managed.

A final example of this pattern unfolded when the android app development began in earnest in Week 4. The clients initially considered developing an app for the iPhone, but Manager A had more experience with android, so he convinced them to do android development. He engaged in backstage repair work in response to two different failing performances. The first involved a team member who was hired to the team but had slightly less android experience, so the initial pivot to the different operating system meant he was slightly out of depth for the work he needed to do. But, Manager A and this team member had discovered a social connection based on their shared culture.

Manager A:	hey bro very nice to talk to you. are you Syed [a last name with religious significance]
Team Member:	yes. my full name is Syed [first name]
Manager A:	:+1: much respect for Syeds :simple_smile:
Team Member:	thanks bro
	(further back and forth discussion of this connection)
Manager:	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

The manager played a significant mentoring role for this team member during their subsequent backstage interactions, helping him with both technical skills and his public presentation. As one example, they developed a routine where the team member would submit work to the manager first, who would review it, and then type, for example: "OK - can you share the screens on #android?" The manager thus iteratively corrected this team member's work before it even appeared in the public team channel, not just before a formal submit to the client. As another example, when the team member accidentally typed something personal in the public channel, the manager immediately slid backstage and said "better to chat about personal things directly :simple_smile: -- you can delete

those messages it is not good to ask in general group." The team member replied, "oh i did not notice we were not in pvt chat… my bad. deleted. thanks for noticing it." These backstage repairs produced the appearance of smooth operations in the android development team, where the manager was the only one who ever made decisions about processes and task allocations. The manager accrued the most hours out of anyone on the team, and through his mentoring, this team member had the second most hours, despite his previous lack of android experience. Through these backstage repairs, Manager A's social connection with this team member became and stayed relevant to how project resources flowed.

Manager A also engaged in backstage repair work in response to a second failing performance which involved the clients' platform, WorkForge. The clients were using WorkForge as a project management tool and valued it because it recorded project information as the work unfolded. Manager A faced more documentation demands than other managers and teams in StoryApp and found that as he used the tool, it was slower than expected and was costing him too much time in documentation. Manager A and this same trusted team member identified and discussed the failing performance backstage.

Team member:	Having some issue with WorkForge
Manager A:	what happened
Team member:	(describes problem with uploading a file)
Manager A:	you can just upload in graphics (Google Drive) folder and share the link don't worry about WorkForge, its new and they're removing issues in it. it is like we are beta tester as well of it :simple_smile:
Team member:	lol

Thus, in an offhand remark, intended to repair back to smooth operations, the manager actually made a consequential decision to not use one of the means of production that the client found valuable. Neither the manager nor the team members spent time using or documenting their work on WorkForge from that point. Because this slight repair to the process of uploading files was done

backstage, the client did not become aware of this until the end of the project. The client could have directed different repair had they been involved in these discussions, but at no point did the managers or team members reveal to the client their sense of the failing performance of the WorkForge tool.

Resources and implications for producing manifest authority

These several examples reveal how immediately, fluidly, and practically people slid into private channels to acknowledge and repair problems that began to play out in the public channels. As summarized in Table 3 above, those who participated in backstage repair work developed different resources than those who did not, with implications for their manifest authority.

Developing relationships and solidarity. The tone and experience of the backstage interactions was different – more informal and more candid, with more joking. The tone and interactions revealed a sense of solidarity, or of the backstage collaborators being "in it" together in a different, more real way. The support and joking often aided admissions about skill or experience gaps, or about the real unspoken story about what was going on. The pervasive pattern can be seen in the interactions of Manager A and the trusted team member. When the team member could not get into the launch call, Manager A sent him a private message to help him figure out the problem and join the call. They continued this brief repair interaction after the call. Manager A said, about no real work, "you are doing very well, keep it up bro" to which the team member admitted with a joking tone, "u have a lot more hours (on Upwork) than me I'm new here I guess lol". As they continued this banter, they discovered their shared social connection, reported above.

As another example, Manager A and this team member figured out that the WorkForge developers were professors and often joked with the clients in backstage repairs about "the professors." The clients were the ones who were primarily hiring, interacting with, directing, paying, and rating all of the team members, while the WorkForge developers were only peripherally involved

as the ones interested in how people were using the WorkForge tool. This came up in a backstage repair interaction in which a client asked Manager A about a bug: "there are two fixes that I'd like to fix - please let me know if you're available." During the interactions to figure out the fix, Manager A pulled in the team member. As the three of them figured out a solution, they continued to joke about the professors.

Team member:	It is a pleasure to be part of this team. Equally excited to hear that we have managed to impress some professors. (a first for me lol)
Manager A:	Thanks God our effort appreciated by the profs
Client:	Haha I was really excited to show off all your hardwork to them!

Together, they were jokingly candid about their sense of what was "really" going on in the organization. The relationships and solidarity developed in this interaction, together with a greater access to more candid discussion, provided a particular resource not available to others.

The developed relationships and solidarity also meant that slips or fails within the backstage interactions were more protected, and future public slips or fails were also more immune from critique or repair. As an example, as the Android team worked to develop the app, someone asked a question in the public Android team channel about who "owned" or controlled the data that users created on the app. The question had sensitive implications for data privacy, but had not been considered by the clients or by Manager A. They immediately sent messages in private channels, got on a Skype video call, and began to repair the oversight. During the call, the clients talked extensively about SoundCloud, an audio file hosting service often used for podcasts. It became clear that Manager A did not know what SoundCloud was or how it worked, but in this backstage interaction, the clients smoothed the interaction and helped him save face by not directly addressing this lack of relevant expertise. Instead, they over-explained the system features to each other and him as they figured out the new plan. Similarly, when Manager A was interacting backstage with his trusted team member, he frequently helped with slips and fails. When they were casually chatting

and joking, he asked, "Hey, when you get the chance, can you mark that you the completed [such and such task]?" In contrast, when interacting with Android team members with whom he did not have a backstage relationship, he posted more strident public critiques, such as: "I see you have completed the web service task but did not updated me about its documentation and working??" Thus, those who engaged in backstage repair together developed this resource of an increased sense of solidarity and received more cover for their own slips or failures.

Developing awareness of action opportunities. Another resource that developed during backstage repair work was awareness of action opportunities. Action opportunities are members' opportunities to contribute to the group goal, for example by contributing ideas about different problems and decisions (Simpson, Willer, and Ridgeway, 2012). Because of people's seemingly instinctive moves to repair problems in private, only a few people became aware of the many action opportunities that arose during the identification and solving of failing performances. This dynamic can be seen in this exchange between the StoryApp clients, who were responding to Manager D's new suggestion on how to expand the user testing process.

Client 1:	Getting videos and transcriptions of the focus groups seems like a great idea!
Client 2:	Yeah. *Actually we hadn't told anyone about that*, I was just talking to Manager D and she suggested the videos. She also thought it would be a great way to see if personality affects the results. It's just a matter of making sure that the (rest of the user testers) are aware of this now and get some videos submitted.
Client 1:	Yeah. That's the big thing, because I don't know if you've narrowed down and started to communicate ... Maybe she can do that.
Client 2:	Yeah. Yeah, that's what we hope for her to do.

Most people on this team were never aware that the clients were not happy with the way things were going. It was during informal backstage discussions that Manager D became aware of this breakdown and related action opportunities and repaired the performance with suggestions that made her own expertise and experience more relevant for all future decisions related to user testing.

As another example, the client felt uncertain about a few poorly performing features on the

app prototype and began chatting with Manager A in a private channel. During this brief and seemingly inconsequential interaction, the client tried to explain what they saw as the problem, "Yeah. I don't know... there are some maybe… UX questions that I ran into here? Things that the UX designer could probably help with ... I don't know." The desired functionality could indeed have been addressed by a UX designer on the team. But Manager A also had relevant ideas and expertise, and since the interaction was in a private channel, he was able to easily and practically understand the client's concern and repair the client's sense that things were not going well. Because Manager A alone was aware of this action opportunity, his proposed solution centered his own expertise and relationships. And because the client practically accepted this easy and immediate repair, Manager A's understanding of the new plan was also privileged and uniquely relevant. He and his team members were able to accommodate the repair through additional paid hours of work.

Performing manifest authority

Table 4 reports the decisions made during the StoryApp that materially changed the way that production proceeded, including means of production, defined processes, roles, and task allocations. Rows 1 through 7 in column 1 all report one-off decisions, for example to develop for Android, whereas rows 8 and 9 represent the many task allocation decisions that took place throughout the project. This analysis represents the culmination of the interaction patterns described above. These decisions represent moments of manifest authority, where someone or some group had developed the capacity to direct production. In some cases, these decisions that demonstrate manifest authority involved active cooperation and approval from a few teammembers, coupled with a general lack of awareness by the others. All of these decisions were first discussed in private channels, and some were never acknowledged in public channels. The decisions to not use WorkForge, to integrate content creation, and to sideline one of the workers, were all made and carried out without public

acknowledgement that those issues were ever in question. Several other decisions were seamlessly introduced into public interactions, meaning the managers and others involved began acting on the decisions but never narrated that the decision was new or represented a change. Finally, another set of interactions, in this case typically those involving task allocations (i.e., "We have a new task, Laura can you take it?"), were introduced in a way that did acknowledge that a new decision was being made. Notably, these public instructions were never questioned or challenged.

Insert Table 7 Here

Also of note is the fact that the managers in each team accrued significantly more hours of work than any of their team members (Figure 3). Later cases show managers losing power, but this case illustrates how managers developed real authority especially in comparison to their team members, typically as they responded to failing performances in backstage interactions.

Insert Figure 3 Here

Case 2: The TraumaApp Project

The second case focuses on the TraumaApp project, run by a medical resident (i.e., physician-in-training). His idea was to develop a mobile app that ambulance drivers could use to communicate with emergency departments (EDs) as they approached the hospital. The intent was for the EDs 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 first fully functional prototype and web screen display in one local ED. This client did not have prior experience developing games or mobile apps. This project was complex, and many involved teams were closely interdependent. Also, the integrated GPS functionality was a novel feature at the time.

The pattern of authority that the managers produced was also more complex than what was observed in the StoryApp project. A few notable patterns emerged. First, Table 5 Row 7 shows that two team members, Manager A from the android development team and Manager C from the front-end development team, were "promoted" to managers during the course of the project. As described in the footnote of Table 2, their Manager IDs (A and C) indicate that not only were they promoted, they also became the highest earning managers in the project. These two provide examples of producing authority without formal authority, and then exercising authority within a new formal assignment. Also, note that Table 5 Row 10 reports that many managers in the project produced real authority to direct resources related to teams other than their own. This authority is outside their formal positional authority, so it is also of interest in this analysis. Finally, note also that Table 5 Row 9 reports that many managers produced and maintained authority for allocating tasks in their own teams throughout the project, which differs from the pattern we report in the next case.

Insert Table 5 Here

This project was similar to StoryApp in that it was also characterized by conflict-free public instructions. This pattern of distributed collective authority and promotions (e.g., rows 7, 9, and 10) playing out with a "remarkable" lack of conflict is characteristic of temporary organizations (Goodman and Goodman, 1976). We argue that it can be better understood in the context of the backstage repair work that preceded public instructions. As with StoryApp, when the expected performance of a tool, process, or person failed, managers and team members quickly went to backstage channels to repair. In this case, the managers' backstage interactions were broad, involving the client, other managers, and members of their own and other team members (see Figures 4 and 5).

Insert Figure 4 Here

Patterns of backstage repair work

Some of the processes and events that unfolded in the TraumaApp project were similar to those reported for StoryApp in terms of managers producing real authority, especially as compared with their team members. Another similarity was that a group of managers acknowledged some difficulties they found using WorkForge and decided to repair the failing performance by simply not using the tool as the clients had instructed and continuing the project with other tools (Table 5 Row 1). For concision those similar processes are not reported in full. Three new examples of patterns in backstage repair work are reported here. The first two examples relate to Manager A and Manager C being promoted from team members to managers, and the third relates to Manager B, the user interface (UI) manager, producing authority to fire a team member who challenged her decisions.

The first example involves Manager A, who began as a member of the Android team. He produced authority by stepping into repairs related to the lack of documentation in the project. But he only knew about these opportunities and had the trust of his manager and the client because of the close relationship he developed with his manager during extensive backstage interactions during ongoing work (see the thick black line between two green dots in the Android team middle circle in Figure 5). Early in the project, his manager, Manager E, engaged in many backstage interactions with the client, helping the client scope the project and plan the work. She developed trust with the client, who frequently said things to her during interactions in the private channel such as, “I want to thank you for always being so responsive and responsible” and “I always know I can count on you to make things happen” and “I trust your judgement.” Some of this early interaction (see Manager E’s spike in Week 2 in Figure 4) arose because of the client’s lack of technical experience – it was difficult for him to fully articulate a plan of work, so she helped him iteratively begin to explain his idea for the project. Note that many development projects begin with “specs” or a set of documented

requirements, to be satisfied by different components of the app. In part because the client's idea was unformed at the beginning, managers and team members developed iterative deliverables for the client to help him communicate his vision by giving feedback. This means that development began with verbal planning and without formal specs. Some challenges arose because the specs were still not formalized after a few weeks. In a backstage interaction, one manager asked Manager E, "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."

Insert Figure 5 Here

In parallel, Manager E and the team member who became Manager A engaged in extensive backstage repair together as the project progressed. It began in interactions that had a bit of an antagonistic tone, but then developed into their regular working routine. They engaged with the broader team and other teams in the public #android team channel, but constantly and fluidly moved backstage in parallel interactions to acknowledge and repair slips, uncertainties, or problems.

The first interactions sounded like this – Manager E posted a snippet in the public channel, and Manager A immediately moved backstage:

Manager A:	Hi, the snippet you gave is not the updated one right? even the type Enum values are not changes in that
Manager E:	uh the part for adding additional medications for part 3 is confusing how does that work
Manager A:	*What do you mean confusing.*. Those are just text entries *Seems you do not remember* the PDF i shared. it explained that we should be able to add more than one
Manager E:	it's not implemented in the api
Manager A:	*ok leave it for the moment* - the plus option – let's keep it and continue the remaining

Over time, these two developed a pattern of checking with each other on unexpected events and of testing code together before sharing it in the public channel. For example, when Manager A began

his work for the day and encountered an unexpected error, he wrote, “hi are you there? as soon as I run I get an error (uploads error) am I missing any updates?” They developed a fluid pattern of pre-checking everything, before pushing to public channels.

Manager A:	(Uploads file) Can you try and access this
Manager E:	yeah i see it it works
Manager A:	great please free to add any details
Manager E:	k thanks. can you share on #android?

Thus, two relationships developed through extensive backstage interactions – Manager E and the client, and then Manager E and Manager A. At the start, Manager A had very little interaction with the client. In the early weeks, he did not threaten the developing authority of his manager. As the project deadline grew close, there was more work to do than Manager E could closely direct on her own, and the lack of formal specs began to cause more problems.

Manager E referred the client to Manager A on a few issues that were complex and involved integrating work between two or more teams. During his backstage interactions with the client (see Figure 4 weeks 6 and 7), 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 a you 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 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

Manager A was thus given delegated authority and responsibility for complex and undefinable tasks.

The client formally promoted Manager A in the project systems and did give him a raise. In the final weeks of the project, Manager A began assigning himself tasks and began allocating specific tasks to members of the android, front-end, and back-end teams (Table 5, rows 9-10, weeks 6 and 7). In so doing, Manager A stepped into problems that were only acknowledged in backstage interactions and helped repair and maintain the public performance of an on-time, on-budget project.

The second example of a team member eventually becoming a manager involved some similar events, and a few differences that we will highlight. In this second example, Manager C went from being a front-end team member to a manager ostensibly in charge of the GPS functionality and all work related to it. At the beginning, the two managers who he worked closely with, Manager G who ran the back-end team, and Manager D who ran the front-end team, both interacted with the client as they defined and stabilized the plan and processes for their teams (see Figure 4 weeks 2-3). During this time, the team member who became Manager C took on work integrating the front-end and back-end of the app, so he interacted extensively with both of these managers and began to understand both teams' work. He developed a unique understanding of how they were integrated. Many tasks were assigned to him because of his unique position and understanding. He engaged in a lot of backstage repairs related to minor bug fixes for both teams but was not exercising authority over processes or task allocation early in the project. That change happened toward the end of the project when the client became concerned about the GPS functionality being behind schedule.

This functionality ended up being so novel and complicated to work out that 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?"
Manager E:	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?
Manager E:	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. During these interactions, the client would ask for an update and would be met by a question like "what do you mean by how close?" or "what do you mean by latest?" and then either hear that the manager thought it was already done, like the above be told by one manager to ask another manager. Manager E said, "ask Manager F" and manager F said, "oh check with Manager D, I think he is doing that." It is interesting to note that the client pursued all of these interactions in backstage channels. He could have publicly demanded updates and answers, and then everyone would have known there was a problem with this functionality getting done. By trying to figure out why the GPS process was failing in all of these backstage interactions, the client himself helped maintain the public performance of the project, and helped maintain the authority of the managers, existing processes, and existing relationships.

Eventually, Managers D, F, and E pointed the client to this team member as the one most likely to know what was going on with the GPS functionality. His prior interactions with these managers made him relevant for this moment. The client contacted him:

Client:	Hey Manager F said to contact you about the web app functionality I am hoping to get an update on the GPS function
Manager C:	Hi (Client), what are you after about the GPS function? At the moment in web app, we… [*technical update*]

Manager C 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 is the location updated from android and see what we can do

on web app." After a couple of days, Manager C returned to the client and said, "I have just tested it and it works." He went one step further and fixed another failure mode and told the client about that repair too: "I have open same case in firefox [one web browser] and on chrome [another web browser] and when I change location in firefox, it updates in chrome." He also spent two hours helping the client understand what he had done in a long backstage session, including helping the client with very basic steps on how to use different google maps features.

From this point on, Manager C 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. There was never a moment where he was formally or jokingly "promoted," but he made many decisions that directed production, and these decisions were never questioned or challenged. He ended up the second highest paid manager in the project (Figure 6) and began directing production in Week 6 (see Table 5, rows 5, 9, and 10 for weeks 6 and 7).

Insert Figure 6 Here

The third and final example of a noteworthy pattern of backstage repair work involves Manager B and someone who was hired to join her team halfway through the project. Manager B maintained active private channels with the client and the other managers throughout the project (see Figure 4 and Figure 5), and the interactions and events were similar to those reported above. As examples of similarities – she had several private channel interactions with the other two female managers and one of her female teammates that demonstrated developing relationships and solidarity based on their shared demographic characteristics. Also, she and a team member developed trust

through backstage repair, and the understanding he developed allowed him to work as a boundary spanner with the front-end manager.

She also maintained a more active public channel than any other manager. She began the channel by saying to the team "We need to agree on every screen before going to the next one." She held the team members to it, asking for updates in that channel more than any manager in any of the three cases. To quantify this difference – the UI team channel transcript was 421 pages; the next closest was the back-end team channel which was 53 pages long. Her pattern of interactions produced manifest authority throughout the project. As Table 5 reports, she was the only one who allocated tasks to her team members. She was the second highest earning manager in the project.

During the third week of the project, the client asked her to hire new team members to help with more of the user interface graphics. She hired several, and on-boarded them in the public channel, mentioning, "Hi. I am the team leader. You can ask me about anything." One of the new team members joined the channel and immediately asked where he could share relevant articles and news. He posted a few blog articles on the difference between user interface (UI) and user experience research (UX), which could have been just for fun, or could have been a comment on the process the team was using. She immediately responded, "please don't post any adds [sic] here." He replied, "no no no. this is not ads." She simply replied "?" but several other team members were chatting about other issues so the moment passed. The next day he asked if he could use his favorite tool, which was different from what others were using. They spent some time figuring out compatibility, he emphasized how much better the tool was and showed some designs he had already made. Later that day, he publicly pointed out a discrepancy in instructions Manager B had given him and what was written in WorkForge. He also then suggested that the team begin usin a centralized check-in process using a cloud drive instead of checking in all of their files on the public team channel as Manager B

had directed. She asked him to focus on his tasks. As he worked on one of his tasks, he had a question that he posed directly in the public back-end team channel and received no response. Typically, people would have asked their manager in a private channel, or the back-end manager in a private channel. He then offered to organize all of the files that had been uploaded to the public channel and she agreed. But then as he surfaced issues related to that task, she publicly asked him to "please concentrate." At this point, he had no backstage channels open with anyone. Their conflict came to a head when he began to push for a different process than the team was using.

> i think when we will have some more free time 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) i just will leave this here

He posted this at 6am. By 8am, Manager B had posted a backstage message to Manager E saying that this team member had downloaded all of the graphic files into a personal Dropbox.

Manager B:	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
Manager E:	see I would also inform (the clients), and provide my opinion and perhaps not assign any work to him
Manager B:	I stopped. (the clients) are offline and not responding
Manager E:	but as off now we do not have the facility to suspend him What if you buzz (the clients) on skype
Manager B:	Please give me his skype Id (receives it) ok thank you

It is unclear from the transcripts 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. It is also possible he was trying to steal them, as Manager B suggested to other managers and the client. What is clear is that he was not acting according to her directions. Manager B wrote the above message to Manager E and also contacted the client with a similar message. She

quickly switched to backchannels where she already had developed relationships. At this point, the team member also moved into backstage channels, for the first time. He wrote directly to the client.

> Team member: 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 Manager B)
> some more examples of what i really like and want to create
> :simple_smile: :
> (4 web site URLs of his work)
> waiting for you responce 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.
> Manager E: [Name]; a UI designer. Manager B didn't approve of his work so we're considering letting him go.

The team member had not produced real authority for all of the decisions and suggestions he was trying to influence. It seemed that he expected that his suggestions had technical superiority that would carry the day. But his suggestions were read by Manager B as a challenge to her authority. She had produced a position of authority in her relationships with the other managers and client. 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; he was paid for his work and then dropped from the project systems.

Resources and implications for producing manifest authority

These examples from the TraumaApp project illustrate that those who participated in backstage repair work developed different resources than those who did not, with implications for their manifest authority (consistent with Table 3). During backstage repair interactions, people developed relationships and also solidarity related to an almost conspiratorial sense of the real story. They also developed a differential awareness of action opportunities to contribute to the group goal, and project-specific understanding and competence.

Developing relationships and solidarity. Similar to StoryApp, the backstage interactions were more candid, and evolved into sensemaking and agreements about how things were really going, and about what really mattered. For example, as Manager A and Manager E developed their relationship, they consistently agreed to disregard feedback from the client.

Manager E:	(Uploads a file with feedback from leader)
Manager A:	i dont think that's possible within the api and i think its unreasonable to add that in to the backend now
Manager E:	Yes don't bother

A few days later, they had a similar interaction, with manager E beginning, "Hi, (the client) has requested quite a lot of changes. I have two tasks so far." Manager A responded, "I recommend against (one of the suggestions)." She responded, "I totally agree with you." They simply ignored the requests which were fairly nuanced and technical; because of their backstage agreement they were able to make that decision together but never reveal it to the client or in the public channel.

Manager E (the android lead) and Manager G (the quality assurance lead) are another example of how developing relationships and solidarity shaped manifest authority. They were both women and joked with each other frequently about some gender issues in the project and interacted socially in their private channel. Then when Manager G assigned a task to one of Manager E's team members, Manager E 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." Manager G led the quality assurance team, and her "right" to assign bug fixes to anyone in the organization was ambiguous – her role could have played out with that expansive authority. But Manager E addressed this potential encroachment on her authority in their well-established friendly relationship. Manager G said, "OK sure" and no longer assigned tasks directly to the android team.

As people developed solidarity and these candid agreements, they also developed cover for their own future slips or fails. For example, right after Manager A was promoted to take on a lot of the messy, ambiguous tasks, he admitted to the client, "I'd like to say that my front-end and backend experience with this project is not as good as my android knowledge. So it might take me a bit longer to fix things." The client confirmed that was fine, and that he could also just assign work he did not understand to other people. Many similar admissions were made and covered in backstage interactions. People addressed slips in private; the more established the backstage relationship, the more likely people were to first address any question or problem directly in the backstage.

Developing awareness of action opportunities. Managers' and team members' involvement in backstage repair work also allowed them to develop differential awareness of action opportunities. This process developed similarly in StoryApp and TraumaApp. As Goffman (1967) noted, people seem to have an instinctive reaction to save face and to help each other save face. Participants immediately moved to backstage channels to acknowledge and repair slips and failures. But it was only in knowing about the slips and failures in these projects that people knew about their action opportunities (Simpson, Willer, and Ridgeway, 2012) and could step in with ideas and contributions about how to reach collective goals.

The TraumaApp case also revealed a new aspect of this differential resource, which involved people's strategic intent and agreements to manage information that would provide other teams with

action opportunities. As an example, after an extensive interaction repairing a bug, Manager A told a team member to "get everything correct" because it would "save us from dealing with back and forth with back-end" – team back-end team may have had a different way of repairing the issue that would expand work on their own side. Managers and team members frequently discussed batching information about new features, bugs, and fixes to control their interactions with other teams.

Performing manifest authority

Table 7 summarizes the decisions made during the TraumaApp project that materially changed the way that production proceeded and how these decisions were issued and received. Similar to StoryApp, rows 1 through 8 summarize one-off decisions, and rows 9 and 10 represent the many task allocation decisions that took place throughout the project. These decisions represent manifest authority, where someone developed the capacity to direct production. The decisions to not use WorkForge, to not revisit the specs, to keep the GPS feature, and to sideline one of the workers were made and carried out without public acknowledgement that those issues were ever in question. The decisions to promote people to managers, keep the deadline, and to change to particular software platforms were seamlessly introduced into public interactions but not narrated as new decisions. And the public instructions involving task allocations were never challenged. The managers in each team accrued significantly more hours of work than any of their team members (Figure 6).

Case 3: The WorkshopApp Project

A project manager at a consulting company led the third case, the WorkshopApp project. He wanted to develop a web app that would connect the company's clients to the possible workshops that they offered. The project scope included user testing and required that the code and graphics be consistent with the company's systems, graphics, and branding. This client had technical experience

and had conducted web development projects before. This project was complex and required close interdependence between user interface, front-end developers, and back-end developers. Although the pattern of authority that the managers produced was different than in either of the other previous cases, still public instructions that effectively directed production were preceded by backstage repair work through which those involved developed relationships and understanding that produced the public instructions and secured implicit or explicit cooperation for them.

A unique aspect of this project is that a fairly discrete change in authority occurred, where most of the managers (B, D, F, G) who initially decided means of production, process, and task allocation lost the capacity to direct production. This shift in power was produced through backstage repair work, especially those involving the client, but was performed in public through a vote (Table 6, row 2, week 3). A team member was promoted (Manager A) and developed the capacity to direct most production in collaboration with Manager B (Table 6, rows 9 and 10, weeks 4 and 5).

Insert Table 6 Here

Managers D and G were explicitly sidelined by the client after private conversations with Manager A (Table 6, row 8, week 4 and 5). And when it came time for Manager E to begin the quality assurance process with his team, he made no decisions related to the means of production, related process, or task allocation (see Table 6: Manager E does not appear). Instead Managers A and B made all of those decisions for him and assigned him and his team tasks (Table 6, row 10, weeks 4 and 5). After the shift in power, Manager F continued to assign a few tasks in public channels, but her capacity to do this diminished over time, due in part to the backstage repair work between the client and Managers A and B to which she did not have access – her understanding and project-specific competence declined. Manager A and Manager B became the highest earning managers in the

project. Figure 7 illustrates the difference between their earnings and the rest of the managers. They also assigned many of the tasks to a team member, who earned more than most of the managers.

Insert Figure 7 Here

Patterns of backstage repair work

There was a significant imbalance in terms of who engaged in backstage repair work and with whom (see Figure 8). Manager A had the most extensive interactions with the client backstage, characterized below. As for the rest, Manager B did not interact very much with the client but interacted extensively with Manager A in a private channel. Managers C and F had some interactions with the client, but they were usually the client expressing concern or asking for updates. Here is an example exchange:

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

Those kinds of mistakes were not uncommon, but were usually caught and resolved with backstage collaborators, not noticed and called out by the client. Part of the trouble that Manager F confronted was that the UI manager, Manager G, was unresponsive to any backstage queries. His team was closely interdependent, so this behavior was unusual. His lack of response meant that Manager F had no collaborator in backstage repair. As delays accumulated in UI and front-end integration, they were not able to mobilize the impression of smooth performance. This slipping performance played out in public channels. Manager A stepped in to repair this performance, producing the needed relationships and understanding during his private interactions with the client, Manager B, and another teammate.

Insert Figure 8 Here

From the beginning, Manager A and the client developed a very active backstage channel (see Figure 9). Over the whole project, this channel transcript was 112 pages. (For contrast, the transcript of the channel for the client and Manager F was 7 pages). The initial interactions between manager A and the client would not be characterized as repair because they were not responding to a failing performance. Instead, Manager A joined as a team member and messaged the client offering to expand his role because he had experience in both back-end and front-end development. Later, the client contacted him in a backstage channel when a task was delayed. The client said, "If you want to do end to end, I'll let you work on (this task)." Manager A confirmed he could finish it that very day and offered "I can help with integration if the UI side is built!" Manager A asked clarifying questions, and during this interaction the client kept asking him to check in with the managers, affirming their authority at that time, but also giving him praise (e.g., "awesome. Thanks man.") and discretion to play an integrating role. Manager A 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 asked him to "share the burden with Manager F".

Insert Figure 9 Here

The delays between UI and front-end began to be a joke between them, and Manager A kept taking on new tasks to help with the delays. Here is an example of their joking:

Manager A:	I think you should check the progress / messages on (public) channel seems like finally something is up there that 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 :simple_smile:
Client:	lol

thanks for the updates man

A few days later, Manager A noticed that the work was slowing in UI and started picking up a few tasks that no one had officially assigned to him and asking a newer team member to do some also. He let the client know in the private channel,

> 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. How is your son? (who had been sick) And how are you?" This was the first time that the client did not direct Manager A to check with or work with the existing managers but implicitly approved Manager A's expanding authority. This pattern of inactive backstage channels for most of the managers, and very active backstage channels for Manager A with the client, Manager B, and one teammate continued throughout the project.

Resources and implications for producing manifest authority

As the managers were involved in different patterns of backstage repair work, they developed different resources, which had implications for their capacity to direct production (Table 3).

Developing relationships and solidarity. Manager A developed a particular kind of relationship with the client during all of these backstage repair interactions. They developed a sense of solidarity as they candidly expressed their shared frustration with various problems. As an example, Manager A shared his feelings about a problem that emerged on his team.

Manager A: so [particular page] went to hell and i was like ohhhh f******
it was fine last night and what happend when i woke up
we need a better angularjs person asap
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, but in this case, he and Manager A provided support for each other in noticing and repairing this kind of problem. As another example, Manager A noticed something happen in another team's public channel that the client was reacting to and immediately wrote to the client backstage, "ha seems to me like not so much progress." The client replied about the event, "haha and getting that damn text was an event…" Manager A responded, ":simple_smile: I saw from the history." These interactions were candid acknowledgements of how things were going and played out as social support and developing solidarity in their relationships.

Similar to examples in the other cases, this developing relationship meant that any skill gaps or mistakes make by the two of them tended to be jokingly acknowledged and repaired or covered. For example, neither the client nor Manager A actually had much experience with different software languages or approaches that became important to the project. They joked with each other about the tutorials they were watching to get up to speed. For example, Manager A shared a tutorial he had used, saying, "I can now at least do basic things like strong loop stuff myself after watching these! phew." The client responded, "haha I need to watch those myself. Manager A then joked, "I watched offline by the way" and added an :innocent: smiling emoji. The client replied, "haha, I didn't ask annnnnnyyyyy questions. :wink:" Their developing relationship covered their skill gaps and mistakes. As an example of how this would play out in the absence of their sense of comradery and solidarity -- the client engaged in a six page interaction with another team member asking him to account for a few extra hours that were charged that the client was not expecting.

Developing awareness of action opportunities. In many ways, people's awareness of action opportunities developed in backstage repair in ways similar to findings reported for StoryApp and TraumaApp. But this WorkshopApp case also revealed another aspect of this developing resource. Manager A's developing awareness of action opportunities evolved over time as he interacted with

the client. He and the client actually co-constructed the action opportunity over several days and during several different conversations. Initially, the client denied all of Manager A's ideas and put curbs on his attempts to expand his role (i.e., "check with Manager F about that"). Thus, the developing awareness of action opportunities in this case, actually involved *co-constructing* an action opportunity through extensive backstage conversations focused on repair. When Manager A first approached the client with the idea of changing to the Angular approach, the client said no:

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
Manager A:	understandable. let me talk to Manager F

He continued to work with Manager F and to check-in tasks. But within a day or so, he came back to the client with a new framing of the problem and a proposed solution. He said, "Just wanted to share early thoughts that came to the mind about theme2 backend , so to validate my understanding at bird's eye view level and it's not lost anywhere." After a few hours, the client responded with a small change to Manager A's framing. He said, "level 2 should be business ops and enabling tech" but then importantly said, "oh I understand what you're doing now" because he understood the overall framing and why the small error had been made. They continued to interact in this way, until they had co-constructed the decision that was put to a vote, as described in next section.

Performing manifest authority

Table 7 summarizes decisions made during the WorkshopApp that materially changed production and how these decisions were issued and received. Similar to the previous two cases, rows 1 through 8 summarize one-off decisions and rows 9 and 10 represent the many task allocation

decisions that took place throughout the project. Several of the decisions were made and carried out backstage without public acknowledgement. These included the decision not to use WorkForge and the decision not to keep some people involved during the final sprint towards the deadline. These decisions secured implicit cooperation, simply because interested parties were not aware of the decisions. Several other decisions, including promoting Manager A, keeping the deadline, and implementing a new Angular onboarding process were all introduced without challenge.

In contrast, two decisions changed the means of production and shifted power away from some managers. These were met with challenge, but the challenges were resolved in favor of Managers A and B. Manager A proposed the decision to change the project to a software framework called "Angular." After a few discussions, they agreed to try it if the rest of the group agreed. They decided to put the decision to a public vote. Both Managers A and B had stronger relationships with the client and their team members at this point than did Managers D, F, and G, who would be affected by the vote. This public event was unique across cases, so we report the details here, which includes long blocks of text, to illustrate the public discussion dynamic:

Manager B:	<@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
Manager B:	Ok so we have 3 votes for angularjs <@ Team member> ur vote?
Team member:	I'm here
Manager B:	<@<Manager F> do vote please
Team member:	I'll use Jquery.
Manager B:	<@Team member> vote angularjs or jQuery
Team member:	jQuery
Team member:	AngularJS
Manager B:	Ok we got 4 angular 2 jquery

Note that as the conversation unfolded, the Managers B and A did not acknowledge that they had already discussed it and had also discussed it with the client. Manager B started the vote, and as it

unfolded, Manager A voted publicly. Manager B teased him that he had already counted his vote (this is a continuation of the above transcript):

Manager A:	I vote Angular js I can help in basic skeleton for angular js side and can start in couple of hours
Manager B:	Counted your vote <@Manager A> ;)
Manager A:	Ok thanks
Manager B:	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
Manager B:	<@Manager G> <@everyone> , please vote here angularjs vs jquery
Manager F:	Ok, but I have no experience in angularjs
Team member:	I'm same to <@Manager F>
Manager F:	So, I vote for jquery.
Manager B:	Ok there is a 10, step tutorial
Team member:	I agree with Manager B, Angularjs is better for project and easy to learn

They introduced the vote and then actively resolved concerns and challenges, telling people that it will be easy to learn Angular and that "coding is learning," and pointing people to a 10-step online tutorial. 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, and no one questioned whether the lack of unanimity was concerning or worth discussion. The vote and proposed change had implications for the work of the UI, UX, Front-end, and Back-end teams. 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, Manager F and her team members struggled to contribute (Figure 6). Managers A and B and one of their team members accrued significantly more hours of work than any other participant. This case illustrates how differential patterns of backstage repair work helped produce a shift in power and authority within this organization.

DISCUSSION

In this paper, we demonstrated that significant authority in organizations can be produced during backstage repair work. The people who are involved in backstage repairs develop trusting relationships and also shared understanding of real problems and progress, instead of only having access to the curated public narrative of how things are going. And as they respond to these additional, more candid and realistic opportunities to contribute to the group, they make decisions that naturally privilege their own understanding, expertise, and relationships. This means that backstage repairs can set in motion path-dependent decisions that continue to privilege the expertise, understanding, and relationships of those involved in earlier backstage repairs.

Our findings further reveal that this general process can favor those in positions of formal authority. The structure of the formal managerial role meant that clients could hold the managers accountable on behalf of their groups (Freeland and Zuckerman, 2018). The clients typically messaged the managers first to ask questions or to discuss minor dissatisfactions with work or progress. We also observed that through these backstage conversations, the clients and managers cooperated to uphold the "interactive order" (Goffman, 1959) and "keep the particular narrative going" that the project was worth everyone's continued investment (Giddens, 1991). In so doing, the clients and managers also helped each other maintain authority; the managers never publicly said to the client that their ideas were out of scope or unrealistic, even though privately they expressed that view to other managers or team members and secretly adjusted the clients' requests. And through backstage repair, the clients could express dissatisfaction and make adjustments without publicly undermining the managers and the group process. Thus, some pairs of clients and managers became dyadic "performance teams" in the backstage spaces, working together to repair the larger public performance (Goffman, 1959, pg. 79). Similar dynamics played out among different sets of managers, who together became other "performance teams," similarly helping maintain the group

performance and existing authority relations through their backstage interactions. Managers in all of our cases were more likely to be involved in backstage repair work than team members.

However, the findings also revealed that some managers lost authority or failed to develop real authority *despite* their formal managerial positions. In each of these examples, the managers did not have active private channels with a set of collaborators, in contrast to the managers who developed and maintained authority. The failing performances of their teams or tools played out in public, and other people stepped in to repair. Taken together, these findings illustrate that the managers' formal positions did not necessarily grant them authority, but their positions did make them more likely to be involved in the backstage repair work that produced significant authority.

We also found that some team members produced authority despite not having formal managerial positions at the start. These examples, where team members developed manifest authority despite not having formal authority, confirm and extend theories of power laid out by Pfeffer (1981b) and Salancik and Pfeffer (1977a). Those earlier theories predict that power in organizations follows problem-solving capabilities; groups or people who can effectively solve the organizations' most strategically valued problems will be able to control resources and require cooperation from others. These dynamics are illustrated by the TraumaApp team member who oversaw the GPS feature, among others. He became one of the most authoritative people in that project, because of his unique understanding of the GPS feature and despite not having a managerial title. It is important to note, however, that he produced this authority through extensive backstage repair work with backstage collaborators who *did* begin the project with managerial titles. During that backstage repair work, the managers developed trusting relationships with him and delegated discretion to him – and these resources allowed him to produce authority around the GPS feature. Taken together, these findings contribute to theories of authority, private spaces, and repair work in organizations.

Producing and Performing Authority

Many theories have explored the question of who in organizational settings develops real or manifest authority (Wrong, 1979). A common assumptions across these different theoretical approaches is that positions of formal authority alone will not produce manifest authority, and that managers must broaden the bases of their claims to authority (Simon, 1945; Weber, 1947; Bennis, 1959; Presthus, 1960; Peabody, 1962). Different theoretical approaches have advanced this idea by identifying different ways that people broaden their bases of authority, including through their problem-solving capabilities, independent access to unique information, personal characteristics, or relationships with targets of their influence (e.g., Pfeffer, 1981b; Brass and Burkhardt, 1993; Anderson, Flynn, and Spataro, 2008; Huising, 2015).

Our findings are consistent with this prior research. However, we argue that our current accounts of authority in organizations underplay how formal managerial offices might contribute to these broader bases of authority. Our study inductively identified a new conceptual link between offices of formal authority and the development of many resources that are known to produce authority in organizations. Our finding is that managers, because of their formal offices, are more likely to be involved in backstage repair work, which is an occasion to develop the unique relevant understanding and particular kinds of relationships that produce authority.

This idea also resonates with the argument in Simpson, Willer, and Ridgeway (2012) that certain people are granted more "action opportunities" because of their status, and their extra opportunities to contribute earn them even more status and influence. Their research focuses on frontstage status characteristics, but our study extends the idea of action opportunities relating to influence; we propose that formal authorities may get more action opportunities almost as a side effect of their frequent involvement in repairing people's impressions of their group's performances.

Our study extends other theories of organizational power and authority as well. Social networks research suggests that network centrality predicts "real" manifest authority because central actors have unique and independent access to information and are therefore not dependent on others for valuable resources (e.g., Brass and Burkhardt, 1993; Brass, et al., 2004; Brass and Krackhardt, 2012). Our paper contributes to this research by proposing a new event mechanism that spurs the construction of network ties. The managers in all of our cases developed informal communication networks that were not necessarily in-line with the formal and planned organizational charts, a pattern consistent with prior research (e.g., Fernandez, 1991; Cross, Borgatti, and Parker, 2002). But prior research has focused on homophily, affinity, or information search as reasons for people to seek out and develop new ties (e.g., Ibarra, 1992; Casciaro and Lobo, 2008; Singh, Hansen, and Podolny, 2010). Again, our findings were consistent with this research – we did see examples of homophilous ties shaping resource allocations – but our findings also identify a new kind of event that created and deepened strong ties. Specifically, we observed that ties were formed between those involved in backstage repair activities. As people moved conversations focused on repair to backstage spaces, they became trusted conspirators who were managing the real story about the team performance.

Our inductive analysis focused on fine-grained daily interactions, similar to Huising (2015), and also confirms and extends that study. Huising (2015) showed how "scut work" was a particular kind of activity that enabled professionals to develop more relevant understanding and closer relationships with the targets of their instructions. Our study also identified a kind of activity that enabled formal authorities to develop relevant understanding and particular kinds of relationships. Backstage repair work is also a seemingly inconsequential and low-powered work activity – but our study showed how backstage repair work gave managers resources that actually produced authority.

Backstage Repair Work

Backstage repair work is thus an unexpected means through which managers develop privileged understanding and trusting relationships and thereby produce manifest authority. By having candid interactions in private spaces, the managers in our study developed a more realistic understanding of progress and problems, as well as a sense of solidarity with their "performance teams" (Goffman, 1959, pg. 79). This idea contributes to two additional research streams. Several studies have looked at the use of private spaces in organizations (e.g., Anteby, 2008; Bernstein, 2012; Anteby and Chan, 2018; Beane, 2018) and the idea of backstage spaces in particular (e.g., Roxa and Martensson, 2009; Selwyn, 2009; Waring and Bishop, 2010; Mair and Hehenberger, 2014). In general, this research has conceptualized how backstage spaces are important for handling role conflict, socializing new members, mobilizing public performances, or mobilizing social resistance (e.g., Sinclair, 1997; Ashforth, Kulik, and Tomiuk, 2008; Kellogg, 2009; Wiedner, Barrett, and Oborn, 2016). Our finding contributes new insight to these studies. First, our findings characterized a much more fluid interface between frontstage and backstage spaces than has been depicted in prior studies (note that Lewin and Reeves (2011) make a similar point about fluid constructions of backstage spaces during medical rounds). The quick almost effortless switches to backstage interactions reminded us of stories of colleagues texting each other in the same room under the conference table during meetings when group discussions got out of hand. Second, our findings also characterized a different backstage interaction than prior research. Goffman (1959) talks about performance teams *mobilizing* public performances in backstage spaces, which is similar to the idea of backstage repair work. But our findings provide new insight by demonstrating how continuously people moved backstage to *repair* ongoing performance. Goffman's theory did not focus on the fact that people, processes, and tools continuously surprise and perform in unexpected ways as work progresses (e.g., Suchman, 1987; Orr, 1996; Suchman, et al., 1999; Brown and Duguid, 2001), so it

also did not characterize the nature of backstage repair. The idea of backstage repair work resonates with Goffman's ideas of "facework" (1967) and "cooling out the mark" (1952).

Research in sociology and media studies focuses specifically on the idea of repair work (e.g., Suchman, 1995; Jackson, 2014; Sachs, 2019). Jackson (2014, pg. 222) describes the idea of "repair work" as coming from "broken world thinking" where we take "breakdown" as a "starting point in thinking through the nature, use, and effects of information technology." Repair work relates to "articulation" work in Star and Strauss (1999), but we chose the label "repair" because the actors in our study were focused on "fixing" things that they thought were going wrong. Note, repair work is different from "relational practice" which refers to the "wide range of off-line, backstage, or collaborative work that people do which goes largely unrecognized and unrewarded in the workplace" (Fletcher, 2001; Holmes and Marra, 2004, pg. 377).

Boundary Conditions and Future Directions

Our research setting provided access to all public and private interactions from project start to completion. This unique data set offered novel insight into the backstage production of managerial authority in organizations. Of course, these features of the research setting also raise important questions about the generalizability of our findings, just as in any exercise of theory development using extreme cases (Edmondson and McManus, 2007). The cases are extreme because they represent very weak institutional settings, and non-existent social networks at the start. 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. It is possible that in these kinds of weak institutional settings, offices of formal delegated authority are more important, because other relationships have not yet had a chance to form – similar to the notion that stronger relationships provide "substitutes to leadership" (Kerr and

Jermier, 1978). Still, some prior research does characterize managers as frequently responding to crises and engaging in what might be considered repair work, even in longstanding bureaucratic organizations (e.g., Greening and Johnson, 1996; Tucker and Edmondson, 2003; Davenport and Leitch, 2005; Valentine, 2017). And many studies have characterized the informal networks that interlace organizations (e.g., Fernandez, 1991; Ibarra, 1993; Gargiulo, Ertug, and Galunic, 2009). It is plausible that people working within stronger institutional settings still engage in substantial backstage repair in ways that shape and privilege their understanding and relationships. Still, the question of generalizability should be investigated in future research.

However, to conclude the paper, we suggest that the research setting is also empirically interesting for organizational theory in its own right. Many studies are now recognizing and exploring the new organizational forms that are enabled by internet technologies (e.g., Majchrzak, Jarvenpaa, and Hollingshead, 2007; O'Mahony and Ferraro, 2007; O'Mahony and Bechky, 2008; Lifshitz-Assaf, 2017). 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., Hackman and Katz, 2009; Dahlander and O'Mahony, 2011). It is worth noting that some scholars forecast that these new internet technologies wherein people can relatively easily convene paid or volunteer groups online will make "flash" teams and other forms of temporary and online organizing a standard rather than exceptional organizational structure in some industries, and therefore worthy of further empirical research among organizational theorists (Puranam, Alexy, and Reitzig, 2014; Davis, 2016; Benkler, 2017; Valentine, et al., 2017).

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Figure 1. WorkPlatform functionality included hiring, onboarding task details, timeline

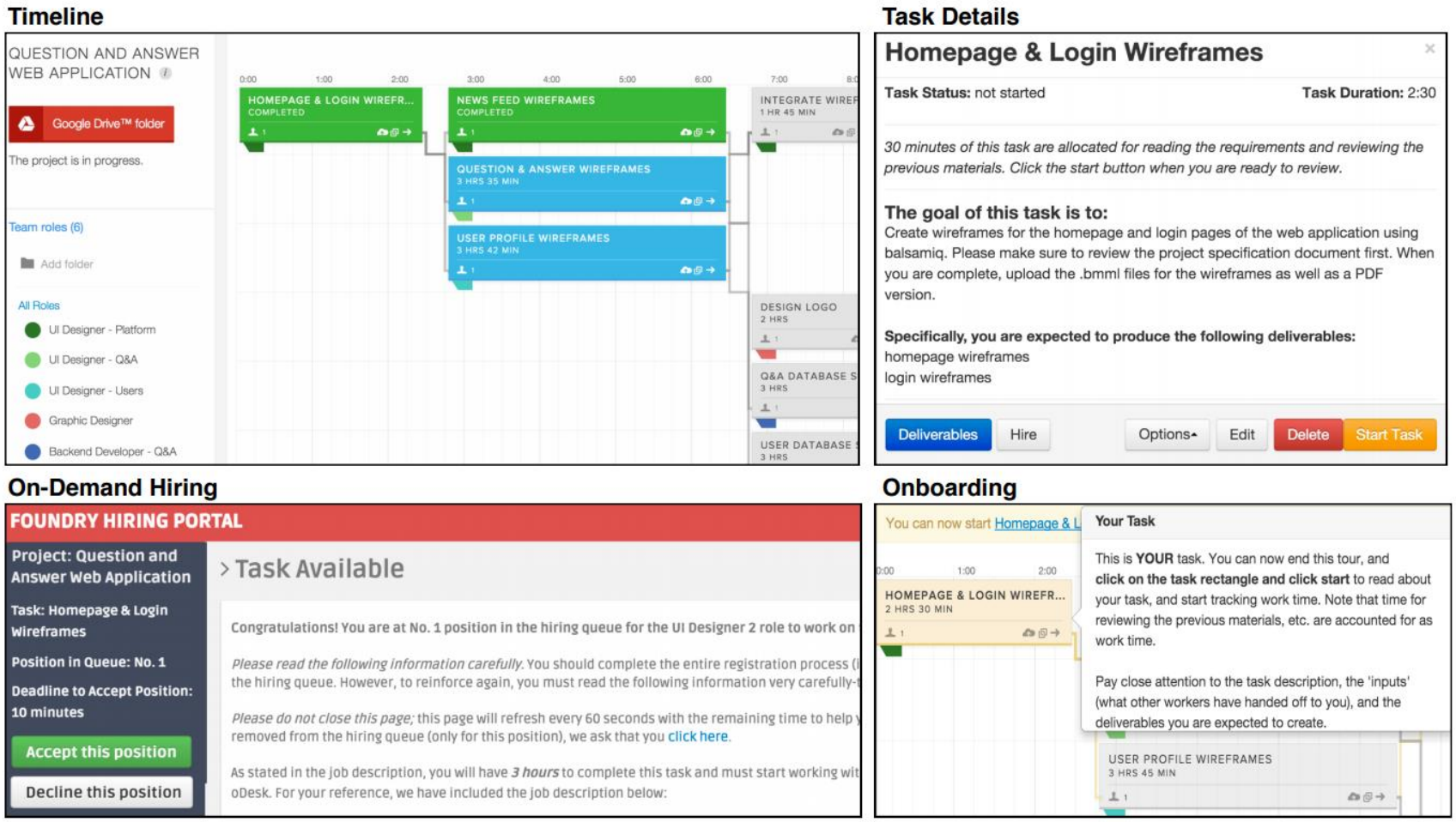

Table 1. Data collected and analyzed

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

Table 2. Team, location, and gender of the final set of managers for each project

	ID*	**Team**	**Initial Role**	**Location****	**Gender**
StoryApp	A	Android development		Pakistan	Male
	B	Design		Ukraine	Male
	C	Web development		Lithuania	Male
	D	User testing		USA	Female
	E	Content Creation	Team member	USA	Female
TraumaApp	A	Android development	Team member	USA	Male
	B	User interface		Egypt	Female
	C	Front-end development	Team member	Czech Republic	Male
	D	Front-end development		Armenia	Male
	E	Android development		Sri Lanka	Female
	F	Back-end development		UK	Male
	G	Quality Assurance		Philippines	Female
WorkshopApp	A	Back-end development	Team member	Pakistan	Male
	B	Back-end development		India	Male
	C	Back-end development		Mongolia	Male
	D	Front-end development		USA	Male
	E	Quality assurance		India	Male
	F	Front-end development		Ukraine	Female
	G	User interface		India	Male

* Manager IDs were assigned by total earnings at the end of the project, rough proxy for amount of authority they had developed. I.e., Manager A in each project was the person who had earned the most out of anyone in the project, controlling for wage. Figures 3, 6, and 9 report full distribution. ** Each manager and team member was fluent or proficient in English language, a proficiency tested by the online labor market.

Table 3. Resources that develop during backstage repair work

Resources	**Implications**
Developing relationships and solidarity • Jokes, admissions, trust • Agreement about what is "really" going on Developing awareness of action opportunities • Privileged chances to contribute Developing project-specific understanding as repair problems and failing performances • Repairing the problems creates understanding and competence	Decisions made with implicit cooperation because others are unaware, or decisions made with explicit cooperation because public instructions are unchallenged Own expertise and understanding has more relevance in future path dependent plans and decisions Own future slips or fails are protected

Table 4. StoryApp: Decisions that changed direction of production, by who made the decisions and where

		1		2		3		4		5	
		private	public	private	public	private	public	private	public	private	public
	Means of production										
1	Whether to use WorkForge							A			
2	Whether to use Android							Client, A			
	Process										
3	Integrate content creation			Client, E							
4	Integrate graphics					Client, C					
5	Pursue user testing					Client, D					
	Personnel										
6	Promote to manager (E)			Client, E							
7	Sideline worker			Client, E		Client, B,C		Client, A			
8	Allocate ….tasks to team				C,E	D	B,C,D	A	A		
9	…tasks to other teams										

Figure 2. StoryApp: Backstage interactions with client and each manager by week

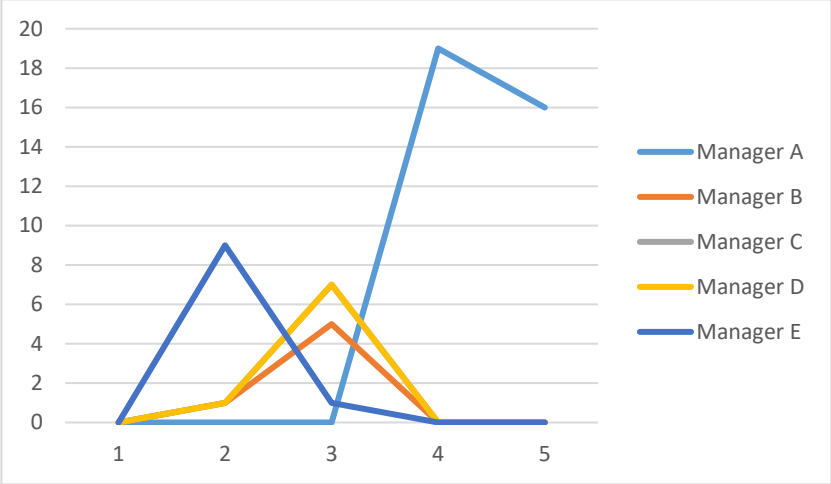

Figure 3. StoryApp: Final earnings (hours) for each manager and worker

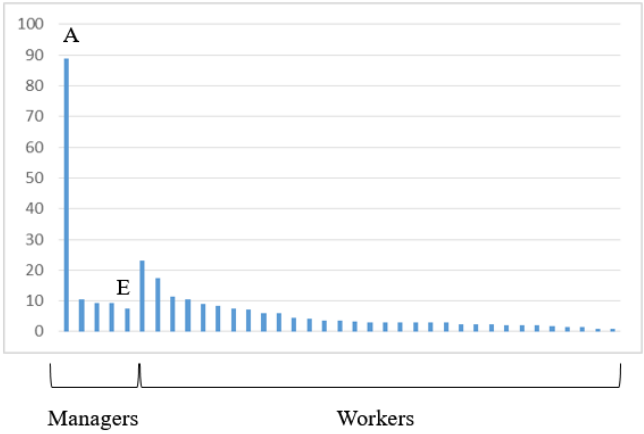

Table 5. TraumaApp: Decisions that changed direction of production, by who made the decisions and where

		1		2		3		4		5		6		7	
		private	public	private	public	private	public	private	public	private	public	private	public	private	public
	Means of production														
1	Whether to use WorkForge					B,E,F,G		C,D							
2	Whether to use Trello					E,F,G			G						
3	Where to host platform					B,D,F		Client, F	F						
	Process														
4	Whether to revisit specs					C,D						Client, A,E			
5	Whether to integrate GPS									Client, F		Client, A,C			
6	Whether to keep deadline											Client, A,C,E			
	Personnel														
7	Promote to manager (A,C)							Client, C				Client, A			
8	Sideline worker					Client, B				E,G				Client, A,E	
9	Allocate …tasks to team	B	B	B,D,E,F	B,D,E,F	B,D,E,F	B,D,E,F	B,D,E,F, G	B,D,E,F, G	B,D,E,F, G	B,D,E,F, G	A,C,G,E	G,E	A,C,G,E	G,E
10	…tasks to other teams							D,E,F		D,E,F		A,E	G,E	A,E	G,E

Figure 4. TraumaApp: Backstage interactions with client and each manager by week

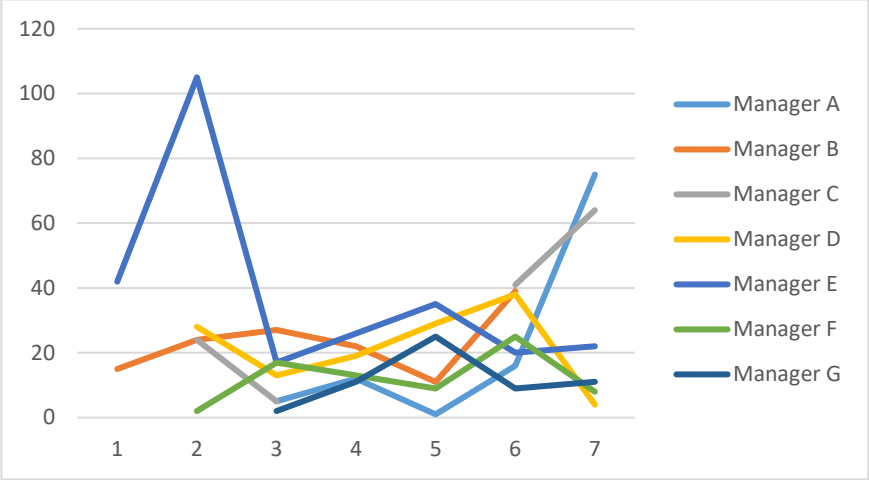

Figure 5. TraumaApp: Network of private interactions

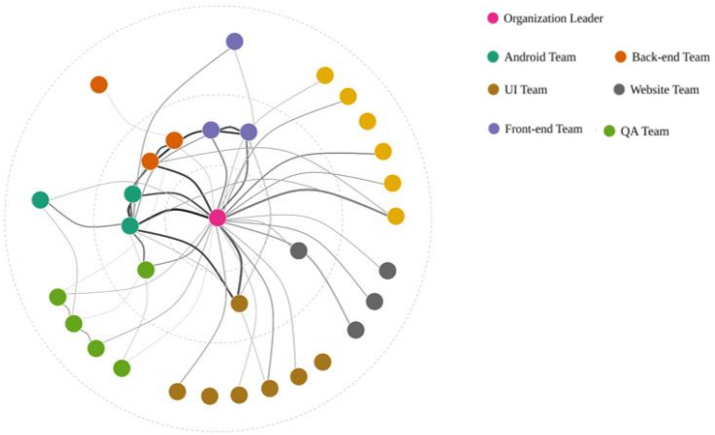

Figure 6. TraumaApp: Final earnings (hours) for each manager and worker

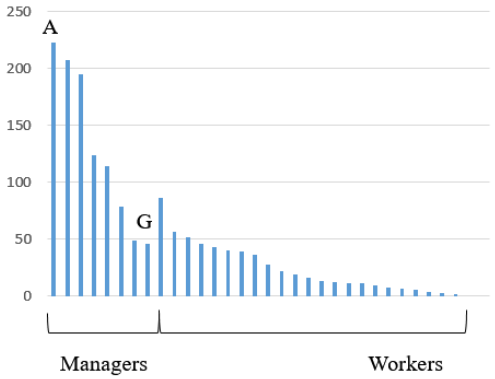

Table 6. WorkshopApp: Decisions that changed direction of production, by who made the decisions and where

		1		2		3		4		5	
		private	public	private	public	private	public	private	public	private	public
	Means of production										
1	Whether to use WorkForge			A, B, C, F							
2	Whether to use Angular			Client, A, B, C, F		Client, A, B, C, F	Vote				
3	Whether to use Strongloop			Client, A, B, C	A		A				
	Process										
4	Onboard to new skill							Client, A	A		
5	Keep members involved					Client, A, B		Client, A, B			
6	Keep the deadline							Client, A, B			A, B
	Personnel										
7	Promote to manager (A)					Client, A					
8	Demote manager (D,G)							Client, A, B		Client, A, B	
9	Allocate tasks …to team members	G	B, D, F	G	B, D, F	G	A, B, F	Client, A	A, B, F	A	A, B
10	…to other teams							Client, A	A, B	A	A, B

Figure 7. WorkshopApp: Backstage interactions with the client and each manager by week

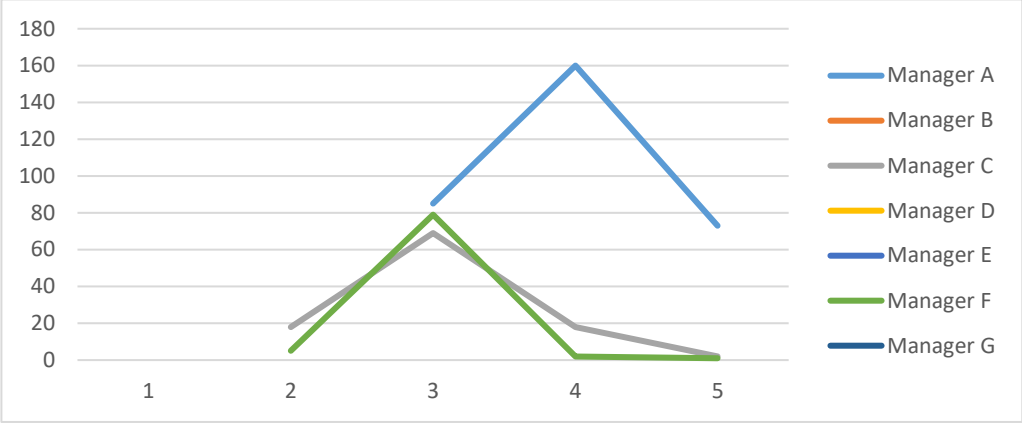

Figure 8. WorkshopApp: Network of private interactions

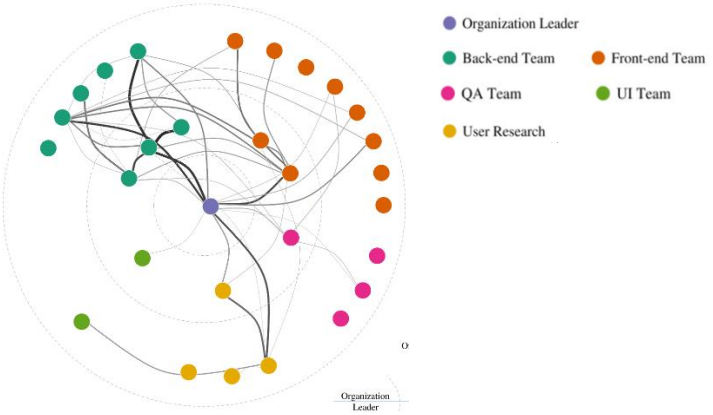

Figure 9. WorkshopApp: Final earnings (hours) for each manager and worker

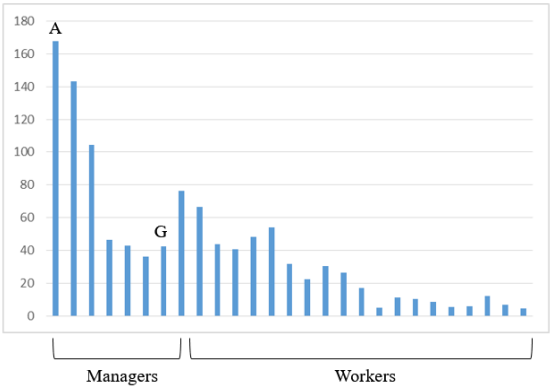

Table 7. Manifest authority to direct production in three temporary organizations

StoryApp		**TraumaApp**		**WorkshopApp**	
Means of production					
1 Whether to use WorkForge	No public instruction	*1 Whether to use WorkForge*	No public instruction	*1 Whether to use WorkForge*	No public instruction
2 Whether to use Android	Seamless instruction	*2 Whether to use Trello*	Questioned, won	*2 Whether to use Angular*	Challenged, won
		3 Where to host platform	Seamless instruction	*3 Whether to use Strongloop*	Challenged, won
Process					
3 Integrate content creation	No public instruction	*4 Whether to revisit specs*	No public instruction	*4 Onboard to new skill*	Unquestioned public instruction
4 Integrate graphics	Seamless instruction	*5 Whether to integrate GPS*	No public instruction	*5 Keep members involved*	No public instruction
5 Pursue user testing	Seamless instruction	*6 Whether to keep deadline*	Seamless instruction	*6 Keep the deadline*	Unquestioned public instruction
Personnel					
6 Promote to manager (E)	Seamless instruction	*7 Promote to manager (A,C)*	Seamless instruction	*7 Promote to manager (A)*	Seamless instruction
7 Sideline worker	No public instruction	*8 Sideline worker*	No public instruction	*8 Demote manager (D,G)*	No public instruction
Allocate 8 ….tasks to team	Unquestioned public instruction	*Allocate 9 …tasks to team*	Unquestioned public instruction	*Allocate tasks 9 …to team members*	Unquestioned public instruction
9 …tasks to other teams	Unquestioned public instruction	*10 …tasks to other teams*	Unquestioned public instruction	*10 b…to other teams*	Unquestioned public instruction

* No public instruction means the decision and related changes were made in private channels, nothing was said in public about the change. **Seamless instruction means the decision was made in private channels and without acknowledgement that a decision or change had been made, the public front stage performance began to reflect the decision. ***Unquestioned public instruction means the decision was made in private channels, and introduced in public channels in a way that acknowledged a change or new decision, with no questions in response. ****Questioned or challenged meant same, but the questions or challenge resolved in favor of the manager issuing instruction,