Identity, Networks andIncentives in the Workplace: A Quasi Field Experiment in India's Manufacturing Sector

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Abstract

Production processesare often organised in teams, yet there is limited evidence on whether and how social and financial incentives affect labor productivity in a coordination task. We run laboratory experiments in the field to investigate the effect of caste based social networkson individual and group productivity in India' s manufacturing industry. Our findings suggest that when financial incentives are made contingent on group output workers are able to coordinate on higher effort levels if they share the same social identity. In addition, workers are more likely to respond to high powered incentives, such as a group based bonus framed as a gain, when they work within their social network, as opposed to bonus framed as a loss.Overall, our results underline the importance of social affinity with co-workers in determining productivity in the work place.

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1. Introduction

It is well acknowledged that labor productivity in developing countries is low compared to the developed world (Bloom et al., 2010).Historically research has highlighted the role of labor regulations, human capital and industrial policies in explaining poor productivity at the macro level, but more recent research has focused on firm level data to understand the factors affecting labor performance.[1]However, production processeswithin firms often consist of workers organisedinto teams, yet there is limited evidence on whether and how team composition and the design of financial incentives affect labor productivity. In this paper we attempt to understand the organisation of workers within firms to investigate the effect of group based identity on individual and group productivity. Specifically, we investigate if and how a worker's performance is affected when she is matched with co-workers with similar social identity using a lab-in-the field experiment withworkers in the manufacturing sector. Further, we ask whether group composition interacts with the framing of financial incentives to impact group output. Unlike the existing literature that has focused on peer effects on individual output,we focus on individuals' social networks with no spillover of performance information in a controlled experiment.This allows us to identify the effect of social affinity on individual and group output in an incentivized coordination task.

We focus on social networks based on the caste system in India - one of the fastest emerging economies in the worldbut beset with concerns of slow growthand low labor productivity (World Bank 2013; Economic Survey of India 2012-13). Caste categorisation is a unique feature of Indian society and an identity enforced by birth. The caste system was introduced thousands of years ago, rigidly classifying individuals based on their occupation, but it continues to socially stratify Indians even today into four hierarchical categories (*varnas*)each

[1]Social – networks (Bandiera et al., 2009); management practices (Bloom et al., 2010); worker ethnicity (Hjort, 2014).

of which is furthersub-divided into *jatis,* having a common origin through similar traditional occupations, language, and social practices.[2] The caste system is endogamous and inter-caste marriages are virtually non-existent even today.

Anthropological studies (e.g. Holmstrom 1984) suggest that a large fraction of low skilled workers in the urban areas indeveloping countries are rural migrants. For example, survey data from garment manufacturing units located around India's capitalindicate that more than 80 percent of the workforce consists of migrants from neighboring states.[3]Since the initiation of economic reforms in 1978 in China, waves of labor has migrated from rural to urban areas (Ravallion and Chen, 2007)– the largest in world history. Migration often results in ethnic heterogeneity of the work force in urban workplaces. Chandavakar (1994) notes that historically migration to industrial hubs occurred within the framework of caste, kinship and village connections in India. Migrants to the city lived with their co-villagers, caste-fellows and relatives and sought work with their assistance(Gokhale, 1957; Cholia, 1941; Burnett-Hurst, 1925). Caste and kinship appreared to form indivisible social networks in the city's working-class neighbourhoods. Munshi (2014) highlights the critical role of caste based social networks in the functioning of labor markets and in ensuring migrants' economic mobility in low income countries in the modern age as well. Migrants tend to find employment through referrals from their caste-based networks and hence often locate within the same work and residential units post migration. It is important to underline that these historical and economic factors suggest that formation of group identities and the feeling of homophily is salient in the Indian context. But surprisingly the effect of group identities within the factory has not been given much emphasis in the economic analysis of labor productivity in developing countries.

[2] At the top of the social hierarchy are *Brahmins* (the priestly caste), followed by the *Kshatriyas* (the warrior caste), *Vaishyas* (the trading caste) and finally*Shudras* (the service caste such as farmers, and craftsmen) in the *varna* system of social categorization.

[3]30% of the Indian population has migrated from another part of the country at some point, of which almost 15% migrate for employment purposes (Census, 2011).

Our study tries to address this lacuna by looking at the effects of homogeneous group identity on individual as well team level output in a coordination task.Social networks can be particularly relevant when workers are organised in groups, such as an assembly line, and when firms are concerned with group rather than individual output. In such a setting, if some workers put in low effort it can lead to the entire team being trapped in a low equilibrium effort level, either due to implicit norms or free riding issues, even when incentives are given at the individual level. In addition, due to inherent free riding issues, when individual incentives are not based on performance and only team output is measured, it is likely that workers underperform. Research has demonstrated that shared identities can affect social interactions. We extend this strand of literature to the workplace. Munshi (2014) notes that members of social networks may respond to the threat of social sanctions by sacrificing individual gains in favour of group objectives. In addition, individuals may have shared expectations of effort norms and cooperative behavior when they are matched with workers with similar social identities.

Our study is the first to combine the social composition of worker groups with incentive framing using caste identities, and also attempt a refinement over existing laboratory studies in three ways. First, we randomly assign subjects using real, existing social identities in the field, to a group of individuals who share their social identity with the subject or a group with separate social identities. Second, we study both genders separately because males tend to have siginificantly different characteristics as compared to women especially in blue collar jobs, where in general, women have lesser exposure and education, but can form a large proportionof the workforce, e.g. garment manufacturing. Third, in our experiemtnal design we eliminate peer effects and study the pure effect of making social identity salient on individual and group productivity.In our controlled experiment we also build on the

behavioral economics literature on framing of financial incentives.[4]A worthwhile question to ask then iswhether closely-connected workers in a team are more likely to respond to the framing of group-based financial incentives when they areset up as rewards or as punishment.

Our preliminary results suggest that men respond positively to being in-group through better within group co-ordination which leads to higher group output. Also, in-group males respond positively to bonus vis-à-vis loss framing. Our findings therefore suggest that making social networks salient can enhance coordination when incentives are group based. They also indicate that high powered incentives framed as a 'bonus' can improve team performance through higher individual effort for within-group workers. Since we eliminated peer effects and did not allow for any communication within group members in our experiment design, the estimates we obtain here are probably a lower bound on the impact of social networks on individual and group productivity.

Interestingly, women's effort is high across all groups relative to men's but women show no overall response to being in a homogeneous group. This is a surprising result which also hides heterogeneous response by caste category. Low caste females show a strong, positive response in terms of effort and coordination when they are in a group with subjects who have a similar social identity as them. This suggests the salience of identity is strong amongst the most marginalised and disadvantaged communities. However, there is heterogeneity in the response to identity salience of Other Backward Castes (OBCs) and high castes. While M females' coordination is significantly worse in the treatment group there is an insignificant effect on H females when social identity is common in a group.

[4]Loss aversion (Kahneman and Tversky, 1979) refers to economic agents' preferences for avoiding losses over acquiring the equivalent amount of gains. Loss framing has been shown to be effective in influencing product demand (Ganzach and Karsahi 1995; Bertrand et al. 2010), increasing workers' productivity in factories in China (Hossain and List 2012), and improving teacher performance (Fryer, Levitt, List, and Sadoff 2012). However, Levitt, List, Neckermann and Sadoff (forthcoming) find that in a field experiment on educational performance, students' effort did not increase when rewards were framed as losses.

The remainder of the paper is organised as follows. Section 2 discusses the context of the study while section 3 describes the experiment design. The data and methodology are presented in section 4. Section 5 discusses the results and section 6 concludes.

2. Literature Review

Existing literature indicates that if team identity can be made salient, workers and thereby firms can be more productive. Using identity to explain behaviour of economic agents rose to prominence with the seminal work by Akerlof and Kranton(2000 and 2005) who argue that "identity" or the sense of self based on belonging to particular groups can affect worker incentives. The foundation of this idea comes from social identity theory that suggests if members are heterogeneous with respect to social categories, they may find it difficult to integrate their diverse backgrounds, values, and norms and work together (Jehn et al., 1999). Further they note, "the discomfort or apprehension that individuals experience when interacting with members of a different social category is a natural consequence of social identification processes". In general, people feel more comfortable working with and are more likely to trust and cooperate with those whom they identify with, and they are more likely to identify with members of their own characteristic group (Eckel and Grossman, 2005). On the other hand, it is possible that workers collude on low effort or that punishing defection from cooperative behavior is more difficult when the worker belongs to the same social network.

Laboratory experiments on team identity conclude that manipulating saliency of group membership contributes to higher level of team cooperation (Eckel and Grossman, 2005; Charness, Rigotti and Rustichini, 2006; Goette, Huffman and Meier, 2006; Chen and Li, 2009; Chen and Chen, 2011). However, empirically, field experiments have been mostly on social networks rather than identity. In the setting of social networks, they give mixed

results. Bandiera et al.(2010) study a UK based soft fruit producing firm and find that having a more able friend as a co-worker increases worker productivity of lower ability workers by 10% but decreases productivity of higher ability workers.Overall, in the presence of heterogenous ability types and substitutability in production, social networks may not imporve team productivity. In another study (Bandiera et al., 2009) find that when the manager or workers' incentives are not aligned with the firm's, they may misallocate effort towards lower ability, but more connected workers. They test for this by varying manager's incentives from fixed wage to performance related pay with a bonus related to the average worker productivity in their line. When managers have incentives to increase worker productivity they switch from helping socially connected workers to helping high ability workers irrespective of social connections. Overall, social networks are detrimental to the productivity of the firm.

These studies look at individual performance and social connections when workers are substitutes in productionand there are no externalities between workers. However, a large fraction of low skilled factory work is in assembly lines. Thus it is important to examine social networks in these different production settings. In an assembly line producton is a situation where workers' efforts are complementary and there are externalities in workers' efforts. In this setting, the literature on group based productivity and social identity is scarce and virtually non-existent.Our study comes closest to Hjort (2014)who examines the ethnic homogeneity of production teams in a flower assembly plant in Kenya and findsthat interethnic rivalries in Kenya lowered allocative efficiency in the private sector, particularly during a period of ethnic conflict. Shifting from fixed pay to performance pay based on group output reduced allocative inefficiencies in multi-ethnic teams.In this particular context the production process was sequential – "suppliers" prepared flowers which were then passed on to "processors" who put the flowers together in bunches, suppliers and processors could have

similar or different ethnic identities. Our paper adds to the growing literature on the effects of ethnic diversity on labor productivity in developing countries in two ways: first, we show that even in the absence of ethnic conflicts, social divisions can be salient and have a significant effect on work effort. Second, or findings suggest that having a more homogeneous group of co-workers enhances productivity even when individual payoffs are contingent on group output. In our controlled experiment when the production process is simultaneous and workers have no knowledge of the effort of co-workers in the group, our results indicate that ethnic diversity can lower group output. Third, we extend this literature by studying whether there exist any interactions between social and financial incentives.

The issue of coordination in groups of employees with different backgrounds, however has been captured by strategic games with multiple equilibria in the economics literature. Among these games, the minimum-effort (or "weak-link") coordination game with multiple Pareto-ranked equilibrium effort levels, which was first introduced by Van Huyck, Battalio and Beil (1990), has been widely used in the laboratory to address the coordination problems faced by organizations (e.g., Brandts and Cooper, 2006; Weber, 2006).In addition to presenting the coordination failure problem in this framework, much of the literature has also focused on how to overcome such failure and improve coordination and efficiency through altering the cost or payoff structures of the game (Brandts, Cooper and Fatas 2007b; Goeree and Holt 2005; Devetag and Ortmann 2007; Van Huyck et al. 2007), or by introducing communication (Blume and Ortmann 2007; Brandts and Cooper 2007a;Kriss, Blume and Weber 2016) or group identity (Chen and Chen 2011).This literature has, however, not tackled the question of how group identity can affect coordination.

Hossain and List (2009) find that the manner in which financial incentives are framed can affect worker productivity. Bonus incentives increase labour productivity when productivity bonuses are framed as either reward or punishment for both groups of workers

and individual workers. But the punishment frame (withdrawing bonus if productivity is lower than threshold) outperforms the bonus frame (announcing reward of bonus if productivity crosses a threshold) in both individual and group treatments (Tversky and Kahneman 1981, 1991; Bateman et al. 1997). In field experiments, however, the evidence on the impact of loss framing is mixed. If team-based monetary incentives interact positively with group identity it suggests that not only do workers increase coordination in response to group identity, but that they coordinate on a higher level of effort. Diversity in the group composition could be worse for team productivity. If the interaction is negative, it could be that the coordination improves but workers coordinate on a lower effort level. In this case, diversity in teams is better for group output.

2. Context and background

India is among the fastest growing economies in the world today but also among the poorest in per capita terms. Concerns about jobless growth abound due to the slow growth of the manufacturing sectorand as the employment potential of agriculture recedes with economic development. The Indian manufacturing sector's contribution to GDP is lower than even that of Pakistan and Bangladesh (World Bank,2013). Interestingly, the economic survey of India (2012-13) indicates that this is due to low worker productivity. Thus there is an urgent need for policy measures to enhance worker productivity. The first step towards any effective policy would be to understand the determinants of labor productivity.

The sociological aspects of labor have long been neglected in the economics literature. In particular, the distinct feature of Indian society is the existence of caste system which enforces caste as the main social identity on an individual by birth. It can be very strong and persistent so much so that individuals belonging to different caste groups may discriminate against each other while identifying strongly with individuals belonging to their

own caste. This could potentially have a significant bearing on interactions between laborers and their incentives in group based production processes.

Our experiments recruited garment factory workers as subjects but it is equally applicable to any production process which is organised in teams. Garment production entails the strongest type of complementary that can exist in team work and performance of the weakest link determines overall firm's productivity.In a typical garment factory production is organized into lines (i.e. an assembly line is like a team). Often these lines have 50-70 workers who can be classified into operators, those who sit on sewing machines and are responsible for stitching. Each worker is allotted a machine and is responsible for performing at least one operation. Multiple workers can perform similar operations on different pieces of a garment i.e. at a point of time workers are not working on the same piece of garment.With each operation, a part of the garment is made. Pieces of the garment are then assembled to produce the entire garment.

In our work in garment factories, we find that workers, including their supervisors, receive fixed wages based on their daily attendance at work. Each worker gets a target number of pieces per hour which depends on operation-style a worker is performing. Given high demand of workers due to complementarities in the production process and requirement of low, soft skills in garment factory hubs it is not difficult for workers to find a new job and thus everyone in a group is likely to underperform, even though, theoretically, there is a threat of being fired. Also, since a fixed wage system doesn't reward high individual effort workers have no incentive to be more productive than a minimum level which ensures continuation on the firm's rolls.

Using data on productivity from garment factories in the National Capital Region (Delhi) gathered by us andtaking advantage of idiosyncratic variation in the daily caste composition of assembly lines due to worker absenteeism, we find that having a higher

proportion of co-workers from the worker's own caste group in the assembly line on a work day significantly increases individual worker's labor productivity on that day.[5] This suggests that organising production such that workers are grouped on co-ethnic lines can have a significant impact on productivity. However, in this real world setting we are not able to separate out the pure effects of castebased social networks from peer effects in the factory data. We, therefore, design a controlled, lab-in-the field experiment which is described in detail next.

3. Experimental design

Since our research question is how team productivity is influenced by the workers' social environment and incentives, we design a lab-in-the-field experiment (Morton and Williams 2010, p. 296) using a 2x3 factorial between-subject design.[6] Each session consisted of a work team of 4 subjects of the *same* gender. We separate the session by genderto account for any differences in behavioural response to external stimuli and incentives by men and women, extensively documented in the laboratory experiments literature (Croson and Gneezy 2008; Gneezy et al. 2003; Rustichini 2003). In about half of the sessions, the team had the same caste based network (hereafter the Homogeneous treatment), and in the other sessions they belonged to different caste based networks (hereafter the Heterogeneous treatment). In addition, we used three different incentive schemes or framing – Piece Rate, Bonus with the Gains Framing, and Bonus with the Loss Framing. The experimental design is outlined in Table 1.

3.1. Subjects and recruiting

[5]Table A1 in the Appendix provides details on these results.
[6]Also referred to as framed field experiment (Harrison and List, 2004) or extra-laboratory experiment in the field (Charness, Gneezy and Kuhn 2013).

The subjects of our experiment were garment factory workerswith a minimum level of primary educationin the National Capital Region's garment factory hub. The experiment was conducted between May and July 2016. Recruiting pamphlets were distributed among the workers during our visitsto their factories and residential clusters (see Figure A1 in Appendix). The advertisement mentioned Rs.200 as participation fee which was about the daily wage of garment factory workersin our sample. Workers registered over phone,and the information on their residential address, native state, caste and gender were collected.

Indians, mostly Hindus,are categorised into 4 administrative groups– Scheduled Caste and Scheduled Tribe (L type) are the historically marginalised communities which belong to the most oppressed social category – *dalits* and tribals – excluded from the caste system. The other backward castes (M type) consist of sub-castes or *jatis* that are socially and economically disadvantaged (e.g. *shudra jati)*. Both the L and M type typically have public sector jobs and political positions reserved for them under India's affirmative action policies. The unreserved *jatis* belong to the high castes(H type). In our experiment, we classified each subject according to their *jati* into the L, M or H type using the official categorization by his/her native state.[7]

The historical literature, as discussed previously, and our own visits to residential clusters during the studyindicated that people with similar socio-economic background(like sub-caste, native state and occupation) tended to reside in the same neighbourhood. Hence the probability of workers having a shared caste identity and being socially connected is high if they come from the same residential cluster. A residential cluster, in our context, represented a lane in a particular colony. For instance, in our sample larger residential hubs were slums but these hubs had narrow lanes or *mohallas* where workers with similar socio-

[7]The L type consisted primarily of SCs, with only 2 ST subjects.

economic backgroundstended to reside. For instance, lane no.7 of Kapashera slum forms a residential cluster in our study. We took advantage of these characteristics, specifically the high correlation between the workers' caste identity and their naturally existing social connections, and used their demographic information pre-collected over phone to randomly assign them to experimental sessions subject to the requirements of the treatments. The details will be explained in subsection 3.3.

3.2. Task and Incentives

The experimental task involved subjects independently stringing beads on beading wiresof a specific length in their private workstations partitioned by opaque curtains. Each subject was responsible for one color, and the beaded wires of four colors were to be combined at the end of the experiment to make beaded bracelets. Therefore, by experimental design, the team productivity was to be determined by the *least* productive worker of the team. Neither communication amongst subjects, nor information on productivity of subjects was made publicat any time during the experiment.

The 4 subjects on each team were randomly assignedID numbers from 1 to 4 which further mapped into their private workstations and their allotted bead colors – red, blue, green or silver. Their ID numbers, workstation numbers, and bead colors were kept private to ensure anonymity of their individual performance throughout the experiment. The experiment started with each subject being seated at his/her assigned workstation with a bowl containing beads of a single color and equal size along with a bunch of 20 cm long wires. The bowl was covered so the bead color cannot be seen while the experimental instructions were being delivered. The subjects were told that their task was to string the wire with the beads in privacy such that the wire was fully covered with beads. The beaded strings of the four colors were to be combined to make bracelets by the experimenter at the end of the experiment. In

other words, each bracelet – the team product – consisted of 4 strings of 4 colors, each made by a subject. Thus, the minimum number of strings(of a color)produced would determine the number of bracelets per team and thus the team output (see Figure A2 for a completed bracelet). The subjects were also told that no information on others' productivity was to be given, so no one else on the team would find out how many strings were made by each of the other subjects.

The task mimicked the production process in a garment factory where a garment is produced only after each operation has been performed on it. Each garment factory worker is responsible for a particular operation or part of the garment and all operations run simultaneously in the assembly line. The total output of the line (number of garment pieces produced) is determined after assembling each part of the garment. Hence the minimal effort of a worker in the line determines the total completed garment pieces produced. Note that our subjects were not required to assemble the strings among themselves to make the bracelets to ensure anonymity of individual performance.

Once the task was explained and demonstrated using beads and a wire by the experimenter, information on the payoff functions were given. We used three financial incentives schemes/framing – Piece Rate, Bonus with the Gains Framing, and Bonus with the Loss Framing.All these payoffs were based on the team output – the number of bracelets. Under Piece Rate every subject received Rs.100 per completed bracelet produced by the team. For instance, if 5 red, 6 green, 4 blue and 8 silver strings were produced in a sessionthe team's output would be 4 bracelets and individual payoff would be Rs.400 for each subject.

Under the Bonus schemes, each subject was offered a bonus of Rs.150 above and beyond the Rs.100 piece rate. The framing used was different, however. Under Bonus with the Gains Framing, subjects were told that they could earn a bonus of Rs.150 if the team made 5 or more bracelets, in addition to the base payment of Rs.100 per bracelet. In the

experiment, subjects were shown a coupon of Rs.150.It was announced that if their team made 5 or more bracelets, each team member would receive a coupon ofRs.150 in addition which could be encashed at the time of payment. In contrast, under Bonus with the Loss Framing, subjects were told that the bonus of Rs.150 would be taken away from them if their team output fell below 5 bracelets. For instilling a sense of loss, each subject was given a coupon of Rs.150.It was announced that the coupon was equivalent to an extra Rs.150 over and above the Rs.100 piece rate base payoff.[8]But if their team made less than 5 bracelets the Rs.150 coupon would be taken away so they would lose this extra money and only get paid with Rs.100 for each bracelet.[9]The description of the financial incentives and payoffs is given in Table 2.

Every subject was given a payoff table in his/her workstation depending on the incentive scheme in that session. The experimenter gave specific examples that elucidated how individual payoffs would be calculated. Each subject was then handed over a sheet and a pen to answer several questions, based on their incentive scheme, to ensuretheir understanding of the payoff calculation before proceeding with the experiment.

3.3. Caste composition in work team

To study how the team productivity is influenced by the workers' social environment at work, we manipulate the caste composition of the 4-person team in the sessions. Subjects were randomly assigned into the Homogeneous and the Heterogeneous treatments of the *same* gender sessions. In a session of the Homogeneous treatment, all 4 subjects belonged to the same caste category and currently lived in the same residential cluster. Specifically, they

[8]We chose to provide coupons rather than actual cash to the subjects because in the event that cash was taken away from these poor individuals, a potentially disruptive situation could have arisen in the lab and threatened the safety of the experimenters.
[9]In our pilot experiment using Piece Rate payments, the median performance of a team was 4 bracelets. We, therefore, used 5 bracelets as the threshold for the high power Bonus schemes.

belonged either to the same *jati* in the low caste category (Scheduled Castes (SC) or Scheduled Tribe (ST) – **L** type), the middle caste category of Other Backward Castes (OBC or **M** type), and the high caste (or **H** type) as per the administrative categorization of the states that they originally belonged to. In contrast, a session of a Heterogeneous treatment consisted of subjects belonging to different caste categories (L, M, H) and different residential clusters. We used the following criteria in selecting four subjects for the Heterogeneous sessions – one L, one M and one Htype. The fourth subject could belong to any of the three types.

One crucial part of our design was to make the subjects be aware of the caste composition of their work team. This was done through public announcements of each subject's name and residential address. After ensuring that the task and payoffs had been clearly understood by the subjects, the experimenter announced in public the first and last name and residential addressof each subjectwith the workstation curtains open.[10] Each subject raised his/her hand when the name was called. In India the last name reflects the *jati* (i.e., sub-caste) that an individual belongs to. In the social settings of India's patriarchal society, however, women are typically referred to using a generic last name of '*Devi*' or '*Kumari*' (i.e. lady or girl) and do not have a family name. We had to follow this tradition in making the announcement for the female subjects, but the generic last name would not signify their *jati*. To overcome this issue, the last name of the father or husband was used to signify the female subject's *jati* since in India caste is determined by birth and inter-caste marriages are virtually non-existent even today. Specifically, in all female sessions, after we announced the

[10]In all sessions the experimenter said the following: "Now I will announce your name and your residential address. As I call out your names please raise your hand. If there is any error in the announcement, please tell us."

first and generic last name of the female subject we also mentioned the first and last name of the male whose wife or daughter she was, followed by her residential address.[11]

Notethe caste composition was made salient in both the Homogeneous and the Heterogeneous treatments. Unlike previous studies that focus on the impact of identity salience (e.g., Hoff and Pandey 2006, 2012; Afridi, Li and Ren 2015), the research question of interest in this study is the impact of homogeneous-caste based network compared to a heterogeneous one.

3.4. Procedure

After signing up for the study, subjects were randomly assigned to a session of a treatment. They were given a date and time to visit the experiment site which was in a building in the garment manufacturing hub where most of these subjects worked. After arriving at the site, each subject was randomly assigned an IDnumber from 1 to 4 and was asked to keep it private. TheirID numbers mapped into specific workstations but the workstation numbering was unknown to other subjects except to the one who worked at that workstation.

Once all 4 subjects were seated in their workstations, the experimenter explained the task and incentives by following a pre-specified protocol.[12]After the task was explained, the experimenter announced the subjects' names and addresses.Then curtains were drawn and kept on to separate adjacent workstationsduring the rest of the experiment to avoid any peer effects on effort. Subjects were asked to remove the cover on the bowls containing their allotted color of beads, and practiced the beads stringing task. Once the experimenter had ensured that every subject had understood the task,10 minutes were given for them to string beads in as many wires as they desired. After 10 minutes, beaded wires were collected one by

[1111]In all the female sessions the instructor experimentersaid the following: "NAME, wife/daughter of FIRST NAME, LAST NAME and resident of…."

[12]In each session there was one main instructor and an assistant instructor of different genders. Both instructors were graduate students whose caste category was kept private throughout the experiments.

one by the experimenter in an opaque envelope and kept in front of the workstations on a desk. Note the color of the beads was only known to the subject him/herself and the experimenter. It was never revealed to other subjects in order to protect the privacy of individual performance in the beads stringing task.

Thereafter the subjects wererequested to complete a post-experiment survey on additional information such as age, marriage, religion, employment status, and relationship (if any) with their team members. Once all four subjects completed their questionnaires, the partition curtains were withdrawn. The envelopes with the beaded strings were opened one by one, and the number of complete strings of each color was counted without revealing individuals' performance. The number of bracelets produced by the team was determined. Subjects then received their paymentin cash based on the team output and the incentive in that session and were dismissed.

As shown in Table 1, we conducted 131 independent sessions including 63 Homogeneous sessions (33 for men and 30 for women) and 68 Heterogeneous sessions (34 for men and 34 for women). Among these sessions, 30 used Piece Rate, 51 Bonus and 50 Loss framing. Between-subject design was used, therefore no one participated in more than one session. The experiment lasted about one hour. The average payment was Rs.587.5 (including the Rs.200 participation fee) which was more than 2 days of daily wageof the subjects.

3.5. Hypotheses

The experimental design allows us to test the following hypotheses:

Hypothesis 1 (Social Incentives): Workers and their team perform more productivelyin the Homogeneous treatment than the Heterogeneous one.

Hypothesis 2 (Financial Incentives):

2a. Workers and their team work more productively under the Bonus schemes compared to under Piece Rate, conditional on the composition of the team.

2b. Workers and their team work more productively under Bonus with the Loss Framing compared to Bonus with the Gains Framing, conditional on the composition of the team.

Hypothesis 3 (Interactions between Social and Financial Incentives):

3a. If the social and financial incentives are complements, the Bonus schemes will have a greater effect on the workers' and the teams' performance in the Homogeneous treatment, relative to that in the Heterogeneous treatment.

3b. If the social and financial are substitutes, the Bonus schemes will have a greater impact on the workers' and the teams' performance in the Heterogeneous treatment, relative to that in the Homogeneous treatment.

4. Data and Methodology

4.1 Data

Table 3 summarises the characteristics of the subjects, overall and by group statususing information from the post-experiment survey. Column 1 shows that our subjects were 29.13 years old, almost 49 percent were women, and 93.5 percent were Hindu.[13]Nearly 20 percent

[13]Although the caste system is a feature of Hindu religion, social identities are strong even amongst non-Hindus in India. A large number of Muslims in modern India are former SCs and STs who converted to Islam. Besides the fact that their caste identities often continue to be strong, they face religion based marginalization. Hindu-nationalist rhetoric categorizes Muslims and Christians as

of the subjects had completed high school or more. Almost the entire sample consisted of migrants from other states of which 2/3rd had migrated from the north-eastern state of Bihar. Uttar Pradesh was the other state from which a large number of subjects had migrated. We were successful in mostly recruiting subjects who were currently working(94.4 percent), 98 percent of whom were currently employed in garment factories. Columns 2 and 3 compare the average characteristics of subjectsacrosstreatment and control groups. Not only are the subjects comparable on almost all observable characteristics (except having done a similartask previously), there is significant difference in the number of other subjects known in a session and *jati* dispersion between homogeneous and heterogeneous groups. The two groups differ significantly in terms of a participant knowing others in the team and caste group dispersion. A subject in a treatment group knew 0.67 more co-members in her group by name than in the control group sessions.To elaborate, a subject in a homogeneous treatment group, on average, knew almost 2 co-group members by name (of the 3), as opposed 0.31 group members known in heterogeneous group sessions. The post-survey questionnaire asked about the subject's relationship with the group members they knew by name.[14]85 per cent of the known group members in the homogeneous treatment sessions were either neighbors or friends or both of the subject. Furthermore, thenumber of *jati*s in the heterogeneoussessions is at least 3 and approximately 1 in conformity with the criterion for the homogeneous groupformation.Caste dispersion is also depicted graphically in FiguresA3 and A4 in the Appendix.

Table 4 shows average characteristics of the subjects by incentive framing. t tests of differences show that average subject characteristics are comparable across the three

'outsiders' which contributes to their social and economic persecution in modern India. 6.5% of our subjects were Muslim. Of these, 60% were M type while remaining were H type. In the Homogeneous treatment sessions we held religion constant. Hence, M (H) Muslim subjects were matched with M (H) Muslims. Nevertheless, throughout our analysis we control for religion. Our results are also robust to restricting the sample to Hindus.

[14]The subject had to specify one or more of the following relationships with the group member they knew by name: neighbor, relative, co-worker or friend.

incentive groupsother than the proportion of Hindus and migrants from Bihar. Overall, Tables 3 and 4 suggest that randomization into groups by caste based networks and incentives was successful.

4.2 Methodology

Since subjects were randomly allocated to treatment sessions, we can run the following OLS specification to study the impact of social and financial incentives and their interactions on productivity. The analysis is conducted separately for men and women to test Hypothesis 1:

$$Y_{is}=\alpha_0+ \alpha_1 Homogeneous_s+ \alpha_2\mathbf{X}_s + \alpha_3\mathbf{Z}_i+\epsilon_i \quad (1)$$

Here $Y_{is}$is a measure of individual i's performance in session s, 'Homogeneous'is a dummy variable that equals 1 if the session belongs to the homogeneous treatment group and 0 otherwise. **X**is a vector of dummies for each type of incentive framing (with piece rate as the reference) in a session while **Z** is a vector of individual characteristics such as caste category, age, marital status, religion, native state, employment status, and education. The caste category consists of separate dummies for the subject being H type and M type. The reference group is L type. α_1 gives us estimate for the effect of being in a homogeneous group on the performance of the subject relative tothe heterogeneousgroup.

We analyse two broad outcomes – effort and coordination. We utilize three measures of effort – individual effort in terms of total number of completed wires, individual payoff and the group output or the minimum individual performance in a group. Group coordination is measured by – 'excess individual effort', which is the difference between individual and group output, 'high effort' which is a dummy variable that takes value 1 if the group output is 5 or more and 0 otherwise, and 'dispersion' or the standard deviation in the number of completed wires by each subject within each group. The analysis of the group level outcomes (group output, high effort and group dispersion) is conducted at the group level. However,

our results are robust to running the analysis at the individual level.From equation 1 we obtain the average impact of homogeneous group composition on males and females. Next, we examine the interaction between social and financial incentives and its impact on productivity (Hypotheses 2 and 3):

$$Y_{is} = \alpha_0 + \alpha_1 Homogeneous_s + \alpha_2 Bonus\text{-}GainFraming_s + \alpha_3 Bonus\text{-}LossFraming_s + \alpha_4 Homogeneous_s \times Bonus\text{-}GainFraming_s + \alpha_5 Homogeneous_s \times Bonus\text{-}LossFraming_s + \alpha_6 X_s + \alpha_7 Z_i + \epsilon_i \quad (2)$$

We run this analysis separately by gender and report the effect of Bonus-Gain framing and Bonus-Loss framing relative to Piece Rate and the interaction between group composition and incentive framing ($\alpha_1 + \alpha_4$ and $\alpha_2 + \alpha_5$).

5. Results

A. Impact of group composition

The results of the analysis using equation 1 is presented in Table 5. Columns 1-2 measure the impact of homogeneous treatment on effort in male sessions. We define individual effort as the number of completed wires produced by a subject in a team and measure group effort in terms of the minimum group output which is equivalent to the number of completed bracelets produced by a group or minimum number of wires beaded by a subject in a group. Columns3-4 estimate the same outcomes for female sessions.

We find aninsignificant effect of homogeneous treatment on individual output as shown in column 1, but a positive effect on group effort for males in column 2. Being in a homogenous group increases group output by 0.552 bracelets or by 15% (at mean group output in control group of 3.2 bracelets). Females, on the other hand, do not respond to the homogeneous treatment either in terms of individual or group effort as shown in columns 3-4.

Note, however, that females are significantly more productive relative to males irrespective of treatment group as shown in Figure 1, top panel.

In Table 6 we estimate the effect of homogenous treatment on coordination among group members. In column 1 the outcome is 'excess individual effort' which is measured asindividual output less group output. Our expectation is that better coordination will imply less wasted effort individually. Hence a negative coefficient on 'homogeneous' would suggest that shared group identity improves coordination amongst subjects. In column 2 the outcome is group dispersion or the standard deviation of individual output within a group. Columns 1-2 analyse the data for males sessions, 3-4 measure the same outcomes for female sessions.

The results on group coordination suggest that men co-ordinate significantly better whenthey are in a group with similar social identitywhile there is no significant effect of treatmenton females. Wasted effort and dispersion in individual output is more than 30% lower in homogeneous treatment for men. Our results in Tables 5 and 6, therefore, validatesHypothesis 1, but conditional on gender.

Next we analyse the conditional effect of homogeneous group composition and its interaction with incentive framing using specification 2. These results are reported in Tables 7 (on effort) and 8 (coordination). We test hypotheses 2 and 3 in the bottom panel of the tables by reporting P-values of t-tests.

Table 7 shows that the coefficient on 'Loss framing Homogeneous' is significantly negative (column 1), suggesting that the high powered incentives do not improve productivity over and above piece rate payments contingent on group output, loss framing significantly reduces individual effort in the homogeneous treatment. This is also indicated by the t-test for $\alpha_4 + \alpha_5$ in the bottom panel (P value 0.037). The difference-in-difference in individual effort between homogeneous and heterogeneous treatment suggests that gains framing performs

better than loss framing (P value 0.081). We find no significant effects for women in column 2, as expected. In column 3, the results suggest a significant conditional effect of homogeneous treatment on group output of 1.123 bracelets. The t-tests, however, indicate that high powered incentives do not lead to any differential effects on group output. Hypothesis 2, therefore, does not hold up in our results.

In Table 7 our results are similar. The P-values on homogeneous vs. heterogeneous groups suggests that high powered incentives significantly improve coordination in both gains (P value 0.039) and loss framing (P value 0.11) relative to heterogeneous framing. This suggests that social incentives complement financial incentives. Our results are along the same lines in column 3 but perhaps suffer from low power.

Our experiments were conducted over a period of three months. Since the experiments payoffs were high, it is possible thatthe characteristics of voluntary participants, as information about the research spread, changed over time. Subjects might differ in terms of motivation and characteristics as the experiments became popular. We include month dummies in our regressions and find that the results are unaltered. Further, putting dummy for 'having done similar kind of task earlier' doesn't alter results either. A worker was allowed to participate only once and had to bring residential proof and garment factory employment proof at the time of experiment. This protocol was followed strictly to ensure that our subjects were comparableacross the duration of the study. These results are available in the Appendix (Tables A1 and A2).[15]

Our findings in Tables 5-8 can be summarised, as follows:

(1) Homogeneous group composition improves group output and within group coordination.

[15]We do not find any significant differences in individual productivity in the control group by L, M and H types. In the real world factory data, as well, there are no statistically significant differences in productivity between caste groups. Our homogeneous treatment results are, therefore, not driven by sorting in effort or ability.

(2) High powered incentives do not improve productivity over and above payoff contingent on group performance. In some cases, bonus with loss framing reduces effort relative to piece rate payment.

(3) Financial incentives complement social incentives.

B. Discussion of results

Our results are driven by the responsiveness of men to the homogeneous treatment. We do not find any effect on women. This is a surprising result.One possibility is that women's dominant identity is that of their gender and being with the same gender overrides being in- a caste homogeneous group. This may be so if women have weak network ties in a patriarchal society where women's social connections after marriage are often formed through their husband and his family. Another explanation could be that since women's effort is significantly higher than men's in the heterogeneous group, their individual and group output hit the ceiling limiting the marginal impact of additional social and/or financial incentives. We explore these questions in the following section.[16]

To test the first hypothesis we conducted 30 sessions with piece rate incentive and heterogeneous gender groups in March 2017 with the same population. Each session consisted of 2 male and 2 female subjects. The sessions were equally divided between homogeneous and heterogeneous groups. We compared the performance of men and women between pure (30 sessions) and mixed gender groups (30 sessions) under piece rate using the following specification:

$$Y_{is} = \alpha_0 + \alpha_1 homogeneous_s + \alpha_2 mixed\ gender + \alpha_3 mixed_s\ xhomogeneous + \alpha_4 X_s + \epsilon_i \quad (2)$$

We run these analyses separately for men and women. The coefficient α_3 would inform us how subjects in mixed groups perform relative to pure gender groups. We find that none of

these coefficients are significant across any of the outcomes suggesting that for women (and men), gender is not their primary identity since they perform as well within pure or heterogeneous gender groups. These results can also be interpreted as double difference estimates. See Table A5 for details.

In the mixed gender sessions we elicited answers to questions on strength of ties post experiment. We ask several post-experiment questions on relationship with subjects that were known to each other. We find no difference in the number of months the subject was known, whether subject was known before migrating to NCR, subject was known through spouse or whether personal matters are discussed with the known subject. These results are included in Table A4 in the Appendix.

Our analysis above suggests that women (or men) do not consider gender as their prime identity neither is the strength of ties to their group members weaker for women, relative to men. This leaves us with one possible explanation – the salience of identity may have been weaker for women than men in the sessions. Women, in India, typically do not have family name. Almost all women in our study had the generic last name "kumari" or "devi" which means girl or lady, respectively.[17] The generic names do not distinguish the caste identification of the female subjects. This is symptomatic of a patriarchal society where women's social status is linked to that of their husband's or father's. Hence to make caste identity within the group salient we announced the names as "FIRST NAME, Kumari" wife/daughter of "FIRST, LAST NAME", where the last name of the husband or father signified the caste of the female.[18] The caste and sub-caste system in India is endogamous – hence inter caste marriages are rare.

[17]In our study, 36.72 percent of females had no last name, 35.16 had the last name *Devi*, 9.38 percent were *Kumari*and 1.17 were either *Kaur* or *Khatoon*. Muslim women usually have the last name *Khatoon/Bibi* which means good woman.

[18] Inter-caste marriages are virtually non-existent. According to the latest Indian Human Development Survey (2012) only 5% of Indian marriages are inter-caste. http://www.thehindu.com/data/just-5-per-cent-of-indian-marriages-are-intercaste/article6591502.ece

In addition, to the fact that in our experiment women's productivity was much higher than that of men in both treatments, new research suggests that women respond differently to peer effects than men. Beugnot et al. (2013) allow workers to interact through networks in an experimental study in two ways: participants in *recursive networks* are paired with participants who played previously in isolation. In *simultaneous networks*, participants interact in real-time along an undirected line. In the simultaneous network, peer effects vary according to gender: they are large for men but not statistically different from zero for women while in the latter performance improves for both genders. They conclude that women may be less sensitive to the productivity of their peers relative to men. Although their study pertains to peer effects and individual productivity, our results suggest the same may be true in a coordination game. What explains the increase in group output and cooperation? To investigate this question we analyse the results by caste categories using specification 2. In Table 9 we analyse the impact of homogeneous group composition on individual effort by L (columns 1-3), M (columns 4-6) and H (columns 7-9) types and by gender. The results are quite revealing. First, the homogeneous versus heterogeneous effect, conditional on gains framing is positive and significant (P value 0.069) for the L type overall and for male L types (P value 0.017). This suggests that the homogeneous treatment had a positive impact on male L types' effort. The loss framing improved female L types' effort more than piece rate in the homogeneous treatment as shown in column 3 (P value 0.051) and relative to heterogeneous group (P value 0.093). Thus we find evidence of high powered financial incentives under homogeneous treatment for the L type even though there is no significant difference in the relative effects of gains and loss framing.

In column 4, in contrast, we find that piece rate raised effort relative to gains (P value 0.054) and loss framing (P value 0.000). But in-line with the results for the L type, gains framing lead to higher effort M type males under homogeneous treatment (P value 0.073) and

by more than the effect of loss framing (P value 0.086). Surprisingly, the male H types' effort was higher under heterogeneous treatment conditional on gains framing (P value 0.004) and loss framing (P value 0.024) as shown in column 8.

Overall, our results in Table 9 suggest that the L types were more responsive to the homogeneous treatment while the H type were the least, in terms of individual effort. This suggests that the lower castes were more altruistic towards subjects with whom they felt greater affinity.

The results in Table 10 suggest that homogeneous treatment led to better coordination amongst L males (column 2, P value 0.082) M males (column 6, P value 0.099)and H males (column 8, P values 0.001 and 0.032). H type women responded very strongly to high powered incentives vis-à-vis piece rate payments by improving coordination under homogeneous treatment (column 9, P values 0.000). These results suggest a very strong effect of homogeneous group composition on coordination - shared identities allows subjects to anticipate co-worker effort better. This suggests that there may exist effort norms. However, co-worker altruism may not manifest itself across all social groups.

The results also indicate that L subjects, both males and female, show a strong, positive response in terms of effort and coordination when they are in a group with subjects who have a similar social identity as them. This suggests the salience of identity is strong amongst the most marginalised and disadvantaged communities. The SCs are considered the most marginalised group of Indian society. Historically and even today, the SCs have been relegated to the most menial jobs such as manual scavenging and segregated from the main habitations in rural and urban areas as 'out-castes' and 'untouchables' (Thorat 2002). They form approximately 16.6 percent of the population of India (Census 2011). The indigenous population of India is referred to as scheduled tribes and they from over 8.6 percent of its current population (Census 2011). Unlike the SCs, the STs do not face ritualistic exclusion in

the form of untouchability but they have been excluded in the sense of being discriminated against participation in mainstream society (Betielle, 1991). The Other backward castes are the largest population group and therefore more heterogeneous particularly since OBC status is determined at the state level. Hence it is possible that a *jati* in one state is consideredan OBC but not in another state. This is so because OBC status is determined by relative social, educational and economic backwardness which can vary across states in India. Moreover, the OBC status is dynamic and *jatis* can gain or lose that status over time.Due to these characteristics OBCs may not have one unifying identity - unlike the SCs for whom untouchability is a common identifier and laid the foundations of their social identity. On the other hand, 'backwardness', is a relative and less tangible identifier.The Census does not record the OBC status of an individual and the National Sample Survey (NSS) did not include OBCs as a caste group until 1999-00.[19]

In 2009-10, 45.6% of ST and 40.6 % of SC as against 30% of OBC and 17.6% of high castes were under the poverty line (Panagariya and More, 2013). Borooah (2005) decomposes the differences between Hindu and SC/ST households on income levels, incidence of poverty and levels of poverty into a residual effect which accounts for the difference between the 'income generating' profile of the SC/ST and Hindu households, and a discrimination effect. He finds that at the minimum, one-third of the difference in income across households is attributable to discrimination of the SC/ST households.

This discussion points to the low castes being a cohesive group with a stronger sense of shared identities who are more likely to have common aspirations and perhaps different

[19]National Commission for Backward Classes suggested thatan annual family income of up to Rs 1.5 million should be considered as minimum ceiling for a *jati* to be listed as an OBC. NCBC also recommended sub-division of OBCs into 'backward', 'more backward' and 'extremely backward' blocs and divide the affirmative action position reserved for them amongst them in proportion to their population.

norms of behaviour and effort. This probably manifests itself in the overall, strong effect of identity salience on the L type.

6. Conclusion

We conduct laboratory experiments in the field to study the impact of caste based identity on group coordination. Our results suggest that being socially connected to co-workers significantly improved group coordination and output but not individual productivity. However, women do not behave differently when they are in their network relative to when they are not. Further, we find that high powered incentives such as a bonus lead to greater individual productivity when workers are in their network relative to loss framing. These results are strong for the low castes, relative to the middle and high caste, which drive the heterogeneous gender response to identity salience.

Our results highlight the role of identity and co-worker relationships inside the workplace in affecting labor productivity. It suggests that the social characteristics of workers can have an impact on their productivity hence the manner in which work teams are formed should account for their social characteristics.

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Table 1: Experiment design and sample

	Number of sessions					Number of Subjects
Financial Incentive	**Homogeneous (Male)**	**Heterogeneous (Male)**	**Homogeneous (Female)**	**Heterogeneous (Female)**	**All**	
Piece Rate	7	9	6	8	30	120
Bonus with Gains Framing	13	12	12	14	51	204
Bonus with Loss Framing	13	13	12	12	50	200
	33	34	30	34	131	524

Table 2: Financial incentives and payoffs

Number of bracelets produced by group	Subject payoff (Rs.)	
	Piece Rate	Bonus
1	100	100
2	200	200
3	300	300
4	400	400
5	**500**	**500 + 150 =650**
6	600	600 + 150 =750
7	700	700 + 150 =850
….	…	…

Notes: Each subject was given Rs.200 as participation fees in all sessions. In bonus with gains framing, the payment schedule was given as depicted above. In the bonus incentive with loss framing the payment schedule was given to subjects in reverse order, i.e. starting with 7 or more bracelets and moving down to 1 bracelet to produce a sense of 'loss' if they do not meet the threshold.

Table 3: Summary statistics by group composition

Characteristics	All	Homogeneous	Heterogeneous	Difference

	[N=524]	[N=252]	[N=272]	
	(1)	(2)	(3)	(3) – (2)
Age (years)	29.128	29.020	29.228	0.208
	(0.291)	(0.426)	(0.398)	(0.583)
Female	0.489	0.476	0.500	0.024
	(0.022)	(0.032)	(0.030)	(0.044)
Hindu	0.935	0.921	0.949	0.028
	(0.011)	(0.017)	(0.013)	(0.022)
Married	0.815	0.810	0.820	0.010
	(0.017)	(0.025)	(0.023)	(0.034)
Competed high school or more	0.197	0.218	0.176	-0.042
	(0.017)	(0.026)	(0.023)	(0.035)
Migrant from Bihar	0.685	0.651	0.716	0.066
	(0.020)	(0.030)	(0.027)	(0.041)
Currently employed	0.945	0.952	0.938	-0.015
	(0.010)	(0.013)	(0.015)	(0.020)
No. of beaded wires	4.805	4.845	4.768	-0.077
	(0.053)	(0.073)	(0.078)	(0.107)
Done similar task earlier	0.250	0.306	0.199	-0.107***
	(0.019)	(0.029)	(0.024)	(0.038)
Found task easy	0.737	0.738	0.735	-0.006
	(0.019)	(0.027)	(0.026)	(0.038)
Knew at least one team member by name	0.515	0.861	0.195	-0.666***
	(0.022)	(0.022)	(0.024)	(0.033)
Caste dispersion per session	0.775	0.307	1.208	0.900***
	(0.023)	(0.023)	(0.010)	(0.024)

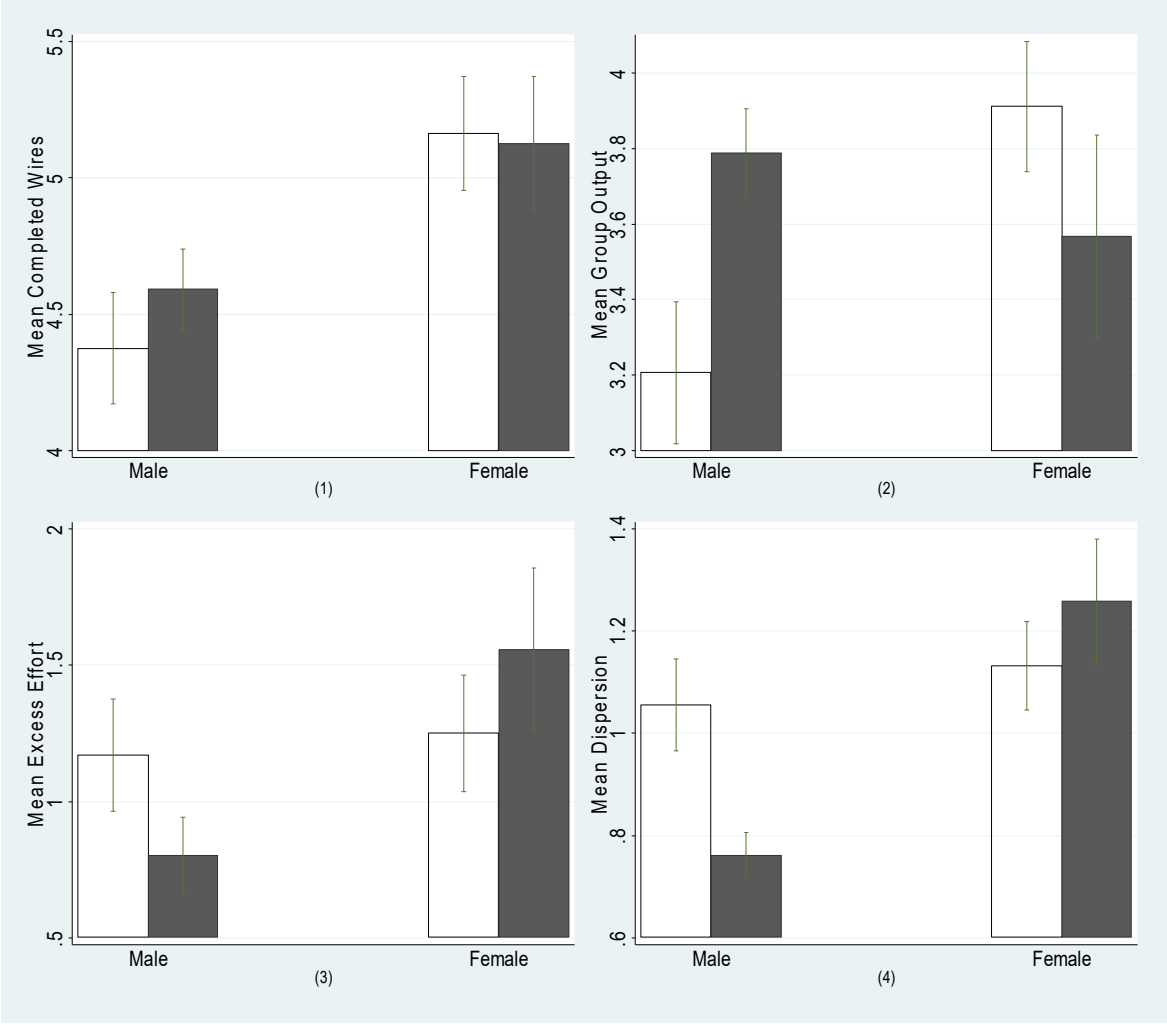
Note: Standard errors in parentheses. Significant at *10%, **5% and ***1%.

Table 4: Summary statistics by financial incentive framing

Characteristics	Piece Rate	Bonus with Gains Framing	Bonus with Loss Framing
	[N=120]	[N=204]	[N=200]
	(1)	(2)	(3)
Age (years)	28.58	29.67	28.9
	(0.582)	(0.463)	(0.485)
Female	0.47	0.51	0.48
	(0.046)	(0.035)	(0.035)
Hindu	0.88	0.92	0.98
	(0.029)	(0.019)	(0.010)
Married	0.79	0.84	0.80
	(0.037)	(0.026)	(0.028)
Competed high school or more	0.18	0.19	0.22
	(0.035)	(0.027)	(0.029)
Migrant from Bihar	0.59	0.73	0.70
	(0.045)	(0.031)	(0.032)
Currently employed	0.96	0.96	0.92
	(0.018)	(0.014)	(0.019)
No. of beaded wires	4.883	4.819	4.745
	(0.122)	(0.086)	(0.812)
Done similar task earlier	0.21	0.28	0.24
	(0.037)	(0.032)	(0.030)
Found task easy	0.73	0.78	0.70
	(0.041)	(0.029)	(0.033)
Knew at least one team member by name	0.54	0.51	0.51
	(0.046)	(0.035)	(0.035)
Caste dispersion per session	0.88	0.73	0.75
	(0.045)	(0.038)	(0.037)

Note: Standard errors in parenthesis.

Figure 1: Effort and coordination by group composition and gender



Heterogeneous Homogeneous

Table 5: Impact of group composition on effort (unconditional estimates)

	Male		Female	
	Individual Output	**Group Output**	**Individual Output**	**Group Output**
	(1)	(2)	(3)	(4)
Homogeneous	0.108	0.552**	0.087	-0.011
	(0.130)	(0.266)	(0.161)	(0.353)
Bonus (Gain Framing)	-0.126	-0.477	-0.0204	-0.153
	(0.214)	(0.346)	(0.199)	(0.431)
Bonus (Loss Framing)	0.001	-0.200	-0.217	-0.441
	(0.208)	(0.355)	(0.185)	(0.438)
Constant	5.605***	5.939***	6.766***	7.805***
	(0.596)	(1.981)	(0.440)	(1.782)
N	268	67	256	64
R^2	0.106	0.210	0.120	0.263

Notes: Individual output = No. of completed wires by subject; Group output= Min. (no. of completed wires by each subject in a group).
Controls include age, dummies for married, Hindu, dummy for H type, dummy for M type, primary schooling complete, native state is Bihar and currently employed. Standard errors clustered at session level in parenthesis (except columns 2 and 4, where the unit of analysis is the group). Significant at *10%,**5% and ***1%.

Table 6: Impact of group composition on coordination (unconditional estimates)

	Male		Female	
	Excess Individual Effort	**Group Dispersion**	**Excess Individual Effort**	**Group Dispersion**
	(1)	(2)	(3)	(4)
Homogenous	-0.461***	-0.317**	0.281	-0.029
	(0.154)	(0.127)	(0.237)	(0.179)
Bonus (Gains Framing)	0.155	0.014	0.220	-0.047
	(0.198)	(0.165)	(0.292)	(0.218)
Bonus (Loss Framing)	0.063	-0.072	0.224	0.006
	(0.192)	(0.169)	(0.330)	(0.222)
Constant	1.464***	0.798	-0.231	0.361
	(0.530)	(0.946)	(0.545)	(0.903)
N	268	67	256	64
R^2	0.091	0.138	0.107	0.148

Notes: Excess individual effort = individual output – group output; Group dispersion = std. dev. of individual output within group.
Controls include age, dummies for married, Hindu, dummy for H type, dummy for M type, primary schooling complete, native state is Bihar and currently employed. Standard errors clustered at session level in parenthesis in columns 1 and 3. Significant at *10%,**5% and ***1%.

Table 7: Impact of group composition on effort by incentive framing (conditional estimates)

	Individual output		**Group output**	
	Male	Female	Male	Female
	(1)	(2)	(3)	(4)
Homogenous (α_1)	0.553	0.175	1.123**	0.012
	(0.333)	(0.297)	(0.555)	(0.718)
Gains Framing(α_2)	-0.004	0.043	-0.361	-0.127
	(0.322)	(0.288)	(0.421)	(0.578)
Gains Framing x Homogeneous(α_3)	-0.335	-0.163	-0.458	0.182
	(0.409)	(0.384)	(0.675)	(0.872)
Loss Framing(α_4)	0.360	-0.182	0.154	-0.412
	(0.318)	(0.285)	(0.421)	(0.614)
Loss Framing x Homogeneous(α_5)	-0.822**	-0.0946	-0.991	0.040
	(0.404)	(0.350)	(0.681)	(0.878)
Constant	5.522***	6.846***	6.357***	7.776***
	(0.592)	(0.460)	(1.902)	(1.896)
P-values of t-tests				
Framing relative to Piece Rate:				
Gains framing conditional on homogeneous treatment ($\alpha_2 + \alpha_3$)	0.160	0.639	0.141	0.935
Loss framing conditional on homogeneous treatment ($\alpha_4 + \alpha_5$)	0.037	0.197	0.151	0.569
Homogeneous vs. Heterogeneous conditional on framing:				
Conditional on gains framing ($\alpha_1 + \alpha_3$)	0.298	0.967	0.101	0.735
Conditional on loss framing ($\alpha_1 + \alpha_5$)	0.150	0.704	0.738	0.922
Diff-in-diff $[(\alpha_1 + \alpha_3) - (\alpha_1 + \alpha_5)]$	0.081	0.840	0.325	0.848
N	0.127	0.119	0.242	0.223
R^2	268	256	67	64

Notes: as elucidated above.

Table 8: Impact of group composition on coordination by incentive framing (conditional estimates)

	Excess Effort		Group dispersion	
	Male	Female	Male	Female
	(1)	(2)	(3)	(4)
Homogenous (α_1)	-0.269	0.380	-0.339	0.099
	(0.320)	(0.586)	(0.270)	(0.357)
Gains Framing(α_2)	0.270	0.256	0.002	0.015
	(0.294)	(0.267)	(0.205)	(0.287)
Gains Framing x Homogeneous(α_3)	-0.260	-0.145	0.028	-0.213
	(0.387)	(0.659)	(0.329)	(0.433)
Loss Framing(α_4)	0.154	0.300	-0.080	0.084
	(0.273)	(0.337)	(0.205)	(0.305)
Loss Framing x Homogeneous(α_5)	-0.232	-0.225	0.025	-0.197
	(0.356)	(0.712)	(0.332)	(0.436)
Constant	1.366**	0.126	0.821	0.277
	(0.522)	(0.549)	(0.927)	(0.942)
P-values of t-tests				
Framing relative to Piece Rate:				
Gains framing conditional on homogeneous treatment ($\alpha_2 + \alpha_3$)	0.968	0.855	0.912	0.553
Loss framing conditional on homogeneous treatment ($\alpha_4 + \alpha_5$)	0.749	0.905	0.845	0.728
Homogeneous vs. Heterogeneous conditional on framing:				
Conditional on gains framing ($\alpha_1 + \alpha_3$)	0.039	0.472	0.115	0.689
Conditional on loss framing ($\alpha_1 + \alpha_5$)	0.011	0.696	0.110	0.707
Diff-in-diff $[(\alpha_1 + \alpha_3) - (\alpha_1 + \alpha_5)]$	0.928	0.879	0.993	0.966
N	268	256	0.138	0.136
R^2	0.0907	0.0843	67	64

Notes: as elucidated above.

Table 9: Impact of group composition on individual effort by incentive framing and caste

	L			M			H		
	All	Male	Female	All	Male	Female	All	Male	Female
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Homogenous (α_1)	-0.029	0.196	-0.081	0.503*	0.368	0.497	0.238	0.658	0.395
	(0.283)	(0.571)	(0.374)	(0.270)	(0.315)	(0.531)	(0.566)	(0.687)	(0.258)
Gains Framing(α_2)	-0.442	-0.663	-0.354	0.148	-0.343	0.615	0.309	0.856	-0.139
	(0.406)	(0.551)	(0.482)	(0.308)	(0.299)	(0.535)	(0.483)	(0.778)	(0.449)
Gains Framing x Homogeneous(α_3)	0.668	0.680	0.375	-0.520	0.010	-0.704	-0.463	-1.627**	-0.071
	(0.424)	(0.695)	(0.776)	(0.359)	(0.399)	(0.662)	(1.128)	(0.677)	(0.483)
Loss Framing(α_4)	-0.138	0.052	-0.490	0.246	0.091	0.451	-0.053	0.875	-0.466
	(0.334)	(0.521)	(0.492)	(0.307)	(0.347)	(0.546)	(0.501)	(0.811)	(0.441)
Loss Framing x Homogeneous(α_5)	0.382	0.000	0.855*	-0.867**	-0.605	-0.936	-0.137	-1.369*	-0.251
	(0.387)	(0.000)	(0.473)	(0.360)	(0.458)	(0.618)	(0.696)	(0.735)	(0.546)
Constant	5.443**	3.974***	6.260***	5.559***	5.343***	6.475***	5.581***	6.320***	6.661***
	(0.693)	(0.954)	(1.066)	(0.548)	(1.017)	(0.803)	(0.824)	(0.899)	(1.094)
P-values of t-tests									
Framing relative to Piece Rate:									
Gains framing conditional on homogeneous treatment ($\alpha_2 + \alpha_3$)	0.361	0.985	0.971	0.054	0.185	0.787	0.884	0.000	0.348
Loss framing conditional on homogeneous treatment ($\alpha_4 + \alpha_5$)	0.270	0.921	0.051	0.000	0.041	0.080	0.723	0.108	0.044
Homogeneous vs. Heterogeneous conditional on framing:									
Conditional on gains framing ($\alpha_1 + \alpha_3$)	0.069	0.017	0.661	0.944	0.073	0.628	0.819	0.004	0.439
Conditional on loss framing ($\alpha_1 + \alpha_5$)	0.247	0.734	0.093	0.123	0.424	0.180	0.805	0.024	0.756
Diff-in-diff $[(\alpha_1 + \alpha_3) - (\alpha_1 + \alpha_5)]$	0.555	0.336	0.599	0.294	0.086	0.648	0.760	0.570	0.765
N	98	42	56	284	152	132	142	74	68
R^2	0.110	0.283	0.114	0.098	0.123	0.148	0.0337	0.227	0.185

Notes: as elucidated above.

Table 10: Impact of group composition on group coordination by incentive framing and caste

	L			M			H		
	All	Male	Female	All	Male	Female	All	Male	Female
	(1)	(2)	(3)	(5)	(6)	(7)	(8)	(9)	(10)
Homogenous (α_1)	-0.338	-0.227	-0.332	-0.085	-0.757	0.690	0.412	-0.026	1.852***
	(0.276)	(0.597)	(0.389)	(0.570)	(0.628)	(0.716)	(0.530)	(0.377)	(0.313)
Gains Framing(α_2)	0.132	0.376	-0.016	0.299	-0.035	0.881***	0.336	0.554	0.229
	(0.359)	(0.507)	(0.559)	(0.400)	(0.575)	(0.272)	(0.306)	(0.415)	(0.489)
Gains Framing x Homogeneous(α_3)	0.012	-0.525	0.113	-0.032	0.377	-0.197	-1.077*	-0.822*	-2.530***
	(0.376)	(0.799)	(0.669)	(0.633)	(0.695)	(0.842)	(0.626)	(0.437)	(0.509)
Loss Framing(α_4)	0.273	0.0899	0.339	0.333	0.0310	0.941**	0.057	0.301	0.032
	(0.400)	(0.591)	(0.715)	(0.416)	(0.557)	(0.428)	(0.298)	(0.442)	(0.496)
Loss Framing x Homogeneous(α_5)	-0.220	0.000	-0.351	0.191	0.249	0.328	-0.932	-0.656	-2.413***
	(0.395)	(0.000)	(0.652)	(0.683)	(0.653)	(0.993)	(0.600)	(0.497)	(0.550)
Constant	0.814	0.576	1.003	0.766	1.683	0.171	1.616**	1.605**	2.085*
	(0.859)	(0.968)	(1.427)	(0.582)	(1.163)	(0.539)	(0.657)	(0.641)	(1.068)
P-values of t-tests									
Framing relative to Piece Rate:									
Gains framing conditional on homogeneous treatment ($\alpha_2 + \alpha_3$)	0.571	0.874	0.855	0.564	0.318	0.377	0.193	0.269	0.000
Loss framing conditional on homogeneous treatment ($\alpha_4 + \alpha_5$)	0.831	0.880	0.972	0.309	0.391	0.159	0.117	0.169	0.000
Homogeneous vs. Heterogeneous conditional on framing:									
Conditional on gains framing ($\alpha_1 + \alpha_3$)	0.282	0.082	0.654	0.658	0.232	0.230	0.019	0.001	0.126
Conditional on loss framing ($\alpha_1 + \alpha_5$)	0.123	0.706	0.287	0.767	0.099	0.117	0.040	0.032	0.228
Diff-in-diff [$(\alpha_1 + \alpha_3) - (\alpha_1 + \alpha_5)$]	0.631	0.516	0.564	0.604	0.769	0.480	0.689	0.665	0.846
N	98	42	56	284	152	132	142	74	68
R^2	0.044	0.128	0.041	0.098	0.146	0.173	0.083	0.121	0.226

Notes: as elucidated above.

	Male			Female		

Table A1: Assembly line caste composition and worker productivity

	(1)	(2)	(3)	(4)	(5)	(6)
Proportion of assembly line workers from own caste category	0.114**	0.101**	0.104**	0.0891*	0.0924*	0.0760*
	(0.0501)	(0.0454)	(0.0494)	(0.0450)	(0.0468)	(0.0421)
Constant	0.274***	0.192**	0.349***	0.248***	0.322***	0.219***
	(0.0802)	(0.0829)	(0.0778)	(0.0737)	(0.0797)	(0.0776)
N	34,721	34,255	34,721	34,255	34,721	34,255
R^2	0.545	0.545	0.549	0.550	0.558	0.561
Individual FE	√	√	√	√	√	√
Factory floor FE	√	√				
Assembly line FE			√	√	√	√
Production day FE					√	√

Notes: The analysis is based on data collected by the authors on daily worker productivity in 2 garment factories in NCR, Delhi. The dependent variable is the worker production efficiency on a day. The analysis is at the worker-day level. The sample in columns 2, 4 and 6 is restricted to worker efficiency being greater than 0 or less than equal to 1. Robust standard error clustered at the assembly line level in parentheses. Significant at *10%,**5% and ***1%.

Table A2: Effect of group composition on effort (all controls)

	Individual Output	Group Output	Individual Output	Group Output
	(1)	(2)	(3)	(4)
Homogeneous	0.115	0.562**	0.090	0.036
	(0.130)	(0.246)	(0.181)	(0.370)
Bonus as gains framing	-0.103	0.000	-0.162	-0.545
	(0.214)	(0.000)	(0.229)	(0.993)
Bonus as loss framing	0.009	0.254	-0.370*	-0.829
	(0.204)	(0.288)	(0.196)	(0.962)
Age	-0.039***	-0.044	-0.053***	0.046
	(0.012)	(0.040)	(0.015)	(0.055)
Married	0.106	0.127	0.247	-1.972**
	(0.172)	(0.669)	(0.243)	(0.983)
Hindu	-0.466	-1.296**	-0.360	-2.523***
	(0.298)	(0.604)	(0.262)	(0.779)
Currently employed	0.054	-0.042	0.353	0.270
	(0.487)	(0.999)	(0.275)	(0.743)
Primary education	0.282	-0.558	-0.427**	-0.552
	(0.169)	(0.589)	(0.178)	(0.588)
Migrant from Bihar	0.290**	0.554	0.019	-0.328
	(0.135)	(0.381)	(0.163)	(0.574)
Done task previously	-0.409	-0.889	-0.222	-0.892
	(0.263)	(1.058)	(0.211)	(0.612)
June	0.000	0.437	-0.346	-0.934
	(0.000)	(0.398)	(0.356)	(1.180)
July	-0.120	-0.192	-0.125	-0.154
	(0.148)	(0.289)	(0.205)	(0.453)
H type	-0.377	-1.063**	0.323	0.827
	(0.237)	(0.452)	(0.237)	(0.739)
M type	0.114	-0.142	0.119	-0.745
	(0.191)	(0.444)	(0.187)	(0.596)
Constant	5.758***	5.684***	6.916***	8.152***
	(0.614)	(1.441)	(0.520)	(1.585)
N	268	67	256	64
R^2	0.124	0.245	0.128	0.315

Notes:Standard errors clustered at session level in parenthesis. Significant at *10%,**5% and ***1%.

Table A3: Effect of group composition on coordination (all controls)

	Male		Female	
	Excess Individual Effort	Group Dispersion	Excess Individual Effort	Group Dispersion
	(1)	(2)	(3)	(4)

Homogeneous	-0.460***	-0.322**	0.286	-0.026
	(0.156)	(0.130)	(0.259)	(0.201)
Bonus as gains framing	0.099	0.000	0.298	0.143
	(0.221)	(0.000)	(0.676)	(0.499)
Bonus as loss framing	0.009	-0.074	0.272	0.173
	(0.218)	(0.128)	(0.684)	(0.484)
Age	-0.030***	0.006	-0.054***	-0.024
	(0.010)	(0.019)	(0.016)	(0.027)
Married	0.142	-0.135	0.984***	0.749
	(0.167)	(0.264)	(0.337)	(0.522)
Hindu	0.163	0.307	1.580***	0.671*
	(0.273)	(0.235)	(0.341)	(0.382)
Currently employed	0.0234	-0.085	0.295	0.158
	(0.473)	(0.523)	(0.281)	(0.396)
Primary education complete	0.459**	0.184	-0.220	0.153
	(0.192)	(0.299)	(0.212)	(0.296)
Migrant from Bihar	0.080	-0.118	0.111	-0.067
	(0.162)	(0.148)	(0.191)	(0.315)
Done task previously	-0.081	0.574	0.0945	0.275
	(0.236)	(0.545)	(0.181)	(0.310)
June	0.000	-0.028	-0.012	0.262
	(0.000)	(0.188)	(0.793)	(0.612)
July	0.094	0.056	-0.224	-0.106
	(0.159)	(0.128)	(0.279)	(0.244)
H type	-0.021	0.190	0.064	-0.549
	(0.199)	(0.269)	(0.272)	(0.401)
M type	0.138	0.116	0.544**	0.186
	(0.170)	(0.215)	(0.248)	(0.287)
Constant	1.521***	0.651	-0.287	0.255
	(0.526)	(0.730)	(0.876)	(0.778)
N	268	67	256	64
R^2	0.093	0.203	0.113	0.189

Notes:Standard errors clustered at session level in parenthesis. Significant at *10%,**5% and ***1%.

Table

A4: Summary statistics by gender (pure gender sessions)

Characteristics	**Male**	**Female**	**Difference**
	[N=268]	[N=256]	
	(2)	(3)	(2) – (3)
Age (years)	28.69	29.59	-0.90
			(0.581)
Hindu	0.89	0.98	-0.10***
			(0.021)
Married	0.72	0.91	-0.19***
			(0.033)
Competed high school or more	0.28	0.11	0.17***
			(0.034)

Migrant from Bihar	0.65	0.73	-0.08** (0.041)
Currently employed	0.97	0.91	0.06** (0.020)
Done similar task earlier	0.15	0.36	-0.21*** (0.037)
Found task easy	0.70	0.78	-0.08** (0.038)
Knew at least one team member by name	0.46	0.57	-0.12* (0.043)

Note: Standard errors in parentheses. Significant at *10%, **5% and ***1%.

Table A5: Strength of group identity by gender (mixed gender sessions)

Characteristics	**Male**	**Female**	**Difference**
	[N=60]	[N=60]	
	(2)	(3)	(2) – (3)
Years married (if married)	12.41 [N=44]	16.57 [N=56]	-4.16*** (1.245)
No. of children (if ever married)	2.18 [N=44]	2.46 [N=57]	-0.27 (0.236)
Number of other subjects known by name	0.62	0.73	-0.12 (0.176)
Number of months knew subject	30.35	31.77	-1.42 (13.127)

Knew subject before migrating	0.34	0.36	0.35 (0.043)
Migrated together with known subject	0.00	0.03	-0.03 (0.026)
Known subject is a friend of family	0.17	0.25	0.21 (0.306)
Knows subject through spouse	0.26	0.33	-0.07 (0.081)
Discuss personal issues with known subject	0.13	0.24	-0.17 (0.069)*

Note: The sample consists of subjects in mixed gender sessions with piece rate incentive. Standard errors in parentheses. Significant at *10%, **5% and ***1%.

Table A6: Effort and coordination in mixed and pure gender sessions (piece rate incentive)

	Individual Output		Group Output		Excess Individual Effort		Group Dispersion	
	Male	Female	Male	Female	Male	Female	Male	Female
Homogeneous	0.602	0.252	0.951*	-0.427	-0.349	0.679	-0.321	0.295
	(0.394)	(0.315)	(0.552)	(0.590)	(0.314)	(0.528)	(0.306)	(0.330)
Mixed gender	0.549	0.270	0.972**	0.000	-0.423	0.269	-0.0239	0.0158
	(0.327)	(0.348)	(0.448)	(0.422)	(0.268)	(0.312)	(0.239)	(0.212)
Mixed gender x Homogeneous	-0.704	-0.214	-1.237**	0.155	0.532	-0.369	0.145	-0.323
	(0.441)	(0.410)	(0.607)	(0.663)	(0.361)	(0.601)	(0.315)	(0.366)
Constant	6.119***	5.718***	3.144***	4.530***	2.975***	1.189*	0.854**	0.671**
	(0.848)	(0.609)	(0.701)	(0.620)	(0.849)	(0.668)	(0.409)	(0.301)
N	240	240	240	240	240	240	240	240
R^2	0.156	0.123	0.199	0.0821	0.166	0.124	0.0858	0.153

Notes: Sample consist of piece rate sessions – 30 mixed gender and 30 pure gender sessions. Other controls include dummies for H and M, age, Hindu, employment status, primary education, migrant from Bihar. Standard errors in parentheses.Significant at *10%, **5% and ***1%.

Figure A1: Recruitment advertisement

ATTENTION!!!

OPERATORS/ TAILORS/HELPERS/PRESSMEN!!!

Garment factory operators, helpers and pressmen volunteers are required for a training-cum-research project. Participants will receive Rs.200 as show-up payment and can earn between Rs. 500-1000 in 30 to 45 minutes on the spot. Please register yourself by calling on following numbers:

9205369718

8800254317

Figure A2: A finished bracelet

Figure A3: *Jati* dispersion in 'out-group' sessions

Figure A4: *Jati* dispersion in 'in-group' sessions