Gender Differences in Leadership: An Experiment

Priyanka Chakraborty and Danila Serra*

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Abstract

Though the gender gap in education and participation in the labor force seems to be diminishing, women still remain under-represented in leadership roles. Studies have shown that family constraints, discrimination, risk aversion or competition aversion may keep women out of leadership positions. In this paper, we examine whether women may self-select out of leadership positions due to aversion to taking managerial decisions that create inequality among employees and/or due to aversion to the possibility of receiving negative feedback from employees. We also explore whether male and female leaders are equally effective and whether they have different leadership styles, i.e. do they communicate, motivate, evaluate and penalize differently? Finally, we examine if followers respond differently to a male vis-à-vis a female leader in an environment where managerial decisions make some employees better off and some worse off. We address our research questions in the laboratory by conducting a novel game designed to simulate corporate decision making, task allocations, promotions and demotions.

1 Introduction

Women have been woefully under-represented in leadership positions historically despite making up a majority of the population in most countries and earning increasing numbers of undergraduate and masters' degrees including law, medicine, business and management. Though they constitute an increasing proportion of the workforce, women lag substantially behind men when it comes to taking up leadership positions. In corporate America alone, women are only 25 percent of executive- and senior-level officials and managers, hold only 19 percent of board seats, and are only 4.6 percent of CEOs. In the financial services industry, they make up 54 percent of the labor force, but are only but are only 19 percent of board directors and 2 percent of CEOs. The statistics are similar for health-care, the legal field, creative industry, academia and information technology (Warner, 2014)[1]. Bertrand and Hallock (2001) use Standard and Poor's ExecuComp data, which contains information on the five highest paid executives in each of a large number of US firms for the years 1992-97 to find that female managers were under-represented in large corporations and that women, who represented about 2.5% of the sample, earned about 45% less than men. As much as 75% of this gap can be explained by the fact that women managed smaller companies and were less likely to be CEO, Chair, or company President. There is also evidence that female academics in science are less likely to be members of corporate scientific advisory boards (McCook, 2013) and that the underrepresentation of women in STEM occupations persists at higher levels of the corporate hierarchy (Adams and Kirchmaier, 2016). These statistics are for the U.S which is number 26 in women's economic participation and opportunity on the World Economic Forum's 2016 Gender Gap Index of 144 countries (Schwab et al. (2016)), which means these are better figures than most of the world.

The empirical evidence on the effectiveness of women versus men leaders is mixed. (Wolfers, 2006) finds no significant differences to stock returns to firms under female leadership. Jurkus et al. (2011) find women managers are more likely than men managers to lower agency cost by using organizational resources for maximizing shareholder wealth than for their own benefit. In contrast, Adams et al. (2015) find women on corporate boards decreasing firm value due to overmonitoring[2]. (Matsa and Miller, 2012) study the impact of gender quotas for corporate board seats on corporate decisions in Norway and find a fall in profitability and lower likelihood of firing employees, even

*Email:; pchakraborty@mail.smu.edudserra@mail.smu.edu

[1]These statistics are the author's updated 2015 version of "The Women's Leadership Gap" published on March 7, 2014.

[2]Monitoring intensity is defined as a composite variable reflecting the combined effect of a board's monitoring efforts proxied by meeting frequency, number of board committees, auditor quality, and level of public disclosure.

during recessions with women on corporate boards. On the positive side, (Kim and Starks, 2016) find women who are appointed as corporate directors diversify the set of boards' expertise more than do their male counterparts and bring unique skills to corporate boards. In addition, (Delfgaauw et al., 2013) see women employees performing better under female leadership even for competitive tasks. (Beaman et al., 2008) investigate exposure to women leaders and see a reduction in bias and stereotypes. Finally, (Moscardi, 2015) finds that companies without strong female leadership[3] showing 24% more governance controversies such as cases of bribery, corruption and fraud. The existing studies use different sets of data, estimation strategies and time periods, and define performance and effectiveness differently which might explain the differences in results.

Are there substantial differences in the performance and efficacy of men and women leaders? Our first research objective is to address this question in a controlled environment where men and women leaders are subject to the same decision sets and incentive systems. One important reason why there may be gender differences in leadership outcomes is that men and women may adopt different leadership styles, and employees may respond differently to them. Quantifying leadership styles in the field is difficult, which explains the scarcity of studies on this topic. A few experimental studies have attempted to measure leadership styles in the lab. For instance, Kocher et al. (2008) study how other-regarding preferences of team managers influence their management style[4] when choosing among risky lottery pairs that affect the payoffs of all group members. One of the results of the study is that male managers employ a democratic style – meaning that they take into account the lottery preferences of the group members – more often than women. Timko (2017)[5] looks at leadership effectiveness and communication styles by gender in a minimum effort game where leaders can send free-form messages to group members.Timko (2017) finds that while men and women leaders are equally effective, men leaders send more assertive messages while women leaders express significantly more often that they are part of the group, rather than standing above the group.

This paper contributes to the small literature on gender differences in leadership styles by investigating whether and how men and women differ in the way they communicate with, encourage and react to followers in a context very different from that studied by Timko (2017). We employ an experiment that simulates a firm environment characterized by heterogeneity in team compositions and worker skills, and we examine how male and female managers communicate and justify to employees possibly controversial decisions, like promotions and demotions, which generate income differentials among them. The experiment also allows investigating gender differences in the language used to encourage or motivate employees, as well as in the responses to employees' demands.

Our second research objective is to investigate whether and to what extent the scarcity of women leaders is at least partly due to women self-selecting out of leadership positions. Traditionally, women choose to invest in family responsibilities and such lifestyle preferences could cause them to self-select out of jobs and roles which demand long hours (Mincer and Polacheck (1974), Polachek (1981), Goulden et al. (2009)). Additonally, a number of studies have shown that the stereotype that women are not competent leaders joint with on-the-job discrimination are a great barrier to more participation of women in policy making(Gangadharan et al. (2015), Beaman et al. (2009)). Women are more risk averse than men as shown experimentally by Jianakoplos and Bernasek (1998), Croson and Gneezy (2009) and Eckel and Grossman (2008). Ertac and Gurdal (2012) find this might make women unwilling to take up leadership positions. Women are also less competitive than men as seen in experiments by (Gneezy et al. (2003), Niederle and Vesterlund (2007). Reuben et al. (2015)) and Preece and Stoddard (2015) find this might make women select out of leadership roles. There is a large literature showing that there are significant gender differences in willingness to initiate negotiations and ask for better positions/salaries (Bowles et al. (2007),Babcock and Laschever (2009)), which may contribute to the observed gender leadership gap.

In this paper, we explore a different possible reason for the lack of women in leadership roles. We ask whether women may hesitate in assuming these roles because they anticipate having to make potentially controversial

[3]Here, to have 'Strong Female Leadership' status, one of these must apply: The company has three or more women on the board, the percentage of women on the board is above its country's average, or the company has a female CEO and at least one women on the board.

[4]Depending on the way in which managers exercise their authority, several studies in economics, psychology and management identify two main management styles: an 'autocratic' and a 'democratic style'. Autocratic managers allow for only a minimal team participation in the decision making process and often ignore the opinions of their subordinates (Knott (2001)). In contrast, democratic managers seek advice from their subordinates and try to reach consensus within their teams (Rotemberg and Saloner (1993)).

[5]Unlike Kocher et al. (2008), Timko (2017) follows Eagly et al. (2003), Burns (1978),Avolio (1999), Bass et al. (1996) in classifying leadership styles as 'transactional' and 'transformational'. While the transformational leadership style focuses on the individual development of followers, creating human capital and making use of it, the transactional style is a classic, more conventional leadership style. Transactional leaders appeal to the self-interest of their followers in that they establish exchange relationships with them: the transactional leader clarifies the responsibilities of the follower, and rewards followers if they meet objectives or correct them for failing to meet objectives.

managerial decisions, like promotions, demotions and dismissals, which would leave some workers happy and others upset. It has been shown that women have different distributional preferences[6] than men, i.e. they are more egalitarian (Andreoni and Vesterlund (2001);Dufwenberg and Muren (2006);Engel (2011);Sharma (2015); Dasgupta et al. (2017)). We hypothesize that distributional preferences may induce women to avoid jobs where they would be responsible for creating inequalities among employees. It might also be that women anticipate receiving social disapproval from workers that are negatively affected by managerial decisions and select out of leadership positions due to an aversion to negative feedback. The existing literature shows some evidence of gender differences in image motivations and reputational concerns (Benabou and Tirole(2006)). For instance, Alan et al. (2016) find that going from childhood to adolescence, women become less willing to assume leadership positions and by analyzing post experimental survey questions they find suggestive evidence that one reason might be fear of public scrutiny and reputational concerns.[7] Jones and Linardi(2014a) examine the "wallflower effect" i.e. the case where any reputation, whether positive or negative, that brings people unwanted attention may negatively affect one's utility. In their experiment, they find that females are more likely to be "wallflower" types –perhaps because of cultural conditioning or other correlated personality differences –and males are more likely to hold preferences consistent with Benabou and Tirole's model. In this paper, we employ a novel experiment to directly test whether distributional preferences and/or aversion to negative feedback may cause women to select out of leadership positions.

In the experiment, subjects play in groups of three. In the Baseline framework, managers are selected based on performance in a real effort task in round one of the experiment and retain their role for the duration of the experiment, which entails five additional rounds. Managers are given information of their workers' productivities and make rank allocation decisions to maximize their own payoff; however, rank allocation creates income inequality among workers. This is a departure from the existing experimental studies of leadership[8] that typically employ public goods games where leaders can set an example by contributing more money or effort to induce followers to do the same[9]. In contrast, in my experiment leadership entails promoting or demoting employees on the basis of their performance in a real effort task.[10] Crucially, the manager has an informational advantage over the employees, as he or she is the only member of the firm that has complete information about individuals' past performances.

By design, in the stylized environment simulated in the experiment, risk and competition preferences have no role to play in the decision to become a manager. Instead, treatment variations allow isolating aversion to creating inequality among employees and aversion to receiving (negative) feedback as possible reasons for gender differences in self-selection into leadership and leadership effectiveness. In particular, in one treatment – the *Choice* treatment – after engaging in a puzzle-solving task that generate individual earnings, subjects are told that in the next five rounds of the experiment they will assume the role of either manager or worker. They are given information about the payoffs of managers and workers as well as the decisions that the manager would have to make. Then, they are asked whether they want to become the manager of their group. In a second treatment – called *Choice & Chat* – we allow for free form communication between managers and workers at the time of the rank allocation in rounds 2 to 5, with the aim to investigate whether anticipation of negative feedback may cause gender differences

[6]Distributional preferences implies decision makers have a genuine concern for the material welfare of others in the sense that their well-being and behavior does not only depend on their own material payoff but also on the material payoffs of other agents. Inequality averse subjects incur a disutility when other agents have either higher or lower payoffs (as in the model by Fehr and Schmidt (1999)) or when their payoff differs from the average payoff of other agents (as in Bolton and Ockenfels (2000)). The fact that only the own material payoff and the material payoff of other agents affect an agent's well being distinguishes distributional preference models from other models of other-regarding concerns, where arguments such as others' intentions (as in reciprocity models), others' expectations (as in guilt aversion models), or others' other-regarding concerns (as in type based models) enter an agent's utility function (Balafoutas et al. (2012)).

[7]Indeed, this might be why Matsa and Miller (2012) find women board members less likely to fire employees.

[8]Economic modeling of leadership in general has notably been by (Hermalin (1998),Kobayashi and Suehiro (2005), and Huck and Rey-Biel (2006)). Leaders have been defined as either average players who move first (Bardsley and Moffatt, 2007) or players who have superior information (Hermalin, 1998). As far as the literature on experimental studies on gender and leadership is concerned, leaders have been average players who have been randomly selected. Grossman et al. (2008), Grossman et al. (2015) is the only study to have incorporated Hermalin's idea of a leader having superior information within the public goods game structure though leadership is still randomly allocated.Brandts et al. (2011) have shown that selected/elected leaders feel a greater degree of legitimacy than random leaders.

[9]Most studies model leadership as a Voluntary Contributions Mechanism (VCM) game. This kind of leadership is often studied by introducing a sequential move structure in public good experiments (Gächter and Renner (2006);Güth et al. (2007);Gächter et al. (2012);Drouvelis and Nosenzo (2013);Moxnes and Van der Heijden (2003);Pogrebna et al. (2011);Potters et al. (2007a);Levati et al. (2007)). A public goods game is useful in understanding leadership in a coordination scenario and captures the incentive structure of leading-by-example.

[10]We also move move away from previous studies that give leaders the task to choose among lotteries that determine the payoffs of all group members use a lottery task (Kocher et al. (2008); Alan et al. (2016)).

in the decision to become a manager. Moreover, the design allows me to test whether aversion to negative feedback affects leadership outcomes – measured as the propensity to assign ranks to workers purely based on their past performance. Finally, through the analysis of messages from and to managers, we are able to identify possible gender differences in leadership styles as well as attitudes toward male and female managers.

Preliminary results suggests that men and women are equally adept at performing the task. More men volunteer than women to be managers in the *Choice* and the *Choice & Chat* treatments (which allow people to choose to be a manager), though the difference is not significant. Fewer women volunteer in the *Choice & Chat* treatment than the *Choice* treatment, though again the difference is not significant. Both men and women are more effective managers when self-selecting into leadership than when they are assigned leadership roles. However, women managers see a significant drop in efficiency in the *Choice & Chat* treatments where there is two-way communication between manager and worker. The evidence suggests that neither men nor women are pure money maximizers and seem to affected by other concerns. Moreover, women seem to affected by distributional concerns and/or feedback more than men. Men and women seem to display distinct leadership styles. Men are more encouraging, like to create competition between workers and give greater importance to performance while women emphasize team building, give practical suggestions to the workers and give more importance to fairness and distributional concerns in task allocation. Men workers are more likely to be upset with managerial decisions that affect them negatively. They are more likely to challenge the manager's decision and ask for a review while women are more likely to accept similar managerial decisions.

The paper is structured as follows-Section 2 presents the literature review, Section 3 describes the design of the experiment and Section 4 contains the results.

2 Literature Review

While there have been sporadic forays into understanding if there are gender differences in leadership, the literature on this issue is still in its nascent stage and there is enormous scope to conduct conclusive studies on whether and how men and women differ as leaders and harness this knowledge to inform policy.

There are three principal strands of literature on gender and leadership that we have identified: 1) Gender differences in leadership styles; 2) Gender differences in the decision to become a leader; 3) Differences in the behavior of followers. In what follows, we will summarize each literature separately.

2.0.1 Gender differences in leadership styles

The literature regarding the leadership styles of men and women is extremely sparse. There are a few studies that examine leadership styles of managers in general. Kocher et al. (2008) investigate leadership styles of managers by looking at how they take risky decisions on behalf of a team. One result of the study is that women leaders are less likely to take into account the other members' preferences over risky lotteries than men do. Some studies have looked at leadership with communication (Brandts et al. (2011);Brandts and Cooper (2007);Chaudhuri and Paichayontvijit (2010)) though all these studies are looking at leadership to overcome coordination failure using a public goods game. Also communication is restricted to the leader sending messages with suggested contribution and the focus has not been on identifying gender differences. Timko (2017) is the only paper to examine gender differences in leadership styles including free-form communication. The author uses a weak-link coordination game where players choose their individual effort contribution simultaneously, and the lowest performing player, the "weak link", determines the performance of the organization. Subjects are divided into groups of 5 and play the coordination game for 8 periods after which one group member is randomly selected as the leader. The leader sends a uniform free-form suggestion message to all followers in his or her group to suggest what amount they should contribute (in the one-way communication treatment) and in the two-way communication treatment, subjects send a suggestion message first to their leaders who may send a suggestion message back to them. She finds that male leaders communicate more assertively while female leaders express significantly more often that they are part of the group, rather than standing above the group. Despite the different paths in communication, both men and women are equally likely to request the highest effort contribution[11].

[11]The operations management literature distinguishes between transformational leaders who "transform or change the basic values, beliefs, and attitudes of followers so that they are willing to perform beyond the minimum levels specified by the organization" and transactional leaders, who "are founded on an exchange process in which the leader provides rewards in return for the subordinate's effort." (Podsakoff et al. (1990)). Eagly et al. (Eagly and Johannesen-Schmidt, 2001; Eagly et al., 2003) suggests that female leaders are

Contrary to previous studies, we employ an experiment that simulates a firm environment where managers and workers participate in a real effort puzzle task that requires cognitive skills and focus unlike a coordination game which involves picking a number to contribute. we select the managers not randomly but based on performance in the task, again mimicking most real world situations where managers are selected based on qualifications. Managers have to undertake rank allocation decisions along with performing the real effort puzzle task. This creates a richer environment for communication, as the manager can use messages not only to make suggestions and motivate employees but also to justify ranking decisions. The workers respond individually to the messages of the manager, and their messages may influence ranking allocation decisions in fiture rounds.

To the best of our knowledge, ours is the first concerted effort to study the difference in leadership styles and effectiveness of men and women managers in an environment where leadership entails decision-making that creates inequality among fellow group members (i.e. the workers).

2.0.2 Gender differences in the decision to become a leader

Insights from behavioral and experimental economics[12] suggest that women might self-select out of leadership positions. Risk taking and engaging in highly competitive settings are often crucial parts of leadership[13]. Gender differences in risk aversion and in competitveness, as highlighted in Ertac and Gurdal (2012),Reuben et al. (2015) and Preece and Stoddard (2015), might explain part of the gender gap in leadership. It might also be that women lack the confidence to negotiate their own promotions, especially in settings where the gender composition of the workforce is skewed heavily toward men (Bowles et al. (2007),Babcock and Laschever (2009), Reuben et al. (2012)), or that they self-stereotype and hesitate to contribute ideas outside of their gender's domain (Coffman (2014)) and hence self-select out of leadership in typically male-dominated fields.

In this paper, we explore an entirely new channel of women's disinclination in assuming leadership roles: aversion to being responsible for generating inequality among employees. This aversion could either be due to distributional concerns or to fear of receiving (possibly negative) feedback from upset employees. Some recent research in gender and distributional concerns have shown that women might be more egalitarian than men (Andreoni and Vesterlund (2001);Dufwenberg and Muren (2006);Engel (2011);Sharma (2015); Mani et al. (2017))[14], which may at least partly explain why women may want to avoid managerial positions that involve decision making that affects employees' well-beings asymetrically. There is also a growing literature on reputation signaling which focuses on individuals' desire for positive reputation and dislike of negative reputation. Image motivations, as modeled in Benabou and Tirole(2006), capture the role of others' opinions in one's utility, i.e., the desire to be liked and respected by others.[15] Recent experimental work on volunteering (Jones and Linardi (2014a); Exley (2016)) finds that women

more transformational than male leaders. Female leaders also engage in more of the contingent reward behaviors related to transactional leadership and individualized consideration. On the other hand, male leaders more likely possess qualities of the transactional and laissez-faire and leadership style. Moreover, literature in psychology also notes gender differences in the use of language with men using more assertive language (language used to influence, such as imperative statements, suggestions, criticisms, and disagreements) and women used more affiliative language (language affirming the speaker's relationship with the listener, including statements of support, active understanding,agreement, and acknowledgment) (Leaper and Smith (2004)).

[12]It has also been seen in the psychology and behavioral literature that those who experience fear of failure often attach negative and painful consequences to the act or experience of failing at a given task or goal (Shultz (1999)). This results in a motive "to avoid situations where one may fail due to anticipatory shame and humiliation because the individual was fearful of failing" (Conroy et al. (2007)). Amongst, other things, failure is linked to upsetting others. (Conroy et al. (2002); Conroy et al. (2003); Conroy et al. (2007)). Substantial evidence points to a preponderance of women demonstrating greater fear and anxiety than men across the life span (McLean and Anderson (2009)).Nelson et al. (2013) find in a psychology study that females reported significantly higher fear of failure than their male counterparts and hence gender differeneces in the fear of failure among engineering students. Fear of failure has also been directly correlated with lack of self-confidence, poor feelings of self-esteem, and low risk-taking (Sherman (1987);Elliot and Sheldon (1997);Martin et al. (2003)). As noted earlier, in the economics literature, we have already seen evidence of gender differences in confidence and risk taking. The psychology literature also identifies fear of negative evaluation separately from social anxiety (Button et al. (2015)) and establishes a link between fear of negative evaluation and performance outcomes (Mesagno et al. (2012)).

[13]A large experimental literature has tested whether systematic differences in risk preferences exist between men and women. This literature has been recently reviewed in two articles: Croson and Gneezy (2009) and Eckel and Grossman (2008). Gneezy et al. (2003) find men strongly increase their performance in the tournament setting but women do not. Niederle and Vesterlund (2007) study the compensation choices men and women make in a mixed-sex environment and find even the women that performing the top performance quartile in the first rounds of the experiment are less likely to choose tournament compensation than the men that performed in the lowest quartile.

[14]Bartling et al. (2009) classify a sample of 117 mothers of preschool children into aheadness averse (averse against advantageous inequality) and behindness averse (averse against disadvantageous inequality) and find that aheadness averse mothers are less likely to compete.

[15]Benabou and Tirole(2006)'s model of prosocial behavior posits that honor (or signaling a type above the average) provides positive

are more affected by social image concerns. A recent study by Alan et al. (2016) investigates the evolution of gender differences in the willingness to assume leadership in a group. They find, in a large-scale field experiment, that while there is no gender difference in the willingness to make risky decisions on behalf of a group in a sample of children, a large gap emerges in a sample of adolescents and the effect is significantly greater for girls. They use post experimental survey questions to explain this change and find that over time women become more averse to public scrutiny, therefore providing suggestive evidence of correlation between aversion to scrutiny and aversion to assuming leadership. There is also experimental evidence that women are more likely to be "wallflowers", i.e., to be averse to any unwanted attention, no matter whether positive or negative.Jones and Linardi (2014a)

In sum, while existing studies suggest that both distributional preferences and aversion to (negative) feedback may play a role in the observed gender leadership gap, our study is the first to investigate the causal impact of both traits on men's and women's willingness to become a leader, as well as on leadership outcomes.

2.0.3 Differences in the behavior of followers

This is the strand of literature that has been explored the most, both using experimental and observational data[16]. Beaman et al. (2009) exploit random assignment of gender quotas across Indian village councils to investigate whether having a female chief councillor affects public opinion towards female leaders and find the public prefer male leaders and have negatively biased priors on the effectiveness of female leaders. King and Matland (2003) find field evidence of the gender of political candidates affecting the possibility of followers voting for them, but the effect depends on the party affiliation of the voters.Gangadharan et al. (2015) find field evidence, using a public goods game, of significant male backlash against female leaders when women are assigned to positions of leadership through gender based quotas. Grossman et al. (2015) provide experimental evidence that female leaders and followers are more cooperative than males in most circumstances and that the behavior of followers is same towards leaders regardless of their gender. Reuben et al. (2012) present evidence from an experiment in which groups select a leader to compete against the leaders of other groups in a real effort task that they have all performed in the past and find women are selected much less often as leaders.

While the behavior of followers is more widely studied in the literature, our experimental design allows us to contribute to the literature by investigating the behavior of workers, in terms of performance, attitudes and communication toward male versus a female managers, in an environment where managers' decisions affect workers' payoffs asymmetrically and where workers have no information on relative productivities, leading to lack of transparency in the rank allocation decisions.

3 The experiment

3.1 Experimental design

The experiment simulates work environments where the leader needs to make decisions that create income inequality between employees due to rank differentials. The leader has an information advantage over the other workers and can make decisions that maximize his or her payoffs. The assumption is that the manager represents the best interests of the firm and should always allocate ranks based on performance. Knowing that leadership entails controversial decision-making and possible conflict, individuals might be unwilling to become leaders. The experiment allows us to investigate gender differences in: 1) the willingness to become a leader: 2) the efficiency of leadership in terms of

utility while stigma (signaling a type below the average) provides negative utility. Thus, if individuals are looking to gain social approval of their behavior, they will try to signal traits defined as "good" based on the community's norms and values (Akerlof (1980); Bénabou and Tirole (2006); Andreoni and Bernheim (2007)).

[16]Studies from psychology, sociology and management show mixed evidence. Psychology experiments by Rice et al. (1980) and Rice et al. (1984) to examine the effects of leader sex in cadet training programs at the US Military Academy find that groups with female leaders are rated as less effective on tasks than groups with male leaders. In a psychology study (Johnson et al., 2008) using qualitative, experimental, and survey methodologies, it was found sensitivity was more strongly associated with female leadership, whereas masculinity, strength, and tyranny were more strongly associated with male leadership. However, for female leaders to be perceived as effective they needed to demonstrate both sensitivity and strength, although male leaders only needed to demonstrate strength. A series of experiments have shown that, holding performance constant, women leaders are evaluated more negatively than male leaders. These studies typically either provide written description of leadership situations, varying the sex of the leader, or use trained actors to lead, allowing the experimenters to control the degree of success the leader achieves (Swim et al., 1989). The surveys find the bias is most pronounced when the leadership role is typically considered a male role.

rank allocation decisions; and 3) the way the leader communicates with the workers; and 4) the workers' attitudes towards the leader, as measured by the language used when communicating with him or her.

The experiment consists of six stages. Before stage one begins, each subject is asked to fill in a brief survey that asks for their age, gender, field of study, and previous participation in an experiment. The answer to the gender question leads to a pre-determined list of gender-based names; subjects are invited to pick a name from the list after being informed that for the duration of the experiment they will be identified with their chosen name[17]. The male subjects choose from a list of male names and the female subjects choose from a list of female names[18]. We did this to ensure that while the gender of the subject is visible to other participants during the experiment, it is not made artificially salient by the experimental instructions.[19]

In each stage of the experiment, subjects engage in a real effort task consisting in finding a 4-letter word in a 6x6 letter matrix[20], for a total of 20 matrices per stage. Studies on leadership have typically used a public goods game, with randomly selected leaders.[21] However, in our study, we wanted leader selection to be based on performance to make it comparable to a firm environment where managers are chosen based on qualifications. Hence, we use a real-effort task which requires cognitive thinking and focus. Leadership studies which have used a real effort task (e.g. Reuben et al. (2012)) have employed the Niederle and Vesterlund (2007)'s math task consisting in adding a series 5 two digit numbers. However, it has been seen in the literature that women are less confident than men in math-based tasks (Niederle (2014),Dreber et al. (2014)). Since we did not want confidence to play a role in individuals' willingness to become a leader, we chose a task in which both genders should be equally confident (if anything, women may be more confident than men in a language-based task). This way, any gender differences in willingness to become a manager cannot be attributed to differences in skills or self-confidence.

In stage 1, subjects receive an endowment of 40 ECU and earn 2 ECU for each puzzle they solve correctly in 5 minutes.[22] At the end of Stage 1, subjects are randomized into groups of 3. They are shown the chosen names of the group members they are paired with and also their absolute performance in the task. They are then given information about the upcoming five stages of the experiment, in which two group members will play in the role of workers and one in the role of manager. The manager gets a fixed wage of 100 ECU and his/her main role is to decide, at the beginning of each stage of the experiment, which worker will be Rank A and which worker will be Rank B. The Rank A worker gets a wage of 80 ECU, while the Rank B worker gets 20 ECU. After the rank allocation, all members of the group engage in a similar puzzle task as in Stage 1 of the experiment. Each correctly solved puzzle generates 2 ECU in addition to the initial wage. Moreover, each puzzle solved correctly by the Rank A worker generated 2 ECU also to the Manager. Therefore the earnings from each stage 2-6 of the experiment are determined as follows:

- The Manager gets 100 ECU + 2 ECU per puzzle + 2 ECU per puzzle solved by Rank A worker
- Rank A worker gets 80 ECU plus 2 ECU per puzzle
- Rank B worker gets 20 ECU plus 2 ECU per puzzle

Stages 3 to 6 are identical to Stage 2. However, at the end of each stage of the experiment, the Manager is informed about the performance of Rank A and Rank B workers in that stage and has the chance to reassign ranks before

[17] The other questions included in the pre-experiment survey were only aimed at not making gender artificially salient in the study.

[18] We use a list of distinctively White sounding names as classified by Bertrand and Mullainathan (2004) in their paper "Are Emily and Greg more employable than Lakisha and Jamal? A field experiment on labor market discrimination". Distinctive names are those that have the highest ratio of frequency in one racial group as compared to frequency in other racial groups.

[19] I did not ask subjects to write down their real names as I did not want to lift anonymity nor did I want the potential confounding bias of race, nationality or ethnicity associated with the actual name of the subject to play a role in the experiment.

[20] We use the website http://tools.atozteacherstuff.com/word-search-maker/wordsearch.phpto create the puzzles and the website % http://www.thefreedictionary.comto find words of varying lengths. We ran some pilots of the puzzle task with varying levels of difficulty created by varying the size of the matrix, varying the length of the word to be identified, changing the way in which words could be identified in the puzzle (forward, backward, up, down, diagonal etc) and the time given for each set of puzzles and found the configurarion of finding 4 letter words in a 6X6 matrix with a time of 5 minutes in Stages 1 and 2, 4 minutes in Stages 3 and 4 and 3.5 minutes in Stages 5 and 6 as optimal in creating enough heterogeneity in performance to see how managers make rank decisions under different situations.

[21] Most leadership studies look at leaders as first movers or average players who are randomly selected and hence use a coordination task which involves making contribution decisions in a public goods game structure.

[22] The screen the subjects face is divided in two halves. On the left, they see the matrix and on the right, they see a list of 40 words. Each puzzle has two words that appear on the list. In order to earn money, the subjects have to identify one word per puzzle. Once they identify the word, they have to enter the number next to that word in the list. They then have to press "submit" to move to the next puzzle. We only allow for the word in the puzzle to appear horizontally or vertically in the matrix, following a forward direction.

the next stage begins. [23]

3.2 Treatments

This is an experimental design with 3 treatments as follows:

Treatment 1 (T1): BASELINE

In every group of 3 members, the best performer in Stage 1 is chosen to be the manager. Ties are broken in favor of women. The remaining two group members are designated as workers.

Treatment 2 (T2): CHOICE

The game is exactly the same as in the Baseline, except for the fact that at the beginning of Stage 2, before the roles are assigned and after receiving information about the next five stages and the names of their group members, subjects have to state whether they would like to be the manager of their group. From the subset of those who indicate they would like to be the manager of their group, the best performer in each group is chosen to be the manager.

Treatment 3 (T3): CHOICE+CHAT

The game is the same as in T2, except that now, after assigning ranks A and B to the workers, the manager needs to send a free-form message to the Rank A worker and a free-form message to the Rank B worker. There is two-way communication between the "Manager" and the "Worker" allowed at the stage of the game where the Manager decides rank assignment. After assigning ranks A and B to the workers, the Manager has to send a message to the Rank A worker and a message to the Rank B worker. The Manager can write anything he or she wishes to communicate to each worker. After the manager submits the individual messages, each worker sees the message sent to him or her and has to send a message back to the Manager. The messages sent by the workers are displayed to the manager before the next stage begins. This happens at every stage there is a rank assignment decision taken by the Manager, i.e. Stages 2-6. Participants are given information about the presence of two-way communication between manager and workers before they are asked to state whether they want to be the manager of their group.[24]

3.3 Predictions

Given the payoff structure in this game, the optimal strategy of the Manager is to allocate ranks based on workers' relative performance. This is because the manager's earnings depend positively on Rank A's performance and do not depend on Rank B's performance in the real effort task. Given that the nature of the real effort task remains constant across stages, this gives a clear incentive to the manager to allocate ranks based on past performance. Moreover, given that the Manager is always the highest earner in the group, everyone should always choose to become manager when they get the chance. Prediction 1 follows:

Prediction 1: *If individuals are purely money maximizers:*

a. *all managers will allocate Rank A to the best performer in the group and*

b. *all participants will choose to be managers in T2 and T3;*

However, individuals may not be solely self-interested and pure money maximizers. Instead they might have distributional preferences, where they care not only about their own payoffs but also the payoffs of others due to fairness considerations and inequality aversion. Prediction 2 follows:

Prediction 2: *If individuals have distributional preferences:*

a. R*ank allocation will not be based purely on performance. Managers might change allocations in rounds regardless of performance, possibly alternating ranks between the two workers.*

b. *Participants who choose to be managers (in T2 or T3) will make more efficient rank allocations than participants who are assigned the manager role (in T1).*

[23] The best performers among everyone in their own group in Treatment 1 are chosen as the Manager. The best performers among everyone in their own group who chose to be the Manager are chosen as the Manager in Treatments 2 and 3

[24] In Treatments 2 and 3, if no one in the group chooses to be a manager. the manager is randomly chosen among the best performers in the group(as in baseline). If more than 1 subject in a group chooses to be the manager, the manager will be the best performer. If 2 or 3 subjects in the group have the same performance, I randomly choose among them, while giving priority to women (as in baseline).

It might also be that individuals are driven by reputational concerns and image motivations. They might give weight to how they are judged by people, especially negatively. Prediction 3 follows:

Prediction 3: *If individuals are image motivated and are averse to negative feedback:*

a. *Managers will change rank allocations in-between rounds regardless of performance more frequently in T3 than T2 or T1;*

b. *Participants will be less willing to be manager in T3 than in T2;*

As noted in Section 2.0.2, empirical findings show women might be more affected by distributional concerns and/or public scrutiny and judgment. Prediction 4 follows:

Prediction 4: *If women are more averse to inequality and/or to receiving (negative) feedback from workers:*

a. *Women managers will be more likely than men to change rank allocations in-between rounds regardless of workers' performances;*

b. *Women participants will be less likely to choose to be managers than men participants;*

c. *Women participants will be less likely to choose to be managers in T3 than T2.*

3.4 Implementation

The laboratory study in this paper used a computerized interface (z-Tree, Fischbacher 2007) and was conducted at the Laboratory for Research In Experimental Economics (LREE) at Southern Methodist University. Subjects were recruited from the LREE subject pool from amongst undergraduate and graduate students and were only informed they would be participating in an economics experiment. Earnings during the experiment were denominated in Experimental Currency Units, or ECU. The dollar to ECU exchange rate was \$1 for 6 ECU. 9 sessions were conducted between March and April 2017, with 4-7 groups per session and 2-4 sessions per treatment for a total of 150 subjects overall (84 men and 67 women) as shown in Table (1). The experiment lasted slightly more than an hour. Average earnings from the six decision rounds were \$27.5[25].

Table 1: Summary of experimental sessions and treatments

Treatments	Sessions	Groups	Participants		Managers	
			Men	Women	Men	Women
Baseline (TI)	2	12	18	19	5	7
Choice (T2)	3	17	26	25	7	10
Choice+Chat (T3)	4	21	43	20	11	10
Total	9	50	87	64	23	27

As participants entered the lab they were asked to provide informed consent. They were asked to pick a random number and had to sit at cubicles pre-marked with that random number to minimize the probability that people who knew each other would be sitting next to each other. We then proceeded with reading the instructions. Participants were informed that the experiment would consist of six stages and the instructions would be provided separately on their computer screens at the beginning of each stage. They would have the chance to earn money in each stage of the experiment. After participating in all the stages of the experiment they would be asked to complete a brief questionnaire. They would then be paid privately, by check, the money they earned in the selected stage of experiment. . At the end of the six stages of the experiment, subjects were shown their final earnings (which included a \$10 participation fee in addition to whatever they earned from a randomly selected stage of the experiment). Then the subjects were asked to fill up a questionnaire which asked them about their experience during the experiment as well as demographic characteristics and some personality questions. They were then paid the money they earned in the selected stage of experiment privately, by check.

[25]The share of women participating in a session ranging between 33 percent and 53 percent. The population did not differ significantly by gender. The average age was 23.4 years, with 21-25 year olds accounting for 72 percent of the participants, 73 percent were graduate students already majoring in or intended to major in Stem (Science, Technology, Engineering, Mathematics) fields, 41 percent had never participated in an LREE experiment before, 64 percent were Indian and 23 percent were born in the United States.

4 Results

Table 2: Subject performance under different treatments

	Average Puzzles correctly solved (Round 1)			Average Puzzles correctly solved (Overall)		
	Men	Women	All	Men	Women	All
Baseline (T1)	12.2	13.8	13.0	15.4	16.0	15.7
Choice (T2)	12.7	14.3	13.5	14.7	15.8*	15.2
Choice+Chat (T3)	13.1	16.2	14.1	15.8	17.6***	16.4
H_0: T1=T2	0.8131	0.8012	0.7372	0.2750	0.7073	0.2891
H_0: T1=T3	0.6121	0.2002	0.4067	0.5094	0.0040***	0.1145
H_0: T2=T3	0.7756	0.2834	0.5994	0.0346*	0.0015***	0.0031**

Note: Asteriks in rows 1 to 3 indicate significant gender differences. P-values are generated by t-tests
*indicates significance at the 10% level, ** at the 5% and *** at the 1% level

Table (2), shows overall performance i.e. in terms of the average number of puzzles correctly solved by subjects under the three treatments. we start by looking at the average performance over Round 1. The average number of puzzles correctly solved ranges from 12 to 16 over all treatments. Women seem to be performing as well if not slightly better than men. There is no statistically significant gender difference in performance though. There also appears to be no differences between treatments for either gender. Breaking performance down by rounds, it appears while women are doing a little better than men in the beginning (which gives them a better chance of being managers), the difference in performance disappears over the rounds. This validates my choice of task since we wanted women to be as good if not better at the task than men so we could observe equal number of men and women managers, at least in the baseline. In fact, 27 managers are women and 23 are men over all the sessions.

When we look at the average performance in all rounds, some treatments effects seem to come into play. It appears the women in treatments 2 and 3 were significantly better than the men and that within treatments, women in Treatments 2 and 3 were better than women in the Baseline and men in Treatment 3 were slightly better than men in Treatment 2.

Table 3: Subject behavior under different treatments

	% Volunteer		% Efficient Allocations (All Rounds)		% Efficient Allocations (Round>4)		# Efficient Allocations (All Rounds)	
	Men	Women	Men	Women	Men	Women	Men	Women
Baseline (T1)			83.33	92.59	70.00	81.82	4.0	3.6
Choice (T2)	100	92	94.12	91.30	85.71	95.00	4.6	4.2
Choice+Chat (T3)	93.02	90	92.16	89.47	95.24	73.33*	4.3	3.4**
H_0: T1=T2			0.184	0.847	0.350	0.235	0.2925	0.2536
[one-sided test]			(0.186)	(0.609)	(0.332)	(0.281)	(0.4161)	(0.3551)
H_0: T1=T3			0.248	0.669	0.050*	0.612	0.5627	0.7784
[one-sided test]			(0.221)	(0.511)	(0.087)*	(0.491)	(0.8516)	(0.6449)
H_0: T2=T3	0.168	0.815	0.730	0.776	0.324	0.070*	0.3240	0.0739*
[one-sided test]	(0.236)	(0.606)	(0.544)	(0.531)	(0.348)	(0.093)*	(0.3329)	(0.0788)*

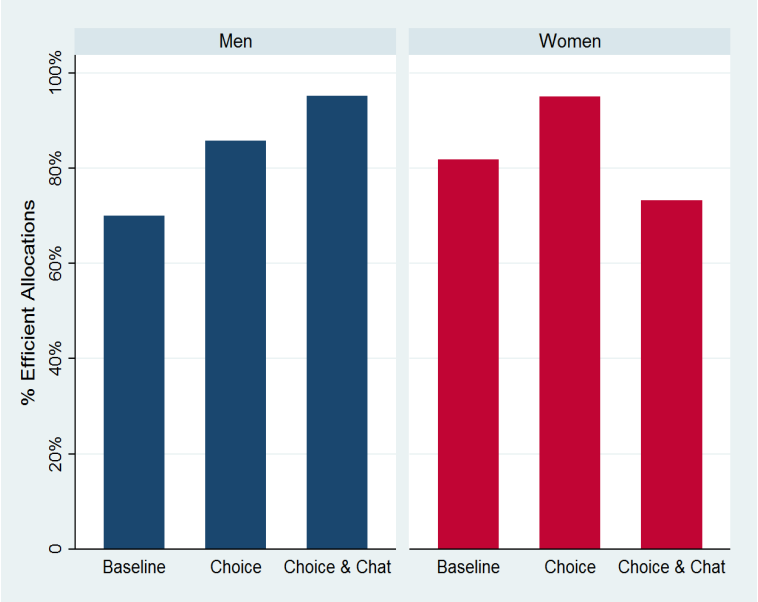
Note: Asteriks in rows 1 to 3 indicate significant gender differences.
P-values are generated by Chi-square tests for % volunteer and % efficient allocations
P-values are generated by tests of equality of means for # efficient allocations
P-values from one-sided Fisher exact tests in parentheses for Cols 1,2,3
P-values from Wilcoxon rank-sum test in parentheses for Col 4
*indicates significance at the 10% level, ** at the 5% and *** at the 1% level

In Table (3), we look at subject behavior under different treatments. First, we look at the percentage of men and women who choose to be managers under Treatments 2 and 3. Under prediction 1b, all individuals should volunteer

if they are pure money maximizers. This doesn't seem to be the case. Treatment 2 sees 92% of females volunteering as opposed to 100% of men while Treatment 3 sees 90% of women volunteering as opposed to 93.02% of men. While women seem to be volunteering less than men, the gender difference is not significant. Moreover, we don't see a significant difference in the percentage of men or women who volunteer in Treatment 2 versus Treatment 3. We don't find sufficient evidence for Prediction 3b. However, we have two possible explanations. First, the sample we have collected so far is quite small and we need to run 4-6 sessions per treatment which we intend to do in the future. Moreover, managers don't seem to anticipate negative feedback from workers of rank B. While analyzing the chat messages for Treatment 3, we don't find evidence of workers being upset and expressing disapproval toward their manager. This may be because through the chat box, managers are able to justify and to explain their decisions to workers, and establish social ties. we intend to run a fourth treatment which generates more negative feedback toward the manager so that subjects might anticipate this better when making their volunteering decision to be a manager. One possible way of doing this is to eliminate messages from the Manager so that managers can't justify their decision to the worker.

Next, we look at the efficiency of rank allocation of managers. We measure this in two ways. First, we look at the percentage of managers that pick the best performer in the previous round as Rank A. We call this the percentage of efficient allocations. We are excluding cases where Ranks A and B have tied scores, since we want to see how managers allocate ranks when there is a clear performance differential between the workers in the previous round. We intend to do a separate analysis for how managers allocate ranks when performance is tied between the workers. Second, we look at the number of times a manager picks the better performer as Rank A over a session. We call this the number of efficient allocations. As per Prediction 2a, rank allocation seems to be based not purely on performance since we see 83% of male and 92% of female managers making efficient allocations overall. In line with Prediction 2b, both men and women managers make better decisions when they select into leadership in Treatments 2 and 3 than in the baseline, especially over time. Moreover, when we look at the efficiency of allocations round by round, we find that with time, women managers see a significant drop in efficient allocations in Treatment 3. This is evidence that the chat seems to be affecting women managers negatively in terms of efficiency and the effect is cumulatively greater in the later rounds. This is in line with prediction 4a and seems to suggest women are more averse to feedback. we have presented this graphically below. The evidence holds for the number of efficient allocations. we see women managers making a significantly lower number of efficient allocations in Treatment 3 as compared to Treatment 2. This seems to be confirmed by regression analysis, not reported here.

Figure 1: Graph 1



In order to investigate gender differences in leadership styles, we categorize and analyze the messages by the managers to their workers in Treatment 3 in Tables 4 and 5. In these tables, the reported categories mean the following: %Encourage means the percentage of messages that contained encouragement/congratulations (For ex-

ample: "Good job", "Well done" etc.). %Info_perf means the percentage of messages that provide information on performance ("You got 15 puzzles correct" etc). %All_perf means the percentage of messages that contained information on allocation rule based on performance. %All_fair means the percentage of messages that contained information on allocation based on fairness. %Justify means the percentage of messages that contained information on allocation (any justification). %Suggest means the percentage of messages that contained suggestions on task. %Team means the percentage of messages that contained team building motivations ("We are a great team", "We are working together" etc). %Compete means the percentage of messages that contained content to create competition between workers. %Sorry means the percentage of messages that mentioned "Sorry".

Interesting patterns of leadership styles emerge here. Men managers have a higher frequency of sending encouraging messages than women managers. They have a significantly higher frequency of mentioning performance considerations in their rank allocation decisions. On the other hand. women managers have a significantly greater frequency of mentioning fairness considerations in their rank allocation decisions than men managers. Women managers also justify their ranking decisions significantly more than men managers. Moreover, men managers have a significantly higher frequency of sending messages (especially to Rank B workers) that create competition between the two workers while women managers tend to send messages containing suggestions for the task and team building motivations. Women managers are more likely to send information to their Rank B workers about their performance and are also more likely to apologize for their rank allocation decision by saying sorry to them.

Table 4: Frequency of categories of messages to Rank A by Manager

Manager	%Encourage	%Info_perf	%All_perf	%All_fair	%Justify	%Team	%Compete
Men	92.59	1.85	7.41	1.85	3.70	1.85	7.41
Women	86.00	6.00	6.00	14.00**	18.00**	6.00	4.00

Note: Asteriks indicate significant gender differences.
P-values are generated by Chi-square tests.
*indicates significance at the 10% level, ** at the 5% and *** at the 1% level

Table 5: Frequency of categories of messages to Rank B by Manager

Manager	%Encourage	%Info_perf	%All_perf	%All_fair	%Justify	%Suggest	%Team	%Compete	%Sorry
Men	61.82	16.36	30.91	9.09	16.36	1.82	0.00	23.64	7.27
Women	50.00	30.00	8.00***	24.00**	24.00	8.00	2.00	10.00*	10.00

Note: Asteriks indicate significant gender differences.
P-values are generated by Chi-square tests.
*indicates significance at the 10% level, ** at the 5% and *** at the 1% level

In Tables 6 and 7 the reported categories mean the following: %Thanks means the percentage of messages that were positive (ex: "Thanks", "No worries"). %Name_Manager means the percentage of messages that mentions name of manager. %Commit means the percentage of messages that mention commitment to work hard in the future. %Competitive means the percentage of messages that display a competitive attitude ("I am the best at this" etc). %Joke means the percentage of messages that display subjects' joking around. %Request means the percentage of messages that contain a request to be A next round. %Upset means the percentage of messages that show the subject to be sad/upset.

We analyze the messages sent by the different ranks of workers to their managers. We find that Rank A workers who are men are more likely to display a competitive attitude ("I am the best at this" etc) and also try and create a sense of camaraderie with the manager through jokes than Rank A workers who are women. Both men and women are equally likely to thank the manager for their decision and commit to hard work in the future rounds. There is a significant difference in the number of men and women who are Rank B workers expressing a positive attitude (By saying "Thanks" or "No worries"). Rank B workers who are men are more likely to be upset, express a competitive attitude and request for a rank switch than women. Even then, the overall number of workers sending such messages is quite low and we will need a bigger sample to further look at gender differences in the messages from each sex of managers (ranks) to each sex of ranks(managers).

Table 6: Frequency of categories of messages to Manager by Rank A

Rank A	%Thanks	%Name_Manager	%Commit	%Competitive	%Joke
Men	80.70	10.53	29.82	10.53	12.28
Women	77.78	11.11	29.41	5.88	5.88

Note: Asteriks indicate significant gender differences.
P-values are generated by Chi-square tests.
*indicates significance at the 10% level, ** at the 5% and *** at the 1% level

Table 7: Frequency of categories of messages to Manager by Rank B

Rank B	%Thanks	%Name_Manager	%Commit	%Competitive	%Joke	%Request	%Upset
Men	65.57	4.92	16.39	6.56	3.28	11.48	8.20
Women	94.74**	5.26	10.53	0.00	5.26	0.00	0.00

Note: P-values are generated by Chi-square tests.
*indicates significance at the 10% level, ** at the 5% and *** at the 1% level

In Tables 8 and 9, we start looking at how workers evaluate their manager and at the self-evaluation of managers by gender. After the experiment, we ask subjects to rate their Manager's decisions on a scale of 1 to 5 where 1 means "Very Bad" and 5 means "Excellent". In Table 8, we look at the average evaluation given by different genders of workers to different genders of managers. Overall, workers tend to rate their Managers better in Treatments 2 and 3 than Treatment 1. This is in line with Managers making more efficient rank allocations in Treatments 2 and 3 than the baseline. Moreover, in the chat treatment (Treatment 3) where managers are able to communicate with their workers., they seem to get better ratings The between treatment effects are significantly stronger for women workers evaluating their managers in Treatment 3. Since women managers are switching ranks more often, at least toward the end, they seem to make Rank B employees happier (and Rank As are not that upset because they seem to understand their manager's decision) and in general it's possible women managers are creating a better work environment. By giving everybody a chance and not looking simply at merit, they are getting better evaluations. With a bigger sample, we will be able to differentiate between same sex and opposite sex evaluation better. Preliminary analysis with the current data shows a tendency of people of one sex evaluating people of the other sex better but the effect is not significant. In Table 9, we look at the self-evaluation of managers. We categorize ratings greater than 3 as positive evaluation and less than or equal to 3 as negative evaluation. Self-evaluation of managers seems to be consistent with the workers evaluation. There seems to be something (possibly justifying their decisions) that the women managers are doing that makes them feel better about themselves, especially in the Choice & Chat treatment.

Table 8: Evaluation of Manager by workers under different treatments

	Average Evaluation		Average Evaluation			
	Men Worker	Women Worker	Men Worker		Women Worker	
			MM	WM	MM	WM
Baseline (T1)	2.6	2.7	1.8	2.9	3.4	2.7
Choice (T2)	3.3	3.0	3.1	3.1	3.4	2.9
Choice+Chat (T3)	3.5	3.8	3.1	3.7	4.0	4.0
H_0: T1=T2	0.2875		0.2339		0.8138	
H_0: T1=T3	0.0130		0.0385**		0.0478**	
H_0: T2=T3	0.1573		0.4784		0.0807*	

Note: P-values are generated by t-tests.
For rows 4-6, I test the overall average evaluations in each treatment(col 1) and by gender of worker(col 2)
MM means Men Manager, WM means Women Manager
*indicates significance at the 10% level, ** at the 5% and *** at the 1% level

Table 9: Self-Evaluation of Manager

	Negative Self-Evaluation	
	Men	Women
Baseline	20.00	14.29
Choice	14.29	10.00
ChoiceChat	27.27	0.00*
H_0: T1=T2	0.793	0.787
H_0: T1=T3	0.755	0.218
H_0: T2=T3	0.518	0.305

Note: Asteriks indicate significant gender differences.
P-values are generated by Chi-square tests.
*indicates significance at the 10% level, ** at the 5% and *** at the 1% level

5 Conclusion

Our study contributes to the growing literature on leadership by gender. While the gender gaps in education and participation in the labor market are narrowing. there is still an enormous gap in leadership. In this paper, we examined a novel channel of that could cause women to self-select out of leadership roles and partly explain this gender gap. We also examined the effectiveness of leadership by gender in a controlled lab setting. We employed a specially designed economics experiment which allows me to observe leadership styles and effectiveness by gender as well as the reaction, feedback and evaluation of different sexes workers to different sexes of their managers. Preliminary analysis suggests that men and women are equally adept at performing the task. More men volunteer than women to be managers in *Choice* and the *Choice & Chat* treatments, though the difference is not significant. Fewer women volunteer in the *Choice & Chat* treatment which has two-way communication along with the choice to be a manager than the *Choice* treatment which just contained the choice to be a manger without allowing communication, though again the difference is not significant. Both men and women are more effective managers when self-selecting into leadership than when they are assigned leadership roles. However, women managers see a significant drop in efficiency in the *Choice & Chat* treatment where there is two-way communication between manager and worker. The evidence suggests that neither men nor women are pure money maximizers and seem to affected by other concerns. Moreover, women seem to affected by distributional concerns and/or feedback more than men. Men and women seem to display distinct leadership styles. Men are more encouraging, like to create competition between workers and give greater importance to performance while women emphasize team building, give practical suggestions to the workers and give more importance to fairness and distributional concerns in task allocation. Men and women also seem to react differently to different genders of managers. Men are more likely to be upset with managerial decisions that affect them negatively. They are more likely to challenge the manager's decision and ask for a review while women are more likely to accept similar managerial decisions. Both men and women workers evaluate their managers better in the *Choice* and the *Choice & Chat* treatments than the baseline in line with the managers making more efficient decisions in those treatments. Men and women also appear to have a positive bias in their evaluations of managers of the opposite gender. On average women managers seem to get higher evaluations than men. Women managers seem to self-evalute higher than men managers, especially in the *Choice & Chat* treatment perhaps because they can explain their decisions. It is possible that women managers create a better work environment by giving everybody a chance and not looking simply at merit and hence get better evaluations. However, we will need to run more sessions of the existing treatments and do further analysis to confirm these reuslts. Moreover, we plan to introduce a fourth treatment with greater scope for negative feedback and examine its effect on leadership decisions.

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6 Appendix

EXPERIMENTAL INSTRUCTIONS

General instructions (For all three treatments)

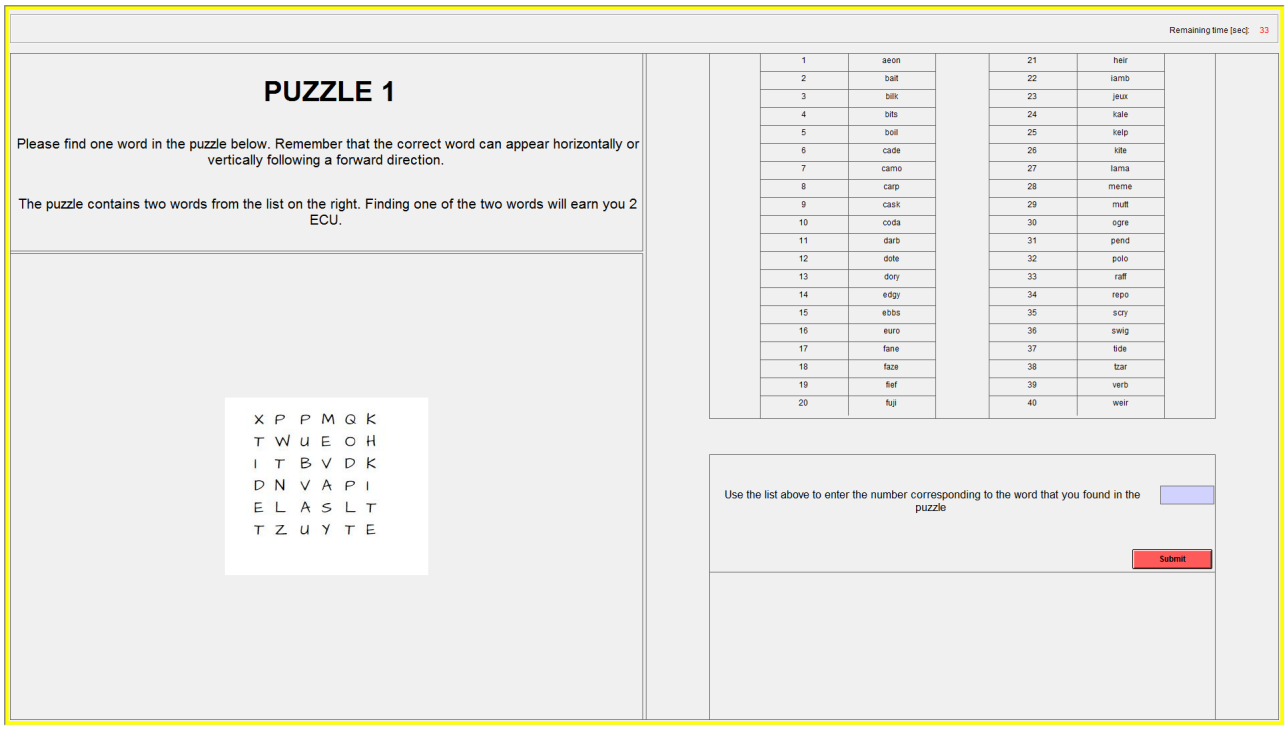
Thank you all for coming today. You are here to participate in an experiment. In addition to a $10 participation fee, you will be paid any money you accumulate from the experiment. You will be paid privately, by check, at the conclusion of the experiment. The experiment will consist of six stages and the instructions will be provided separately on your screen at the beginning of each stage. You will have the chance to earn money in each stage of the experiment. Earnings during the experiment will be denominated in Experimental Currency Units, or ECU. At the end of the session one stage of the experiment will be randomly selected for payment and your earnings in that stage will be converted to dollars at the exchange rate of **$1 for 6 ECU**. After participating in all the stages of the experiment you will be asked to complete a brief questionnaire. You will then be paid the money your earned in the selected stage of experiment. This study has been reviewed and approved by the SMU Human Subjects Committee. *If you have any questions during the experiment, please raise your hand and wait for an experimenter to come to you. Please do not talk, exclaim, or try to communicate with other participants during the experiment.* Participants intentionally violating these rules may be asked to leave the experiment and may not be paid. Please read and sign the Consent Form that you found on your desk. Please raise your hand if you have any question about any of the information on the Consent form. We will proceed with the experiment once we have collected all signed consent forms.

PUZZLE EXAMPLE (Handout)

During the experiment, you will engage in multiple rounds of a puzzle-solving task. Please refer to the paper you have been given to see an example of the task.

Each task consists of finding a **4-letter word** in a 6x6 matrix. As you can see on the example you have been given, the screen will be divided in two halves. On the left, you will see the matrix and on the right, you will see a list of 40 words. Each puzzle has two words that appear on the list. In order to earn money, you will have to identify one word per puzzle. Once you identify the word, you will have to enter the number next to that word in the list. You will then have to press "submit" to move to the next puzzle.

Please note that the word you are looking for can appear **horizontally** or **vertically** in the matrix, following a **forward** direction. You should ignore words that are read backward or diagonally. You should also ignore words that do not appear in the list.



Look at the example you have been given. In order to earn points, you would have to find either the word "tide" or the word "kite" and enter the corresponding number. The word "tide" appears vertically on the first column. The word "kite" appears vertically on the sixth column.

Can you all see the two words in the puzzle? Raise your hand if you cannot see them.

Note that there are other words that you may identify in the matrix. For instance, the word "sale" [appears horizontally on the fifth row, but it reads backward] and the word "bale" [appears diagonally]. These words would not be valid entries, since they either appear backward or are not on the list. Remember that for an entry to be valid, **it MUST be on the list to the right of the matrix.**

Can you all see the two words in the puzzle? Raise your hand if you cannot. Do you have any questions or doubts about the puzzle-solving task?

Instructions for Stages 2 to 6 (Handout)

Stage 2 of the experiment is about to begin.

• In this stage and in the following 5 stages of the experiment you will be part of a group, together with two other participants. One group member will assume the role of **Manager** and the other two group members will assume the role of **Worker**.

• The manager gets a wage of 100 ECU. The main role of the manager is to decide which worker will be rank A and which worker will be rank B in the group, in this stage of the experiment.

• A **Rank A** worker gets a wage of 80 ECU. A **Rank B** worker gets 20 ECU.

• After the rank allocation, all members of the group will engage in a similar puzzle task as in Stage 1 of the experiment. Each correctly solved puzzle generates **2 ECU** in addition to the initial wage. Moreover, each puzzle solved correctly by the Rank A worker generated 2 ECU also to the manager.

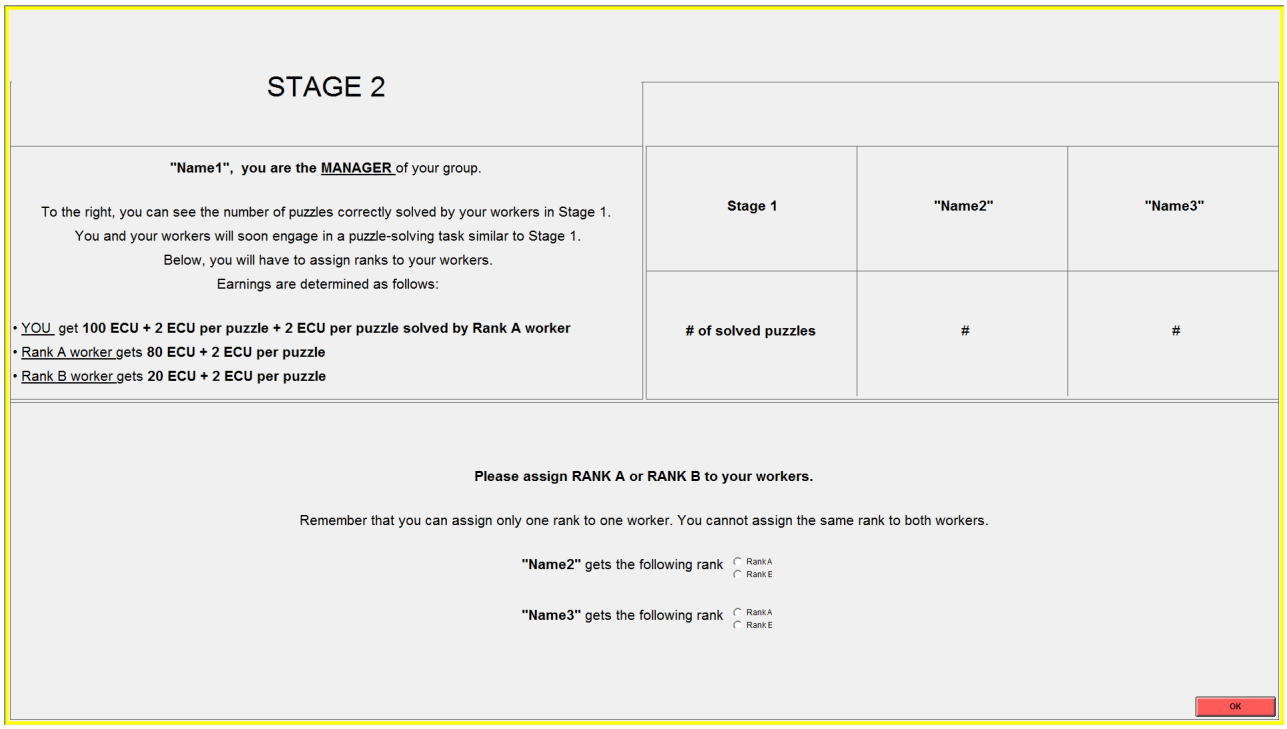
• Therefore the earnings from this stage of the experiment are determined as follows:

- The Manager gets **100 ECU** + **2 ECU** per puzzle + **2 ECU** per puzzle solved by Rank A worker
- Rank A worker gets **80 ECU** plus **2 ECU** per puzzle
- Rank B worker gets **20 ECU** plus **2 ECU** per puzzle

Stages 3 to 6 will be identical to Stage 2. However, at the end of each stage of the experiment, the Manager will be informed about the performance of Rank A and Rank B workers and will have the chance to reassign ranks before the next stage begins, at his or her discretion.

[Specific instructions for Treatment 2 (Choice)]

The Manager will have to decide which worker will be **Rank A** and which worker will be **Rank B**. In the example below we did not use actual names, so the Manager is listed as "Name1" and the workers are listed as "Name 2" and "Name 3". However, in the experiment, each Manager will see the actual names of the two workers in his or her group, and the workers will know the name of their Manager. On the right half of the screen, the Manager will see the actual number of puzzles solved by each worker in the previous stage. After the Manager makes the allocation decision, each worker will be informed about the Rank they have been assigned, either rank A or rank B.



At the end of each of the next 5 stages of the experiment, the Manager will have to decide whether to keep or re-allocate ranks A and B to the two workers, at his or her discretion.

Is the role of the Manager clear? Please raise your hand if you have any questions about the next 5 Stages of the experiment.

In the next screen, you will be asked **whether you want to be the Manager of your group**.

[Specific instructions for Treatment 3 (Choice & Chat)]

After assigning ranks A and B to the workers, the Manager will have to send a **message to the Rank A worker** and a **message to the Rank B worker**. The message chat box **CANNOT** be left blank. In the chat box, the Manager can write anything he or she wishes to communicate to each worker. After the Manager submits the individual messages, **each worker will see the message** sent to him or her and **will have to send a message back** to the Manager.

Please turn this page to have a look at the actual messaging screens that the Manager and the workers will see.

The Manager will see the following screen and will have to send a message to each of the two workers. As before, we are referring to the Manager as "Name 1" and the workers as "Name 2" and "Name 3" but in the actual experiment the names of the three group members will be displayed.

Each worker will see the message sent to him or her and will **have to send a message back** to the Manager. The **messages sent by the workers will be displayed** to the Manager as displayed in the screen below before the next stage begins. [Please note that in this example there is no actual text displayed in the Message Box.]

At the end of each of the next 5 stages of the experiment, the Manager will have to decide whether to keep or re-allocate ranks A and B to the two workers, at his or her discretion. The Manager will also **have to send messages** to Rank A and Rank B worker before the beginning of each stage of the experiment, and the **workers** will **have to reply to those messages.**

Is the role of the Manager clear? Please raise your hand if you have any questions about the next 5 Stages of the experiment.

In the **next screen**, you will be asked **whether you want to be the Manager of your group.**