

Getting Their Hands Dirty: How Female Managers Motivate Female Worker Productivity Through Subordinate Scut Work

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Abstract. Using ethnographic, personnel, and experimental data from an Indian garment factory, this paper investigates whether and how manager gender affects female worker productivity. We find that female managers motivate greater female worker productivity than male managers by engaging in *subordinate scut work*, the practice of voluntarily getting one's hands dirty to perform subordinates' routine tasks, which increases subordinates' engagement with their work. Our qualitative data help to generate hypotheses that we explore using personnel data on individual productivity and test causally using a laboratory-in-the-field experiment in which we randomly assign workers to supervisors and experimentally manipulate supervisors' ability to perform subordinate scut work. This paper contributes to the literature on motivating worker productivity by drawing attention to the important role of manager gender and by studying a less-researched organization context—that of a female-dominated workplace. The paper also contributes to the literature on women in management by investigating their impact on worker performance, measured objectively, and uncovering subordinate scut work as a specific managerial practice that female managers can use to foster engagement with work and improve female worker productivity.

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Introduction

How managers motivate workers to be productive is one of organizational theory's central inquiries. Early scholars in the field investigated the use of time and motion studies in factories to finely monitor worker productivity (Gilbreth 1911, Taylor 1914); later, scholars examined the ways in which organizations made workers more productive by promoting employee welfare and improving working conditions (Mayo 1933, Herzberg 1966). More recently, researchers have investigated how managers improve worker productivity and create high-performance work systems through incentive structures (Hassink and Fernandez 2017), enabling technologies (Ranganathan and Benson 2020), and the design of jobs (Bernstein 2012).

However, this literature on worker productivity has paid scant attention to the role that manager gender plays in affecting productivity, perhaps because the workplaces studied in the literature have historically had little variation in manager gender. However, the world of work is changing: women have been growing in representation in managerial positions around the world (Bidwell et al. 2013), especially in workplaces in which women dominate

front-line positions (Nieva and Gutek 1981, Reskin and McBrier 2000). In this paper, we use a female-dominated workplace to investigate whether and how manager gender affects female worker productivity. This is a question of paramount importance because the trend of promoting women into management positions depends crucially on how well they can motivate workers and thereby contribute to organizational performance.

Hints from existing gender research would lead us to believe that male and female managers might not vary in their effectiveness. Some studies have investigated the performance of female managers using data on evaluations of their effectiveness by their colleagues or subordinates, concluding that "male and female leaders were equally effective" (Eagly et al. 1995, p. 125; see also Bass 1990 and Powell 2018). Other studies have investigated the effectiveness of female managers by assessing how they influence the gender wage gap among their subordinates through their discretionary allocation of bonuses, finding that female managers "had no discernible effect on the gender wage gap among their subordinates" (Srivastava and Sherman 2015, p. 1802; Abraham 2017). Although these studies

are pioneering for considering the impact that gender has on managerial effectiveness, this research has focused predominantly on measures of effectiveness that are subjective, prone to bias, and only loosely coupled with objective performance (Castilla 2011, Eagly 2013), leaving open the question of whether female managers effect real change in organizations when objective performance is considered. Our paper attempts to fill this gap in the literature.

The setting for our study is a large garment factory in India. The factory we study has a female-dominated front-line workforce but employs both men and women as supervisors, thus offering important demographic variation among managers in the same role performing exactly the same job, which allows us to test whether manager gender affects female worker productivity. Additionally, this is a context where worker performance can be quantitatively measured and tracked, offering a rare opportunity to objectively compare worker productivity under male and female managers.

We first performed 18 months of ethnographic fieldwork during which time we conducted interviews with workers and supervisors at the factory, which generated three hypotheses about the relationship between manager gender and worker productivity. We then performed exploratory analysis with personnel data to compare mean worker productivity under male and female managers. Finally, to causally test the hypotheses, we conducted a laboratory-in-the-field experiment (Baldassarri 2015), where each session consisted of five randomly selected workers performing a simple, uniform task (sorting buttons by color) under either a male or female supervisor.

Using these data, we find that female managers motivate *greater* female worker productivity than male managers. Building on the concept of scut work, used in the professions literature to refer to “menial work in the service of the client” (Huising 2014, p. 289), we argue that female managers motivate greater female worker productivity than male managers by performing *subordinate scut work*, which we define as the practice of voluntarily getting one’s hands dirty to perform subordinates’ routine tasks. This practice, we argue, has the effect of improving subordinates’ engagement with their work. Although subordinate scut work might seem similar to other concepts such as leading by example, as we discuss later in the paper, we use the term narrowly to refer to the practice of managers stooping down to the level of their subordinates to perform their routine tasks.

This paper contributes to the literature on worker productivity by, explicitly focusing on a female-dominated workplace, an organizational context that, although widespread, has received limited academic attention. Additionally, although we suggest female-

dominated workplaces as a scope condition for the specific direction of our findings, we contribute to the existing literature by showing that manager gender is an important variable that can produce differences in worker productivity. The paper also contributes to the literature on women in management by studying their impact on objective measures of worker productivity. Our finding that female managers motivate greater female worker productivity than their male counterparts highlights how different conclusions might be drawn about male versus female managers depending on how their effectiveness is measured. Additionally, the paper uncovers the novel managerial practice of subordinate scut work that has the potential to increase workers’ engagement with their work and their resulting productivity.

In what follows, we review the literature on productivity and women in management. We then present the qualitative data that we use to develop our three main hypotheses. Next, we describe how we test these hypotheses with personnel records and experimental data, and we conclude by discussing the implications of this research for the advancement of female managers.

Motivating Worker Productivity: The Role of Manager Gender

Motivating worker productivity is one of management’s central tasks (Bendix 1956, Jacoby 1991). Scholars have been theorizing about how managers can and should motivate their employees ever since the time of the Industrial Revolution (Owen 1813), giving rise over time to a series of managerial ideologies including welfare capitalism (Montgomery 1832), scientific management (Taylor 1914), and the human relations movement (Mayo 1933). More recently, scholars have empirically investigated a variety of human resource levers that managers can use to motivate worker productivity and create high-performance work systems (Huselid 1995, Macduffie 1995, Ichniowski et al. 1997, Appelbaum 2000).

Although the literature on levers that promote worker productivity is diverse, the influence of managers themselves is understudied. In particular, one specific characteristic of bosses that remains unexplored is that of manager gender. This is perhaps because the workplaces studied in the productivity literature historically had little gender variation, and managerial positions in particular were once reserved for men (Kanter 1977). In the past 50 years, however, the population of managers has become significantly more diverse: women have been making inroads into these historically male roles both in the Western world and in developing economies (Cappelli 1999, Osterman et al. 2002). Although there is growing gender diversity among managers, we know little about the effects of

this manager gender diversity on worker productivity. Furthermore, it is reasonable to expect that female managers might motivate workers differently than their male colleagues owing to gender status dynamics that have been documented consistently across many cultures (Williams and Best 1990; Jacobs 1992; Glick et al. 2000, 2004).

We focus on the role of manager gender in the context of a female-dominated workplace (Nieva and Gutek 1981, Ragins 1989). Examples of such work contexts abound, including primary education and nursing occupational settings (Reskin 1993, Ridgeway 2011). Our existing theories of management come predominantly from studying male workers in male-dominated workplaces (Acker 1990) and gender-balanced workplaces (Doering and Thebaud 2017), but what works to motivate male workers might not work to motivate female workers (Klein and Hodges 2001). Furthermore, the rising representation of women in managerial roles is especially salient in female-dominated workplaces (Reskin and McBrier 2000). Therefore, we break from previous research by investigating the impact of manager gender on worker productivity in a female-dominated work context. The results of this inquiry will advance our existing theories of managerial strategies to enhance worker productivity.

Additionally, from a policy standpoint, the trend of promoting women into managerial roles is likely to depend on how effectively they contribute to organizational performance (Smith et al. 2006, Dezsö and Ross 2012), and worker productivity is perhaps one of the most important indicators of organizational performance. Indeed, holding a management position in itself can bring income, status, and empowerment to female managers, especially in developing economies (Joshi et al. 2015). Although the literature on worker productivity has little to say about whether male and female managers differentially motivate workers, the literature on women in management offers a way forward.

Women in Management

Set against the backdrop of rising female representation in managerial positions, the sociological research on women in management has investigated whether female managers alter the gender wage gap among their subordinates (Hultin and Szulkin 2003, Cohen and Huffman 2007). Some of the more recent studies in this domain have relied on matched employee-supervisor data that offer a “rare opportunity for a proximate examination of the relationship” (Abraham 2017, p. 34) between workers and their managers. The key finding of these studies is that

female managers have no discernable effect on the attainment of their female subordinates (Penner et al. 2012, Abendroth et al. 2017), although some find negative (Srivastava and Sherman 2015) or positive (Abraham 2017) effects for particular subsamples of female workers in certain contexts. This overall nonfinding may be because, at least in part, these studies examine the effectiveness of female managers using the disbursement of organizational rewards to measure effectiveness—a process that is notoriously only loosely coupled with objective performance and is prone to bias (Castilla 2011). In other words, although in theory the bonus a worker receives should reflect his or her performance, in practice that performance may not be measured and rewarded in an objective way. Thus, the disbursement of organizational rewards ultimately is not a reliable objective measure of employee job performance.

An alternative social-psychological literature on women in management has also compared male and female managers’ effectiveness in their roles (Rudman and Glick 1999, 2001, 2012; Ridgeway 2000; Carli and Eagly 2001). This literature has concluded that, overall, male and female leaders are equally effective (Bass 1990, Eagly et al. 1995, Powell 2018). With respect to female-dominated workplaces, some scholars have argued that male leaders might be more effective if they encounter a *glass escalator*—a phenomenon in which female workers bestow the few men in the workplace with authority and control (Williams 1992, 1995; Maume 1999; Kmec 2008; Wingfield 2009)—whereas other scholars have argued that women leaders might be more effective if the leadership role is defined in feminine terms (Pugh and Wahrman 1983, Eagly et al. 1995, Fletcher 2001, Paustian-Underdahl et al. 2014, Chan and Anteby 2016). Ultimately, this research cannot adjudicate whether male or female leaders will be differentially effective at motivating workers in female-dominated workplaces.

Furthermore, like the sociological research, the social-psychological research too has used subjective measures of managerial effectiveness in its analysis. This literature has predominantly investigated *perceived* effectiveness of male and female managers measured through ratings of managers’ performance by colleagues or subordinates, rather than their *actual* effectiveness (Eagly et al. 1995, Eagly and Johannesen-Schmidt 2001). Although subjective evaluations are important, especially in the absence of objective metrics, they could reflect raters’ gender bias rather than genuine differences in effectiveness (Eagly 2013). In fact, in their highly influential meta-analysis of gender and manager effectiveness, Eagly et al. (1995, pp. 138–139) acknowledged that the “favoring of subjective

ratings of leaders' performance raises questions of validity because such judgments do not provide pure measures of leaders' actual performance. . . [and because their] vulnerability to bias is well documented."

Of course, asking whether some managers are more effective than others begs the question: *Why* are those managers more effective? The management literature has addressed this question by identifying a plethora of leadership styles and strategies that are theorized to result in greater worker performance. For example, leading by example is a leadership style entailing role-modeling exemplary behavior that can serve as an example or inspiration to others (Hermalin 1998, Yaffe and Kark 2011, Drouvelis and Nosenzo 2013), and charismatic leadership is a style in which leaders are extraordinarily capable of inspiring employees to accept and execute their will (Conger and Kanungo 1987, Shamir et al. 1993). The literature on women in management has adopted this focus on leadership styles as it probes mechanisms that might explain why male and female managers differ in their perceived effectiveness (Eagly and Karau 2002). Women, for instance, are hypothesized to adopt a participative or democratic style, in which they encourage employee participation in decision making more often than men (Yukl 1989, Eagly and Johnson 1990, Eagly et al. 2000). Similarly, women are hypothesized to be transformational in their leadership style, focusing on the development and mentoring of their subordinates and attending to their subordinates' individual needs (Eagly and Johannesen-Schmidt 2001, Eagly et al. 2003).

However, recent scholarship has critiqued the concept of leadership style as being a multidimensional construct that lacks a clear conceptual definition or careful specification as to how different dimensions of style are included, excluded, or combined to denote the overall style. For example, saying that women are effective in managerial roles because they are transformational is vague because a transformational leadership style encompasses several different elements such as the ability to inspire confidence and consideration of group members, and it is unclear which of these elements contributes to their greater effectiveness. As a corrective, van Knippenberg and Sitkin (2013, p. 3) recommend that "going forward, . . . theory and measurement concentrate on conceptualizing and operationalizing more precise and distinct elements and effects of leadership."

Motivated by these gaps in the existing research, in this paper, we focus on the productivity of front-line workers, which we can measure objectively due to advances in technology. Using an objective measure promises a more definitive answer to the question of whether male or female managers are more effective at motivating female workers. Our paper also moves

away from the vague construct of leadership style to investigate a specific practice differentially adopted by male and female managers to motivate worker productivity. Before stating our theory and hypotheses (developed through our qualitative data), we describe our setting for this study.

Research Setting: Garment Factory in India

Our setting for this study is a large garment manufacturing firm in the southern Indian city of Bangalore. Garment manufacturing is a female-dominated industry that offers front-line employment to millions of women in the Global South; yet, we know little about how women fare in leadership positions in the garment industry, a factor that may determine whether women will continue to receive opportunities for career advancement and growth. In India, this industry is also an important sector of the economy, contributing 4% to the country's GDP, 13% to its export earnings, and 14% to its industrial production (Technopak 2015). Therefore, this is a context where achieving high worker productivity is crucially important.

The factory that we study was established in 2001 and is one of the market leaders in the Indian garment industry, reporting an average annual revenue of \$400 million. We gained access to the firm by approaching the Chief Executive Officer through an industry association. This factory produces both menswear and womenswear but focuses primarily on trousers and jackets for men. The factory produces an average of 100,000 trousers and 40,000 jackets per month. Work is organized in assembly lines, but there is slack built into the lines so that workers operate relatively independently of one another. Workers in this factory perform specific tasks called operations, such as attaching a zipper or a waistband, which they typically repeat several hundred times over the course of a day. The factory's workforce is more than 90% female, consisting of 1,800 female workers; unfortunately, there are not enough male workers in our qualitative and quantitative datasets to theorize about them.

The factory that we study has a relatively flat organizational structure. In this paper, we focus specifically on the supervisors in the factory, who occupy the first level of the managerial hierarchy above factory workers. Typical tasks performed by a supervisor include managing technical and nontechnical production issues that arise and motivating workers to maintain high levels of productivity. This factory currently employs about 50 supervisors. A key benefit of our factory is that both men and women are represented equally in the same supervisory role.

In this paper, we investigate whether male or female supervisors are more effective at motivating female worker productivity, and if so, why.

Full-Cycle Research Design

To investigate whether and how manager gender might affect female worker productivity at the factory, we were inspired by a full-cycle research approach, which combines inductive and deductive methodologies in a single research program (Fine and Elsbach 2000, Ranganathan 2018). The logic is that initial qualitative data can richly describe real-world issues that are worth studying and generate theory and hypotheses close to the field or immediate experiences of informants; quantitative data can then complement the qualitative data by corroborating the key theoretical ideas. Our research methods in this paper mirror this process.

Qualitative Methods

To inform our theory and hypotheses, we first conducted 18 months of ethnographic observation in the factory between April 2014 and September 2015, producing more than 800 single-spaced pages of fieldnotes. To capture the range of experiences of factory employees, we also conducted 120 in-depth interviews with a subsample of people at all levels of hierarchy within the factory—workers, supervisors, and upper management—in Kannada, Hindi, and English. Throughout our involvement with our field site, we described our project to informants very broadly as an attempt to understand the work of garment manufacturing.

The initial phase of the ethnography was open ended as we sought to inductively understand how production was managed in the factory and how workers and supervisors interacted and worked together. We regularly sat in on meetings between factory staff members during which different aspects of factory life were discussed, such as managing the workforce, limiting worker absence, attrition, and dealing with technical issues in production.

The later phase of our ethnographic observation was focused on understanding the effectiveness of male and female supervisors in managing female worker productivity and worker responses to various practices adopted by male and female supervisors. By shadowing supervisors and workers both inside and outside the factory, we observed how supervisors interacted with workers to deal with common challenges that they encountered during production, such as machine breakdowns, slow production, worker conflicts, and pressure from superiors. In our interviews, we asked male and female supervisors how they decided what managerial practices to use and

how they dealt with people both below and above them in the organizational hierarchy.

We analyzed our data inductively as we collected it (Glaser and Strauss 1967), generating fledgling theories that we would evaluate in subsequent fieldwork. Coding of fieldnotes and interviews was done primarily by hand or using Excel (Hahn 2008). We also wrote memos to refine our understanding of how male and female supervisors differed in their approach to managing worker productivity (Denzin and Lincoln 1994). This iteration between the collection and analysis of data produced hypotheses pertaining to male and female supervisors' effectiveness in motivating female worker productivity, their adoption of distinct managerial practices, and workers' reactions to these practices.

Qualitative Findings and Hypotheses Development

Supervisor Gender and Female Worker Productivity

We began our fieldwork by observing and understanding the job of a supervisor at the female-dominated garment factory. In the words of one supervisor, the crux of the job was to “get workers to keep finishing pieces and moving them along” so that production on the line progressed at the desired pace. Our fieldnotes indicate that we “heard this phrase—keeping the pieces moving—many times in exactly the same language from many workers and supervisors.”¹ Although getting workers to keep moving pieces might sound relatively easy, an experienced supervisor explained that this was in fact a challenge: because of the monotony of their work, workers were prone to stalling and taking breaks, a problem that had to be overcome because “without the workers, no work can be done.”

Our observations indicated that female supervisors seemed to be more effective than male supervisors at getting workers to keep their pieces moving. For example, recounting an incident that occurred earlier in the day, one worker said, “Two to three operators were holding up the entire back parts production. The fabric was such that the vacuum in the machine of the problematic worker was not able to hold it in place, making it hard to do the back pocket operation. [My female supervisor] sat down and demonstrated how to do it correctly,” thus resolving the issue. We heard a similar story when “a lady in the line kept attaching sleeve pieces to the main body without realizing the difference in size between the two separate pieces” and if the female supervisor “hadn't fixed [the issue], the entire line would have come to a stop.” According to our fieldnotes, lines managed by female supervisors seemed to “run smoothly” with “less shouting and yelling” than lines managed by male supervisors.

In contrast, male supervisors used demonstrations of authority to get workers to keep their pieces moving, an approach that has been documented in prior work (Eagly et al. 2000). One male supervisor warned, “If you give the workers too much lenience, they will take the supervisors for a ride. They wander around and supervisors won’t have control over them. They begin to regard supervisors as their own family members and take advantage of this familiarity.” Male supervisors often raised their voices, yelling instructions and shouting at workers if they made mistakes. Male supervisors did not ascribe any special value to conversation with workers and often saw it as a hindrance to work. One male supervisor said, “That is the problem with these women. They are always talking.”

However, this style of monitoring by authority did not seem to resonate with the female workers at the garment factory. A group of workers described that when male supervisors encounter problems in production, “They give very broad level instructions, not getting into the depth of the problem. They also keep asking why [the worker] isn’t performing well,” which the workers described as unproductive. Speaking about a male supervisor, a worker said, “When there is pressure to move 10–20 pieces, male supervisors here shout at people. . . . They do not have the ability to gauge an operator’s capacity and they just yell at them to produce more without understanding why they may not be able to produce.” This worker clarified that male supervisors’ inferior effectiveness did not stem from lack of effort or ill intentions but instead from their efforts not translating into results.

Overall, our observations indicate that manager gender is associated with female worker productivity. In particular, in our garment factory, we observed that female managers seemed to be more effective than their male counterparts at keeping pieces moving. Based on our qualitative data, we therefore hypothesize the following.

Hypothesis 1. *Female supervisors elicit greater worker productivity than male supervisors in female-dominated workplaces.*

We next sought to understand why female supervisors seemed to be more effective than male supervisors at motivating productivity. Although there may be a number of reasons for this difference, in the next section, we focus on one that seemed especially salient in our observations yet is unexplored in the literature.

Managerial Practice of Subordinate Scut Work

Having observed female and male supervisors at work, we were intrigued by how female supervisors motivate greater worker productivity than their male

counterparts in this garment factory. Our observation uncovered a managerial practice that female supervisors were much more likely to perform: female supervisors voluntarily engaged in the routine tasks of their subordinates alongside them, a practice that we call *subordinate scut work*. Here, we build on the concept of scut work from the professions literature, used to describe menial work performed by professionals in the service of clients. For example, a doctor who draws a patient’s blood or wheels a patient from one room to another, tasks normally performed by nurses or orderlies, is performing scut work (Hughes 1958, Kellogg 2010, Huising 2014). The professions literature has long theorized about scut work as a rite of passage into a profession (Hughes 1958, Abbott 1988, Kellogg 2010) or as a tactic to build relationships with clients and later elicit compliance from them (Huising 2014). We bring this concept to the study of management in organizations.

In the garment factory, we observed female supervisors partaking in a variety of routine tasks that were formally the responsibility of their subordinates, including cleaning up, ironing garments, and performing alterations on finished pieces with errors. One female supervisor “constantly kept folding the sleeves of the jackets inside out, making them easier to work on” and another “constantly kept picking up pieces that fell off workers’ desks and transferring them to the next worker.” Female supervisors described that they perform such tasks “four to five times a day at least.” Explaining this tendency to perform subordinate scut work, one female supervisor said, “If there are small problems like loose stitches in finished pieces, I resolve them myself—I don’t bother my workers with these annoying jobs.”

Perhaps the strongest and most common illustration we observed of female supervisors’ performance of subordinate scut work was supervisors sitting alongside their subordinates and stitching garments. Given that supervisors had earned the right to escape from this unglamorous, monotonous work, we interpret female supervisors performing the front-line work of their subordinates alongside them as significant evidence of them willing to “get their hands dirty.” We often observed female supervisors sitting at empty machines and stitching garments. In interviews, female supervisors spoke about how they saw front-line participation as normal and emphasized that this practice made them feel “closer to their workers. . . [and made them] feel as though they were part of the team.” One female supervisor said, “If I pitch in and work too, then the operators feel that I am one among them.”

In contrast, male supervisors, despite knowing how to perform the tasks of their subordinates, did not want to be associated with doing their subordinates’

work. Our fieldnotes describe that “male supervisors don’t seem to physically perform any worker tasks but just direct people to do them.” We observed male supervisors overseeing the production activity of their workers, walking down the lines, giving instructions and scrutinizing the work without touching the garments or getting their hands dirty. One male supervisor explained, “I am a supervisor, so I do not need to do my workers’ tasks.”

When we asked supervisors whether they participated in stitching garments, 90% of female supervisors replied affirmatively, whereas less than 50% of male supervisors did so. Female supervisors even had some intuition that their performance of subordinate scut work would improve worker productivity. One female supervisor said, “If I sit with them, a worker who would produce 80 pieces in an hour would easily finish 100 pieces.” Others added that their performance of scut work “improves the production” and results in workers “working much faster.”

Earlier, we documented that the women in management research has criticized the concept of leadership style as vague and multidimensional, calling instead for theorization of specific managerial practices that contribute to different styles. We respond to this call by introducing subordinate scut work as a practice used by female managers to motivate female worker productivity.² Based on our qualitative data, we hypothesize the following.

Hypothesis 2. *Female supervisors elicit greater female worker productivity than male supervisors by performing subordinate scut work.*

As demonstrated, the focus of our inquiry is on the consequences of managers’ performance of subordinate scut work. Although outside the scope of our research, in interviews, we also explored antecedents to this managerial practice. We asked female supervisors why they engaged in subordinate scut work. What was most salient in their responses was that female supervisors did not see the work of their subordinates as being inaccessible, possibly because the tasks of their subordinates were female-typed. Describing the work of stitching, for example, one female supervisor said “This work fits me.” In contrast, a male supervisor justified his decision to not perform subordinate scut work by saying, “Stitching is not my work.” Workers also seemed to perceive the practices of male and female supervisors quite differently, especially with respect to subordinate scut work. When asked about a male supervisor who stitched garments, two female workers said that he “behaves like a mental [crazy] person” for helping in production activities and “has not moved up the ladder at all.” Interestingly, we saw male supervisors engage in some male-typed subordinate scut work by

trying to help their workers fix machines, and these instances of scut work seemed to be well received by workers. However, few routine tasks in the factory were male-typed, and overall, we observed female managers performing much more subordinate scut work.

Improving Subordinates’ Engagement with Their Work

Finally, we sought to understand why female supervisors’ performance of subordinate scut work increased female worker productivity. Interviews with workers at the factory suggested that female supervisors doing scut work increased subordinates’ engagement with their work. Engagement with work has been defined in the literature as investing personal energy in one’s work—becoming physically involved, cognitively vigilant, and emotionally connected with a task (Kahn 1990). Scholars have argued that workers can be more or less engaged when performing the same task (Rothbard 2001). For example, an engaged traffic police officer might embrace the role with “arms dancing and whistle blowing” but someone else might “distance himself... yawning and mock-grimacing” (Goffman 1961, p.108). Other scholars have argued that engaged workers might experience elevated affective states, offer high-fives to colleagues, and have higher attention and greater focus (Collins 2004, Grodal et al. 2014).

Our observation indicated that female supervisors’ subordinate scut work increased workers’ engagement with their work. One female supervisor explained, “Workers feel touched that their supervisors are doing work that is actually the worker’s own work,” and this act changes how workers approach and connect with their work physically, cognitively, and emotionally. Describing her physical response to subordinate scut work, one worker said, “Seeing my supervisor doing my own work... I put in extra effort, my hands work faster and I get the work done.” In fact, we saw this worker voluntarily work during her lunch break. She explained, “I want to finish up some more pieces before I go to eat.” Cognitively, also, we saw workers connect more deeply with their work. One worker said, “If she [my supervisor] too sits down and works with us, I like the work more,” and another worker said, “I feel I should match her work through my own work.” Finally, workers seemed to experience heightened emotions when their supervisors did subordinate scut work. Our observation noted workers smiling and laughing more when their female supervisor worked alongside them. One worker said, “I feel very good when my supervisor works with me” and another said, “I feel happy.” In one instance, we observed “a female supervisor altering a piece done by a worker, [after which] she pointed to the piece and playfully said to the

worker ‘Look what you have done!’ [In response] the worker laughed.”

This section thus uncovers one pathway through which the managerial practice of subordinate scut work operates and could affect worker productivity. Although we cannot directly establish the link between engagement with work and worker productivity, and we fully acknowledge that there could be alternative pathways through which subordinate scut work operates as well, our qualitative data shed light on one important effect that female supervisors’ performance of subordinate scut work has on workers. Based on our observations, we hypothesize the following.

Hypothesis 3. *Female supervisors’ enactment of subordinate scut work increases female subordinates’ engagement with their work.*

Having derived three testable hypotheses based on our fieldwork, in the next sections, we explore Hypothesis 1 using personnel data and then causally test Hypotheses 1–3 using our laboratory-in-the-field experiment.

Exploratory Analysis with Personnel Data: Supervisor Gender and Worker Productivity

Before we causally test our hypotheses, we check whether the idea that female supervisors will elicit greater female worker productivity than their male counterparts has face validity. We perform a simple comparison of mean worker productivity by supervisor gender using personnel data from the factory. These personnel data offer three benefits: (a) we can track the productivity of workers as they perform their regular work tasks, (b) we have an objective measure of worker productivity, and (c) we can track worker performance over a relatively long time span. However, this personnel data analysis also has two key limitations: (a) we have only seven supervisors, out of which three are female, and (b) the assignment of workers to supervisors is not explicitly random. Therefore, we consider this personnel data analysis to be exploratory, and we follow it up with a carefully designed laboratory-in-the-field experiment (discussed later) that overcomes the stated limitations.

Using detailed personnel records maintained by the factory, we constructed a data set of 10,922 observations at the worker-date level, where each data point corresponds to productivity for a specific worker on a specific date. We have data for the daily individual productivity of 199 female employees who worked in one trouser line (line 1) in the factory from January 2013 to October 2014. Line 1 had fewer than 20 male workers, whom we drop because no statistically valid conclusions can be drawn from this small male sample.³ We track

worker productivity using a radio frequency identification (RFID) system that was installed in October 2012 in line 1. The RFID system consists of RFID tags attached to each garment and RFID terminals attached to workers’ stations. When a worker finishes with a garment, she scans the attached tag on the RFID terminal at her workstation and then passes the garment to the next worker in the production line. This facilitates tracking daily variation in individual worker productivity.

The productivity of workers in the factory is measured as a percentage value calculated using two parameters: a worker’s output per minute in a given operation, measured as the number of pieces produced by the worker in a given operation in a minute, and the standard minute value (SMV) for that operation, a concept commonly used in industrial engineering to denote the time required for a typical worker performing at standard productivity to perform that operation. Individual worker productivity is then calculated as $Output\ Per\ Minute \times Operational\ SMV \times 100$, making worker productivity comparable across multiple operations.⁴ Additionally, we obtained detailed data on weekly supervisor assignments in line 1 over the two-year observation period. Supervisors are rotated through the different garment lines in the factory; thus, both male and female supervisors supervise the same workers in line 1 at different points in time. The key purpose of the supervisor rotation is to produce multiskilled supervisors who can manage multiple garment lines. The assignment of supervisors to lines is thus not correlated with worker performance. By merging the worker productivity data set with the supervisor assignment data set, we were able to create a unified data set that tracks the productivity of a worker under her assigned supervisor on a particular date. Table 1 reports descriptive statistics for the 199 female workers in our data set.⁵

We first conducted a cross-sectional comparison of the productivity of workers under male versus female supervisors, without any controls. In our setting, such a comparison revealed no difference in mean individual worker productivity. However, this comparison could be misguided because garment production volumes are known to vary seasonally depending on fashion cycles, and supervisor assignments could unintentionally covary with the different seasons of the year.⁶ Appendix A demonstrates that male supervisors are more likely to be assigned to the line in the summer when productivity is higher. Some industrial engineers described this seasonality of garment production in interviews. “There are clearly some peak periods and some lean periods,” said one engineer. He continued, “March/April is a lean period when products are being designed for the winter, and then mid-June till the end of the summer is busy when

Table 1. Descriptive Statistics for Female Garment Factory Workers in Line 1

	Mean	Standard deviation
Fraction female	1	0
Age (in years)	29.80	6.057
Fraction married	0.719	0.451
Fraction from Karnataka state	0.935	0.248
Fraction low skilled ^a	0.508	0.501
Tenure in factory (in years)	2.871	2.357
Average daily productivity (%) ^b	59.58	20.27
Fraction of time exposed to female supervisor	52.79	37.57
Observations	199	

^aLow skilled accounts for two lowest categories in four-category skill system as designated by the Government of India (highly skilled, skilled, semiskilled, and unskilled).

^bThis was computed by first calculating average productivity per worker and then computing the average of these averages. Average productivity across the observations in the data set, by contrast, is 69.3%, suggesting that workers with lower productivity had shorter stints in our data.

these products are produced and moved to the stores for purchase in the winter.” Given that male supervisors are generally assigned to line 1 in the summer, it would be difficult to identify if workers’ higher productivity was caused by the supervisor’s gender or the high volume season in which male supervisors managed the line.

Therefore, we next conducted a cross-sectional comparison of the productivity of workers assigned to male supervisors versus those assigned to female supervisors, controlling for month of year. The results are visually depicted in Figure 1. The figure shows that the season-adjusted productivity of workers under female supervisors is higher than under male supervisors and that this difference is statistically significant. Individual worker productivity improves by 1.5 units under female supervisors compared with male supervisors, which amounts to a 2.2%⁷ productivity increase under female supervisors. This result is also robust to conducting a within-worker comparison of

productivity under male versus female supervisors (that controls for differences in individual worker characteristics), which we are able to do because of the panel structure of the data and the rotation of supervisors across garment lines (see Appendix B).

This exploratory analysis tracking workers as they perform their regular work tasks suggests that manager gender affects female worker productivity. However, this analysis is based on studying a very small number of supervisors. Therefore, we conducted a laboratory-in-the-field experiment using a larger sample of supervisors where we are also able to randomly assign workers to supervisors.

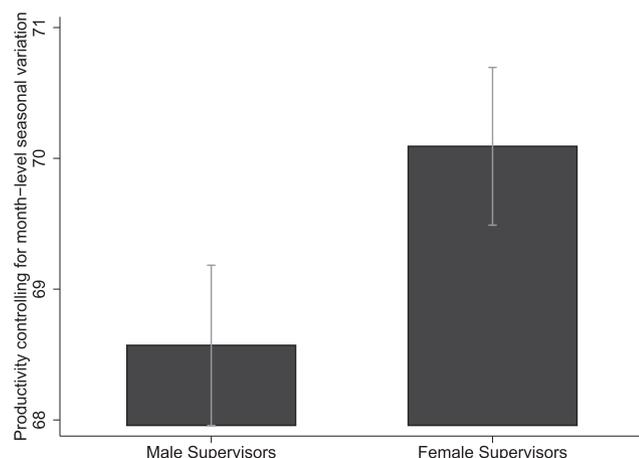
Experimental Design

We use a laboratory-in-the-field experiment to causally test Hypotheses 1–3, that female supervisors inspire higher productivity in their workers, that this productivity difference can be explained by female supervisors’ performance of subordinate scut work, and that female supervisors’ enactment of subordinate scut work fosters engagement with work. Laboratory-in-the-field experiments represent a relatively new addition to the social scientist’s toolkit. The idea is to run randomized behavioral games in a controlled experimental setting within the field site to gain insights into human behavior (Baldassarri 2015, Gneezy and Imas 2016). This important tool offers us the best of both worlds: the chance to study specific mechanisms in a laboratory in isolation from confounding factors but not in isolation from the rich context that the field setting provides.

Experimental Participants

As a first step, workers were offered the opportunity to volunteer to participate in the experiment. We called our experiment a *production game* to encourage participation because workers had mentioned to us that they enjoyed playing games during the factory’s

Figure 1. Mean Individual Worker Productivity by Supervisor Gender



Note. 95% confidence interval bars are drawn around the mean.

Annual Day celebrations. The signup procedure was advertised to all workers in the factory for seven days through flyers and announcements in the local language. No specific details about the purpose or design of the experiment were revealed at this stage, so it is very unlikely that the workers who volunteered were familiar with the research agenda. Signups were conducted during lunch in the factory canteen, where workers could approach research assistants seated at a prominently placed table to register.

Workers were excited to volunteer and participate in a seemingly fun game. In total, 345 workers signed up. About 15% of the workers who volunteered were male; however, given that our qualitative and personnel data set had few male workers, we restricted the actual experimental pool⁸ to female workers. In addition, we enlisted all supervisors in the factory who were available to participate in the game. Each supervisor participated in only one experimental session, ensuring there was no repetition.

Schedule

The experiment was conducted over 19 days in August–October 2015 on the factory premises in a separate building with classrooms.⁹ The experiment was conducted in three phases: (1) a trial run, (2) before a major Hindu festival, and (3) after the festival. In the first phase (lasting three days), we conducted a trial run of the finalized experimental setup. The trial was done on the factory premises with workers who had signed up to participate. Because no changes were made to the research design based on this trial, we include data from these trial sessions to gain statistical power. This is standard practice in field experimental research (Tully and Boudewyn 2018). The second and third phases lasted seven and nine days, respectively. Experimental sessions were held at the end of the workday during factory overtime hours. This ensured minimal disruptions to the factory's production process. Factory-run buses were available to workers for a safe commute back to their homes. A session typically lasted 90 minutes, including bringing participants to the classrooms, running the game, and conducting a brief survey.

Each day of the experiment consisted of two sessions conducted in parallel: one run by a male supervisor and one by a female supervisor. There were 38 sessions in total. From the list of workers who signed up, we randomly assigned five workers to participate in each session. All participants were informed in advance and reminded on the day of their session. Because the factory has nearly 1,500 workers and the signup was voluntary, workers typically did not have an existing working relationship with the supervisor in the session they were assigned to before

the day of the experiment; even if they did, however, the likelihood of this was randomly distributed.

Design of the Production Game

The production game consisted of a uniform task performed by the five randomly selected female workers. The task was to individually sort brightly colored buttons under the supervision of a supervisor. Our buttons were of four distinct colors but were identical in shape and size. We modeled our button-sorting exercise on prior research (Macchiavello et al. 2015). Button sorting is a common activity performed by women in the production lines of the factory, so the exercise was familiar to the workers.

Control and treatment sessions were held on alternate days. Therefore, on any given day, the two sessions that were run—one with a male and one with a female supervisor—were either both treatment or both control sessions. In control sessions, supervisors were allowed to manage workers as they saw fit. In treatment sessions, supervisors were not allowed to participate in the task of sorting buttons alongside workers, taking away their ability to perform one key form of subordinate scut work. If the supervisor in a treatment session attempted to sort buttons, the research assistant would ask him or her to stop. Note that the treatment here is thus a restriction of a managerial practice sometimes adopted by supervisors. There were no other restrictions, however, on how the supervisors conducted their sessions.

Session Logistics

Each session was held in its own classroom with no visual connectivity, so supervisors could not see what others were doing. Participating workers were first taken to a preparation room, where they listened to a prerecorded set of instructions informing them that the supervisor conducting the game would explain all necessary details. They were paid a fixed participation fee irrespective of their performance. Workers then took an oath of secrecy that bound them to not reveal details about the game to other workers who were yet to participate. Finally, the workers picked numbers in a lottery that randomly assigned them to one of the two classrooms with either a male or female supervisor. In a similar fashion, the male and female supervisors on a particular day were randomly assigned to one of the classrooms, where they listened to a prerecorded set of instructions. The instructions explained that the goal of the game was to sort as many buttons as possible and that their compensation was linked to this metric. As a final step, when both the workers and supervisors were ready, workers were brought to their assigned classrooms, and the supervisors began orchestrating the button-sorting game.

Supervisors were tasked with explaining the activity and managing the workers’ productivity, allowing us to simulate actual production lines in a factory as closely as possible. In addition to a large pile of unsorted buttons, each supervisor was given a timer and a weighing scale to measure the numbers of buttons sorted. Much care was taken to ensure that the classrooms were set up in identical fashion for each session. The game lasted for a total of 25 minutes. Afterward, all participants answered survey questions about their experiences of the production game and their real-world experiences in the factory. These surveys were conducted by surveyors hired for this project and lasted approximately 15 minutes per person. See Appendix C for more details about the logistics of the experiment.

Data

The key outcome variable in the game, used to test Hypotheses 1 and 2, was the individual productivity of each female worker, measured as the number of buttons she sorted correctly. To capture this data, each worker was given four boxes, one for each color of button. Supervisors were informed at the beginning of the game that failure to turn in separate boxes for each worker would result in a heavy penalty. Extra boxes were provided so that, if the supervisors themselves chose to sort buttons in the control sessions, their buttons would go into separate boxes to not affect our measure of individual worker productivity.

We also video recorded the sessions with the consent of the participants. Both supervisors and workers on factory production lines are used to being monitored closely, and as such, this observation is unlikely to have caused any tension or affected their behavior. We hired an independent contractor to translate (from Kannada to English) and transcribe all the dialogue that occurred in 34 of the 38 experimental sessions (we were unable to record four sessions), and we then hired a research assistant to code the content of the dialogue, for, among other things, workers’ engagement and disengagement with work. Our engagement with work code includes verbal indications of workers’ interest in the work and nonverbal indications such as smiling and laughing (see Schaufeli et al. 2006 for a scale that informed our coding). Examples of sentences coded as engagement include “Sister, I am enjoying finding the pink button (She laughs)” and “The game is interesting.” Similarly, our disengagement with work code includes verbal statements about lack of interest in the work and nonverbal indications such as yawning. Examples of statements coded as disengagement include “I am getting bored” and “Madam, come on, can we do something else?” A simple count of the number of coded instances of engagement and disengagement per worker in our data gave us

Table 2. Experimental Design

	Control sessions	Treatment sessions
Male supervisors	11 (55 workers)	8 (39 workers ^a)
Female supervisors	11 (55 workers)	8 (40 workers)

Notes. Each session had five randomly picked workers individually performing a task under the management of one supervisor. In control sessions, supervisors were allowed to manage workers as they saw fit. In treatment sessions, supervisors were explicitly prevented from participating in the task alongside workers.

^aOne observation is missing in one of the treatment sessions run by a male supervisor because a randomly picked worker could not attend the session on that particular day.

individual worker-level measures for engagement and disengagement with work that we use to test Hypothesis 3.

Experimental Results

Table 2 summarizes the experimental design. Data from 22 control sessions and 16 treatment sessions was used for the analysis in this paper. The control and treatment sessions were equally distributed between male and female supervisors, as indicated in Table 2. In total, 189 workers participated in the experiment; one observation is missing from a male supervisor-treatment session because one randomly picked worker did not show up to her assigned session.

Table 3 offers descriptive statistics for supervisors who participated in our laboratory-in-the-field experiment. The data were collected by survey. As indicated, there is no statistically significant difference in age, education, skill, marital status, state of origin, or work history between supervisors in the treatment and control group, giving us confidence in our randomization.

Figure 2 presents a comparison of mean individual worker productivity measured as the average number of sorted buttons for each of the four experimental conditions: female supervisor-treatment, female supervisor-control, male supervisor-treatment, and male supervisor-control, with confidence interval bars around the mean. It is important to note that even if the supervisor chose to participate in button sorting in the control sessions, their sorted buttons were not included in the calculation of individual worker productivity, and hence worker productivity did not mechanically increase because of supervisory participation. This figure demonstrates that mean individual worker productivity was higher under female supervisors than under male supervisors in the control sessions, validating the results observed in our exploratory personnel data analysis. Specifically, worker productivity was 8% higher in control sessions run by female supervisors than in control sessions run by male supervisors; this difference is

Table 3. Descriptive Statistics for Factory Supervisors in Experiment

	Control	Treatment	Difference	<i>p</i> -Value of difference
Age (in years)	30.05 (5.214)	31.06 (4.234)	-1.017	0.526
Fraction with high school education	0.864 (0.351)	0.938 (0.250)	-0.074	0.477
Skill rating (1–4; 4: highest skill)	3.227 (0.528)	3.125 (0.500)	0.102	0.551
Fraction married	0.636 (0.492)	0.875 (0.342)	-0.239	0.104
Fraction from Karnataka state	0.864 (0.351)	0.750 (0.447)	0.114	0.386
Fraction who had been a worker in same factory	0.591 (0.503)	0.500 (0.516)	0.045	0.590
Observations	22	16		

Source. Survey conducted in October–November 2015 for the sample of 38 supervisors in the experiment; 100% response rate for both female and male supervisors.
Note. Mean coefficients; standard deviation in parentheses.

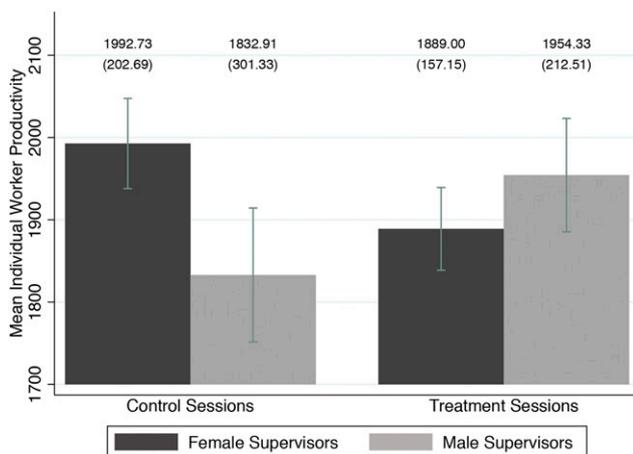
statistically significant (difference = 159.82, standard error = 69.79). This provides support for Hypothesis 1. In contrast, in the treatment sessions, in which female supervisors were restricted from performing subordinate scut work, their productivity advantage disappeared, and worker productivity was no different under female supervisors than under male supervisors, offering support for Hypothesis 2.¹⁰

As a next step, we systematically test the comparison of raw means presented above through a least-squares regression model (Table 4). Model 1 includes only control sessions to test Hypothesis 1, that female supervisors motivate greater worker productivity than

male supervisors. Model 2 adds treatment sessions and the interaction term *Female Supervisor* × *Treatment Session*. This interaction term tells us if the difference-in-differences in worker productivity across treatment and control sessions under male and female supervisors is statistically significant. Finally, model 3 includes control variables for supervisor characteristics to test whether subordinate scut work is meaningful even in the face of other possible differences between male and female supervisors. All models include standard errors clustered by supervisor and time fixed effects to control for differences across the three phases of the experiment as described previously.

In model 1, we see that the *Female Supervisor* coefficient is significant at the 0.10 level, providing support for Hypothesis 1 that female supervisors elicit greater female worker productivity than male supervisors (consistent with results from the personnel data analysis). In model 2, the interaction term represents (mean worker productivity_{female-treatment} – mean worker productivity_{male-treatment}) – (mean worker productivity_{female-control} – mean worker productivity_{male-control}). This is our variable of interest because we want to compare how worker productivity changes when we restrict female supervisors’ ability to perform subordinate scut work against the change in worker productivity between the treatment and control sessions under male supervisors. This estimate is marginally significant in model 2, and the addition of control variables in model 3 serves to strengthen the effect. The experimental results thus demonstrate that the managerial practice of subordinate scut work is a key mechanism through which female supervisors achieve superior female worker productivity, which supports Hypothesis 2.

Figure 2. Experimental Results



Notes. In control sessions, supervisors were allowed to manage workers as they saw fit. In treatment sessions, supervisors were explicitly prevented from participating in the task alongside workers. Bars represent mean individual worker productivity, excluding any supervisor contribution. 95% confidence interval bars are drawn around the mean. Means and standard deviations (in parentheses) reported.

Table 4. OLS Regression of Effect of Supervisor Gender and Experimental Treatment on Individual Worker Productivity

	Control sessions		Control and treatment sessions	
	(1)	(2)	(3)	
<i>Female Supervisor</i>	159.909*	159.909*	207.672**	
	(92.555)	(93.140)	(85.759)	
<i>Treatment Session</i>		105.368	178.788	
		(110.608)	(97.436)	
<i>Female Supervisor × Treatment Session</i>		−222.941*	−369.339**	
		(128.407)	(134.909)	
<i>Supervisor high school education</i>			−42.151	
			(111.304)	
<i>Supervisor skill rating</i>			−181.349**	
			(77.185)	
<i>Supervisor promoted from within</i>			91.755	
			(76.799)	
<i>Supervisor from state of Karnataka</i>			30.947	
			(67.389)	
Constant	1676.695***	1672.380***	2208.473***	
	(86.869)	(78.174)	(274.481)	
Phase fixed effects	Yes	Yes	Yes	
Observations	110	189	189	
R ²	0.204	0.150	0.222	

Notes. Experiment was conducted in three phases. Observations are at the individual worker level. Standard errors are clustered by supervisor. The sample for model 1 is restricted to only control sessions. OLS, ordinary least squares.

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

Finally, we sought to test whether female supervisors’ performance of subordinate scut work affected female workers’ engagement with their work. Table 5 uses the same setup as Table 4—ordinary least squares regression models with individual worker level observations—to test this hypothesis. The outcome variable in model 1 is engagement with work and the outcome variable in model 2 is disengagement

with work, allowing us to test whether the difference-in-difference in subordinates’ engagement and disengagement with work across treatment and control sessions under male and female supervisors was statistically significant. Our count of observations drops from 189 to 169 because we do not have data for 20 workers because of our inability to video record four experimental sessions. Again, our variable of interest is

Table 5. OLS Regression of Effect of Supervisor Gender and Experimental Treatment on Subordinates’ Engagement and Disengagement with Their Work

	Engagement	Disengagement
<i>Female Supervisor</i>	0.156*	−0.000
	(0.083)	(0.034)
<i>Treatment Session</i>	0.036	−0.021
	(0.070)	(0.025)
<i>Female Supervisor × Treatment Session</i>	−0.208*	0.176*
	(0.108)	(0.103)
Constant	0.056	0.017
	(0.068)	(0.079)
Phase fixed effects	Yes	Yes
Observations	169	169
R ²	0.043	0.067

Notes. Experiment was conducted in three phases. Observations are at the individual worker level. We have data for 169 workers rather than the full sample of 189 workers who participated in the experiment because we were unable to video record four experimental sessions. Standard errors clustered by supervisor are in parentheses. OLS, ordinary least squares.

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

the interaction term between supervisor gender and treatment session. This coefficient is marginally significant in both models, but importantly, the direction of the coefficient is negative in model 1, which estimates engagement with work, and positive in model 2, which estimates disengagement with work. These results demonstrate that when female supervisors are restricted from doing subordinate scut work, their female subordinates' engagement with work decreases and their subordinates' disengagement with work increases, thus supporting Hypothesis 3.

Alternative Explanations

In this section, we consider alternative explanations for why female supervisors are more effective than their male counterparts at motivating productivity. First, could female supervisors' effectiveness at managing workers be explained by different work histories of male and female supervisors? The argument here is that if female supervisors had been factory workers themselves before being promoted to managerial roles, whereas male supervisors had not, this personal experience might explain the former's superior effectiveness. Fortunately, we are able to directly measure whether a given supervisor was previously employed as a worker in the same factory using our survey data. Our results are robust to controlling for this variable in our regression analyses, thus ruling out the alternative explanation that career differences between male and female supervisors account for female supervisors' superior effectiveness. Additionally, in Appendix D, we compare female and male supervisors along a variety of different dimensions and do not find a significant difference on any of these dimensions, including their work histories.

We also consider the possibility that female supervisors' performance of subordinate scut work affects worker productivity not through the channel of engagement with work that we propose but instead through the elimination of bottlenecks. We investigate this alternative channel using experimental data and present the results in Appendix E. Does female supervisors' performance of subordinate scut work allow them to eliminate bottlenecks more effectively? Our coded video recordings gave us data on the number of suggestions offered by supervisors, which we use as our measure of elimination of bottlenecks. As Appendix E shows, the difference-in-difference in supervisor suggestions across treatment and control sessions under male and female supervisors is not statistically significant, thus ruling out this alternative.

Discussion: How Female Managers Motivate Female Worker Productivity Through Subordinate Scut Work

We began with the research question: does manager gender affect female worker productivity, and if so, how? To answer this question, we study a large Indian garment factory that employed male and female supervisors in the same role and used RFID technology to measure individual worker productivity. Through fieldwork, interviews, and surveys, we hypothesized that female supervisors motivate greater female worker productivity than male supervisors by doing what we call subordinate scut work, voluntarily getting their hands dirty to perform subordinates' routine tasks, which increases subordinates' engagement with their work. Next, using personnel data, we explored mean season-adjusted worker productivity under male and female supervisors and found that female supervisors indeed increase female worker productivity. Finally, using a laboratory-in-the-field experiment, we causally tested the effect of supervisor gender on female worker productivity and the mechanism of subordinate scut work. We confirmed that female supervisors increase female worker productivity, found support for the scut work mechanism, and further showed, through coding of experimental videos, that female supervisors' subordinate scut work increased workers' engagement with their work. Thus, we show that manager gender can produce significant differences in female worker productivity.

To be clear, we are not arguing that female managers, because they are women, are intrinsically more likely to engage in helping behaviors such as subordinate scut work. Sociological research has long distinguished between the concepts of sex and gender and has found that gender effects are often not rooted in intrinsic, biological differences between the male and female sexes. Here, sex is "a determination made through the application of socially agreed upon biological criteria for classifying persons as females or males," whereas gender is "the activity of managing situated conduct in light of normative conceptions of attitudes and activities appropriate for one's sex category" (West and Zimmerman 1987, p. 127). Our paper demonstrates how manager gender—where gender reflects normative responses—shapes female worker productivity.

In this paper, we posit that an important mechanism underlying female managers' greater effectiveness in motivating female workers is their performance of subordinate scut work. The concept of subordinate scut work might seem similar to various leadership styles that have already been theorized

in the literature, most notably leading by example. Leading by example is broadly defined as a leadership style where a member of a collective informally motivates other members of the collective to behave in the interest of the common good by role-modeling exemplary behavior (Hermalin 1998, Yaffe and Kark 2011). In contrast, we describe subordinate scut work as a specific practice adopted by managers with formal authority to motivate workers to be more productive. Subordinate scut work entails managers stooping down to the level of their subordinates to participate in their subordinates' routine tasks, which is quite distinct from leading by example where a leader role-models exemplary behavior by doing their own designated tasks (rather than unglamorous, lower-status tasks of their subordinates) well or efficiently.¹¹ Appendix F further distinguishes the managerial practice of subordinate scut work from a variety of other similar leadership styles beyond leading by example.

Our experiment provides causal evidence that one key mechanism, not necessarily the only mechanism, through which female supervisors achieve greater worker productivity is their performance of subordinate scut work. In this way, our paper rules in subordinate scut work as an important factor that drives female managers' effectiveness. That being said, there could be other factors that additionally contribute to female supervisors being more effective than their male counterparts in our setting. First, gender-based homophily could contribute to female supervisors' effectiveness. Prior studies suggest that when there is manager-subordinate gender homophily, worker performance improves (McPherson et al. 2001, Castilla 2011). Future research should investigate the effect of male and female managers on both male and female worker populations to more fully develop the effects of gender-based homophily. Second, communication styles could also contribute to female supervisors' effectiveness. Some research has theorized about the impact of gender differences in communication styles on outcomes such as influenceability (e.g., Eagly and Carli 1981). Although our qualitative data are suggestive of differences in communication styles between male and female supervisors, future research should pay closer attention to different dimensions of communication style such as responsiveness to questions and the length of interactive sequences to fully unpack this mechanism and its effects on productivity.

Contributions to Literature on Motivating Worker Productivity

Our study makes two contributions to the literature on worker productivity by focusing on the role of gender. First, although the literature on the determinants of worker productivity in industrial settings

is vast (Barley and Kunda 1992), very few scholars have focused on the role of manager gender, perhaps because of a lack of female managers in their settings. We find that male and female managers are differentially effective at motivating productivity, suggesting that going forward the literature should pay attention to the gender composition of managers in understanding productivity.

Second, although existing studies on productivity have focused predominantly on studying male-dominated and gender-balanced workplaces in the West (Acker 1990, Budhwar and Debrah 2013; see Bernstein 2012 for an exception), in this study, we focus on a female-dominated workplace in a developing economy, a setting that is under-represented in management research despite employing a sizeable portion of the global labor force. By studying a garment factory in India, we uncover a managerial practice, subordinate scut work, that improves productivity of female workers in the Global South yet is general enough to inform our theoretical understanding of managerial tactics to motivate workers. In fact, we have come across anecdotal accounts of managers doing subordinate scut work in a variety of settings including at airlines and hospitals and among firefighters and engineers, and we hope that more systematically studying subordinate scut work across diverse contexts will shed light on the range and extent of subordinates' tasks that managers need to participate in for this practice to be effective (Weick 1996, Gittell 2003, Bersade and Meisiek 2004, Leonardi and Bailey 2008).

Our findings also speak to the literature on the role of management practices in explaining variation in firm productivity in developing countries. This literature has highlighted that formal management practices within firms, whereby managers are actively setting incentives and providing feedback, are causally linked to improved firm performance (Bloom et al. 2012, 2013; Chatterji et al. 2019). We show that even within a firm, differences in management practices can explain variation in worker productivity. More broadly, our paper supports the literature's conclusion that there is room to improve management skills in ways that directly impact productivity in developing countries.

Contributions to Women in Management Literature

This paper also makes two contributions to the literature on women in management. First, although this literature has predominantly focused on white-collar settings where subjective measures of managerial effectiveness are relevant (Eagly et al. 1995, Eagly 2013), we investigate gender and managerial effectiveness using objective measures of worker productivity. Existing gender research would lead us to believe that male and female managers might not

vary in their effectiveness. However, our study investigates objective effectiveness in a female-dominated garment factory, finding that female managers are more effective than their male counterparts in motivating female worker productivity. In this way, we highlight how different conclusions might be drawn about male versus female managers depending on how their effectiveness is measured.

Second, in response to recent work critiquing the concept of leadership styles as being multidimensional and ill defined (van Knippenberg and Sitkin 2013), we build on the professions literature to theorize about a specific managerial practice, namely *subordinate scut work*, which could be considered a key element of some leadership styles. We also clarify the pathway through which this managerial practice operates, highlighting how subordinate scut work increases workers' engagement with their work. Although the specific interplay between manager gender and subordinate scut work in motivating worker productivity is likely to be context specific, more broadly, we posit that subordinate scut work is a novel managerial practice that has the potential to increase worker productivity.

Our findings also speak to scholarship on devaluation of women in management (Baron and Newman 1990, Fletcher 2001, Guarino and Borden 2017). Subordinate scut work requires effort and hard work, but data from our field site suggest that, although female supervisors motivate greater worker productivity than male supervisors through subordinate scut work, they earn 15% less than their male counterparts. This finding mirrors conclusions from recent work suggesting that although female managers may work harder, their extra effort is often not priced into their wages, such that the value they create is captured, not by them, but primarily by their employers.

Generalizability and Future Research

We suggest female-dominated workplaces, such as those found in garment manufacturing, as a scope condition for our specific findings. In gender-balanced or male-dominated workplaces, we are less confident that female managers will outperform their male counterparts. We hope that future research will extend our study to workplaces with diverse gender compositions to advance our understanding of the interplay between manager gender and subordinate scut work in motivating worker productivity. We also urge future research to investigate the impact of scut work on the unique population of male workers in female-dominated workplaces.

We document that in our female-dominated work setting, female supervisors are more likely to adopt the managerial practice of subordinate scut work, and that this practice helps them motivate greater worker productivity. Based on our ethnographic observation, we suggest that one reason for female supervisors' adoption

of subordinate scut work might be that the stitching-related tasks of the workers in our setting were female typed. In theory, both male and female supervisors might have had the ability to enhance subordinates' productivity by performing gender-appropriate scut work, although in practice, male supervisors might have had little opportunity to perform subordinate scut work because, in our garment factory, few routine tasks were male-typed. We hope that future research will systematically test this prediction, perhaps using our experimental setup with a different treatment condition where supervisors are forced to participate in female-typed and male-typed tasks of their subordinates.

Implications for Method and Practice

This paper makes use of a laboratory-in-the-field experiment, a novel method that is rarely seen in management research. We believe that a laboratory-in-the-field experiment offers two key advantages over laboratory experiments (Gneezy and Imas 2016). Although laboratory experiments abstract from naturalistic settings and use a university laboratory environment to maintain tight control and eliminate confounds, a laboratory-in-the-field experiment retains the advantages offered by the university laboratory without sacrificing the naturalistic setting. Additionally, although laboratory experiments use student populations, laboratory-in-the-field experiments use relevant populations from the field, thus making the findings more believable. That being said, even laboratories in the field can never fully reproduce the diversity present in the field itself. For example, in our paper, although workers perform diverse tasks on the shop floor, our laboratory-in-the-field experiment relies on a uniform button sorting task, familiar to all workers.

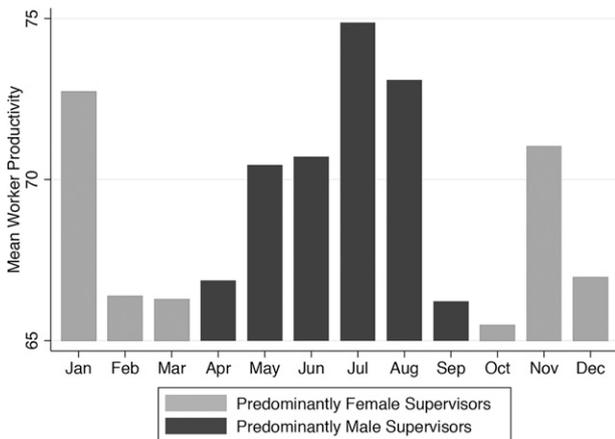
Our findings offer clear implications for organizations. First, organizations should consider the possibility that female managers might be more effective than male managers at managing worker performance, even in settings that have a disproportionate representation of men in management (Blum et al. 1994, Maume 1999). Second, organizations should embrace practices such as subordinate scut work that female managers are adopting to motivate greater worker productivity because these practices may be effective (Bersade and Meisiek 2004). Finally, organizations should consider using objective performance data, when appropriate, in compensating male and female managers to overcome gender bias (Baron and Newman 1990, Castilla and Benard 2010).

In sum, what is clear from our research is that manager gender influences worker productivity and that subordinate scut work is a managerial practice that could be used differentially by male and female managers to motivate workers. These findings offer novel theoretical insights and hold practical relevance.

Acknowledgments

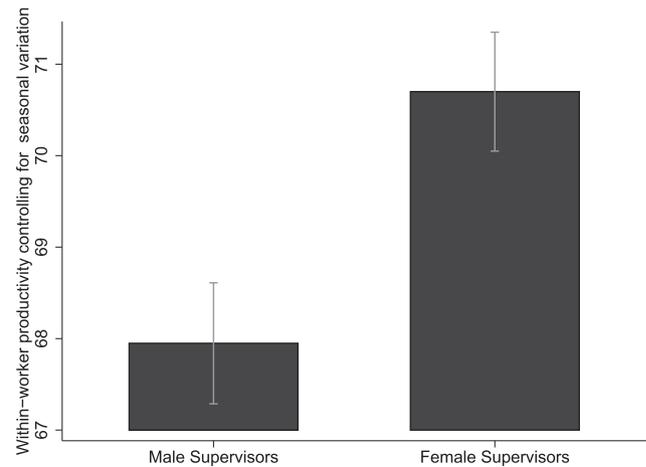
The authors thank Susan Silbey, Shelley Correll, Sameer Srivastava, Eliot Sherman, Michele Rogan, Huggy Rao, Jesper Sorensen, Kathy Phillips, Adina Sterling, J. P. Ferguson, Kate Kellogg, Ezra Zuckerman, Roberto Fernandez, Abhishek Nagaraj, Erin Reid, Carrie Oelberger, Julia DiBenigno, Mabel Abraham, and Laura Doering for generous feedback; seminar participants at Stanford Graduate School of Business (GSB), Massachusetts Institute of Technology (MIT) Sloan, Berkeley Haas, Wharton, Michigan Ross, Harvard Kennedy, Emlyon, Field Experiments conference, Junior Organizational Theory conference, Nagymaros conference, Economic Sociology conference and the American Sociological Association, Academy of Management, European Group for Organizational Studies, and Labor and Employment Relations Association annual meetings for valuable comments; Greta Hsu, an anonymous associate editor, and three anonymous reviewers for significantly improving the paper; MIT’s Tata Center for Technology and Design for support; Ishwarya Thyagarajan for assistance with fieldwork and experiment implementation; the Stanford GSB Behavioral Laboratory for research support; the field site for providing access and data; and the numerous informants and interviewees who made this study possible. The views and conclusions contained herein are those of the authors alone.

Appendix A. Mean Worker Productivity by Month of Year



Notes. Bars are color coded light gray if the likelihood of female supervisors being assigned to the line is greater than 50%. Bars are color coded dark gray if the likelihood of male supervisors being assigned to the line is greater than 50%. This figure depicts that male and female supervisors were differentially assigned to the observed garment line by season. We plot mean monthly worker productivity in each of the 12 months of the year and color code which months male and female supervisors were more likely to be assigned to the line. The figure shows that (a) male supervisors were more likely to be assigned to the line in the summer months of April through September and (b) that mean monthly productivity is generally higher in the months that male supervisors had control of the line. The correlation between mean monthly productivity and the likelihood of female supervisors being in charge is -0.2 . Therefore, expected worker productivity is higher under male supervisors compared with female supervisors, which warrants controlling for seasons in our analysis comparing the productivity of workers under male versus female supervisors.

Appendix B. Mean Within-Worker Productivity by Supervisor Gender



Note. 95% confidence interval bars are drawn around the mean.

Appendix C. Logistics of Experiment Institutional Review Board Approval

The study was approved by the institutional review board of our research institution. Subjects signed up voluntarily to participate in the experiment. The voluntary signup ensured that there was no pressure to participate and the workers who were eventually randomly picked to participate in the experiment were indeed available and interested in the game. When subjects arrived for the experiment, informed consent was obtained orally before the experiment commenced.

Factory Approval and Sponsorship

We received permission from factory management to independently design and run such an experiment; note that the experiment was not financially sponsored by the factory. As such, flyers used at the signup stage clearly stated that the game would be conducted by researchers from a university and was neither sponsored by nor connected to the factory management in any way.

Compensation for Experiment Participants

The workers who participated in the experiment were each paid a flat rate of 150 rupees, in line with the hourly overtime rate for the workers in the factory. The supervisors who participated in the experiment were compensated based on the total number of correctly sorted buttons in their session to incentivize them to elicit better productivity from their workers. Each supervisor received a baseline compensation of 200 rupees and an additional 100 rupees for every 1,000 buttons correctly sorted by their workers.

Appendix D. Comparing Male and Female Supervisors in the Garment Factory

	Female	Male	Difference	<i>p</i> -Value of difference
Age (in years)	31.74 (5.075)	29.21 (4.250)	2.526	0.105
Fraction with high school education	0.895 (0.315)	0.895 (0.315)	0.000	1.000
Skill rating (1–4; 4: highest skill)	3.211 (0.535)	3.158 (0.501)	0.053	0.756
Fraction married	0.842 (0.375)	0.632 (0.496)	0.211	0.148
Fraction from Karnataka state	0.789 (0.419)	0.842 (0.375)	–0.053	0.686
Fraction who have been worker in same factory	0.684 (0.478)	0.421 (0.507)	0.263	0.108
Observations	19	19		

Source. Survey conducted in October–November 2015 for sample of 38 supervisors in experiment; 100% response rate for both female and male supervisors.

Note. Mean coefficients; standard deviation in parentheses.

Appendix E. Ruling Out Alternative Explanation: Supervisors' Elimination of Bottlenecks
OLS Regression of Effect of Supervisor Gender and Experimental Treatment on Supervisors' Attempts to Resolve Bottlenecks (Number of Suggestions Offered)

	Supervisor suggestions
<i>Female Supervisor</i>	0.589 (0.515)
<i>Treatment Session</i>	0.788 (0.548)
<i>Female Supervisor</i> × <i>Treatment Session</i>	–0.176 (0.873)
Constant	–0.295 (0.335)
Phase fixed effects	Yes
Observations	169
R^2	0.149

Notes. Experiment was conducted in three phases. Observations are at the individual worker level. We have data for 169 workers rather than the full sample of 189 workers who participated in the experiment because we were unable to video record four experimental sessions. Standard errors clustered by supervisor are in parentheses. Example of statements coded as supervisor suggestions: “You should use all the boxes. Take take, take the boxes. You have to put [buttons] in all the boxes. All the colors are there.” OLS, ordinary least squares.

Appendix F. Differentiating Subordinate Scut Work from Various Related Leadership Styles

Leadership style	References	Definition	Differentiating subordinate scut work (SSW)
Leading by example	Hermalin 1998, Yaffe and Kark 2011, Drouvelis and Nosenzo 2013	When leaders informally motivate others to act in the interest of the common good by role-modeling exemplary behavior	SSW is about managers with formal authority motivating their subordinates to be more productive by performing their subordinates' routine, low-status tasks rather than setting an example by doing their own designated tasks well
Participative/ democratic leadership	Yukl 1989, Eagly and Johnson 1990	When leaders encourage employee participation in decision making	SSW is about managers performing employee's tasks rather than leaders encouraging bottom-up employee voice
Self-sacrificial leadership	Choi and Mai-Dalton 1999	When leaders abandon personal interests, privileges, or welfare in the division of labor, distribution of rewards, and exercise of power	SSW is about a particular sacrificial action of managers rather than broad sacrifices such as giving up personal comfort, money, and safety
Authentic leadership	Luthans and Avolio 2003	When leaders display high self-awareness, transparency, honesty, and integrity	SSW is about one specific practice adopted by managers rather than traits displayed by an authentic leader
Ethical leadership	Trevino and Brown 2005	When leaders display high moral standards	SSW is about one specific practice adopted by managers rather than moral standards held by leaders
Charismatic leadership	Conger and Kanungo 1987, Shamir et al. 1993	When leaders are extraordinarily capable of inspiring employees	SSW is about one specific practice adopted by managers rather than traits or behaviors associated with charisma
Transformational leadership	Bass 1990, Eagly and Johannesen-Schmidt 2001, Eagly et al. 2003	When leaders focus on idealized influence, inspirational motivation, intellectual stimulation, and individualized consideration	SSW is about one specific practice adopted by managers rather than the several elements associated with transformational leadership
Self-leadership	Manz and Sims 1980	When employees display exemplary behavior on their own accord (in the absence of external influences)	SSW is about one managerial action that influences worker behavior, not about workers self-managing themselves

Endnotes

¹ Any quotations in this section that are not attributed to specific informants are from our fieldnotes.

² It is important to note that even if supervisors chose to stitch garments in the production lines, their own production was not included in the calculation of individual worker productivity because supervisors signed in to workstations by scanning their own identification cards before they started stitching. Therefore, even though female supervisors' performance of subordinate scut work could directly raise productivity of the line, we are interested in the indirect effects of this practice on their subordinates' individual productivity.

³ Our results are robust to keeping this small set of male workers in the sample.

⁴ For example, the SMV for the zip attach operation is 0.52 minutes and the SMV for the more complex waistband attach operation is 1.29 minutes. Thus, a worker attaching 1.5 zips per minute and a worker attaching 0.6 waistbands per minute would have roughly the same productivity of 78% (of their SMVs) because the worker productivity measure accounts for the varied complexity of operations.

⁵ Note that, although only three of the seven supervisors were female, an average worker was supervised by a female supervisor for about 50% of her time because different supervisors managed this garment line for different spells of time. An interview with the head of the factory suggests that this was "just by chance."

⁶ Ryan and Haslam (2007) allude to the possibility that women could be assigned to leadership roles during times of lower productivity.

⁷ $(1.5/69.3) \times 100$.

⁸ Our sample size was guided by power calculations using the *sampsi* function in Stata. We used the mean and standard deviation of our productivity measure from the personnel data and determined that the treatment and control groups each needed to have a sample of 63 workers to detect a 10% effect, at $\alpha = 0.05$ and power = 0.8. We used best practice to perform these power calculations, following Cohen (1988), Duflo et al (2007), and guidelines from JPAL and the World Bank.

⁹ Before carrying out the experiment, we conducted a pilot study at another factory owned by the same firm to finalize the research design without contaminating our research setting.

¹⁰It is also worth noting that worker productivity seems to improve slightly in male treatment sessions compared with male control sessions. Although this difference is not statistically significant and our main focus in the experiment is to understand how female supervisors' (rather than male supervisors') effectiveness changes, we speculate that this might arise from male managers feeling legitimated about their typical approach to management in the treatment sessions.

¹¹Despite the differences, our study offers two important contributions to prior research on leading by example. First, we look at how subordinate scut work affects worker productivity, thus responding to the critique that "leaders' ability to influence group behavior through exemplary behavior has received little attention in empirical work" (Yaffe and Kark 2011, p. 1). Additionally, unlike previous studies, we investigate the interaction between manager gender and exemplary leader behaviors, finding that subordinate scut work is a practice that is used by female managers to motivate greater worker productivity in female-dominated contexts. This extends the finding in Drouvelis and Nosenzo (2013) that leading by example is especially effective when the leader and follower share a common identity.

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