Female Leadership and Workplace Climate*

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Abstract

Using data from over 2,000 professionals in 24 large corporations in Turkiye, we explore the relationship between female leadership and the relational culture in the workplace. First, we document that while male and female leaders possess equal cognitive capacity, they diverge in socio-emotional characteristics. Next, we show that the relational dynamics in the workplace are different under male or female leadership. Male employees form homophilic professional ties under male leadership, whereas we observe less gender-segregated networks under female leadership where both males and females establish more links with their female colleagues. Female employees receive more support from their leaders and are less likely to quit under female leadership. However, female employees working under female leaders report worse workplace satisfaction and meritocracy. Delving into the mechanisms reveals that female employees depict a gloomier workplace climate in the absence of social support from their female leader. Overall, our findings highlight the influential role of social support from leaders and suggest that increasing supportive female presence in leadership positions may be an effective way to foster a more inclusive relational culture in the workplace.

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1 Introduction

Creating and maintaining a healthy workplace climate is essential for employee motivation, well-being, productivity, and the reputation of firms. Central to a healthy work environment is the quality of social interactions among colleagues and the degree of professionalism between leaders and subordinates (Dutton & Ragins, 2017; Kahn et al., 2018). The latter is critical as leaders have a significant role in setting the tone for the relational culture in the workplace (Van den Steen, 2010; Hoffman & Tadelis, 2021). There is now a growing interest in identifying the skills and qualities that would make an ideal leader in terms of shaping employees' experiences in the workplace (Lazear et al., 2015; Deming, 2017; Heinz et al., 2020; Englmaier et al., 2021). In this paper, we explore the gender angle in this endeavor to understand the relationship between female leadership and the relational culture in the workplace (see, Matsa & Miller, 2013; Bednar & Gicheva, 2014; Lawson et al., 2022; Chakraborty & Serra, 2023; Adams-Prassl et al., 2024). We first explore how male and female team leaders in corporations differ in their cognitive and sociocognitive skills and economic and social preferences. Then, using plausibly exogenous cross-sectional variation in leaders' gender, we document the relationship between female leadership and (i) the inter-gender structure of support networks within firms, (ii) job separations and promotions, and (iii) the workplace climate perceived by employees.

Our study features a data set with detailed information on the characteristics, social networks, and perceived workplace climate of over 2,000 white-collar professionals in 24 large corporations in Turkiye. These data - collected using cognitive tests, incentivized behavioral tasks, and surveys - are complemented with administrative data on promotions and separations. To explore the role of female leadership, we rely on the cross-sectional variation in working under a female leader or between-department variation in the share of female leaders within firms. Our key assumption for the empirical approach is that the assignment to female leaders is as good as random once we control for the nature of the job performed by the employee, female share within the department, and firm fixed effects. To alleviate the room for potential selection at the recruitment stage, we admitted into our study only firms with centralized, transparent, and fair recruitment and team formation (leader-subordinate match) practices. To test for observed selection, we present balance in characteristics of employees working under male and female leaders (Chetty et al., 2011). We provide additional credibility to our empirical approach by showing that the robustness of our

results to the exclusion of covariates.

We characterize the relational culture in the workplace using a comprehensive set of outcomes. Our first set of outcomes relates to the structure of support networks and the degree of gender segregation in professional and personal links. We are interested in whether female leaders differ in providing support for their employees in professional and personal matters. Then, following Coleman (1958), we construct department-level segregation indices, i.e., the degree of male and female homophily within departments. Our second set of outcomes contains job separations and promotions, utilizing administrative data we obtained from the firms. Finally, using item-response survey questions, we construct normalized indices of i) workplace satisfaction, ii) perception of firms' meritocratic values, iii) collegiality, iv) job satisfaction, v) behavioral norms, and vi) leader professionalism. We complement these outcomes with data on individual characteristics regarding cognitive and non-cognitive skills and economic preferences. We use these characteristics as control variables and to document the differences between male and female leaders.

Throughout the paper, we define a "team leader" as an employee responsible for multiple employees and acting as their direct report manager. As most large corporations have hierarchical structures, most of the leaders in our data also have their leaders. A "team" refers to the smallest organizational unit, typically characterized by a specific task or project. In larger departments, multiple teams may exist, each performing different functions. Our focus in this paper is on the subordinates and their team leaders.

We start by documenting the characteristics of leaders. While the unconditional gender gap in the probability of holding a leadership position is 4.7% in favor of men in our data, this gap disappears once we control for demographic and department characteristics. We find that fluid IQ, also known as abstract reasoning ability, is the strongest predictor of holding a leadership position, whereas competitiveness and risk tolerance have no predictive power. Interestingly, except for fluid IQ, verbal creativity and altruism, the skill endowments of female leaders are significantly different from that of male leaders: Female leaders are significantly less competitive, more risk averse, and less cooperative. Moreover, they have significantly higher cognitive empathy and hold more modern gender role beliefs than male leaders. These findings imply that progression into leadership positions does not require women to possess male-like attributes such as high competitiveness and

risk tolerance.[1]

We find that female subordinates are 20% (46%) more likely to receive professional (personal) support from female leaders than male leaders. Male employees, however, are equally likely to receive support from male and female leaders. Second, under female leadership, both males and females are more likely to form support ties with their female colleagues. We show that departments with male leadership exhibit significant male homophily, consistent with Cullen and Perez-Truglia (2023), which shows that male leaders tend to interact more with male subordinates. We show a different pattern under female leadership, where we find less gender-segregated workplace. Our findings add further nuance to the existing literature by showing that women, not only men, also benefit from the homophilic effects of being assigned to same sex leaders. We also find that female employees under female leadership are about 7 percentage points less likely to quit their jobs, implying a 56% reduction in voluntary job separation rates compared to working under male leadership. We find no relation of female leadership to the probability of promotion, neither for females nor for males.

At odds with these positive findings that same-gender interactions are uniformly better for female employees, we find that more than half of the employees in our data prefer to work under male leadership. Employees working with female leaders report significantly lower workplace satisfaction and worse meritocratic values for their firms. Even more striking is that these negative perceptions are driven entirely by female employees. Females report about 0.199 standard deviations lower workplace satisfaction and 0.193 standard deviations lower meritocratic values under female leadership relative to working under male leadership. These results echo the findings of Artz and Taengnoi (2016), who find that women are less satisfied with their jobs when they have a female boss, whereas there is no differential effect for men. Our explanation for this puzzling result is that female employees hold their female leaders to a higher standard than their male leaders. Our results suggest that having a female leader is essential to female workers' well-being in the workplace, but this is conditional on their leader being professionally supportive. We provide suggestive evidence that when the leader provides professional support to their subordinates, the gender of the leader does not matter for the workplace climate perceptions, neither for males nor for females. However,

[1] A prominent literature identifies a series of factors that cause women to shy away from leadership positions, like lack of competitiveness and risk-taking (see, e.g., Niederle & Vesterlund, 2007; Eckel & Grossman, 2008; Croson & Gneezy, 2009; Fisman & O'Neill, 2009; Furtner et al., 2021), reticence to initiate negotiations (e.g. Bowles et al., 2007; Babcock & Laschever, 2021), or aversion to competitive environments (e.g. Gneezy et al., 2003; Flory et al., 2015; Preece & Stoddard, 2015; Niederle, 2017).

female employees judge workplace conditions much worse than their male colleagues when they do not receive support from their female leaders. These findings are consistent with Abel (2022), who shows that negative feedback by female managers decreases job satisfaction and the perceived importance of the task significantly. They are also consistent with evidence from Grossman et al. (2019) or Chakraborty and Serra (2023) about female leaders receiving more backlash or being less positively assessed than men.

Our paper contributes to several strands of the literature. First, our paper speaks to the literature that examines the link between leadership and workplace climate, and in particular also how male or female leadership affects gender-related personnel decisions. Cullen and Perez-Truglia (2023), for example, show that male employees who socialize more with their male managers get promoted more quickly than their male colleagues who are assigned to female leaders. On the contrary, the career progression of females is not affected by the leader's gender. While Cullen and Perez-Truglia (2023) and Minni (2023) focus on vertical social interactions between managers and subordinates, we also consider horizontal interactions among subordinates. Moreover, while Cullen and Perez-Truglia (2023) study the effects of these vertical relationships on the gender pay gap and promotions, we focus instead on networks, the relational atmosphere and perceived workplace climate within the firms, as well as on employee separations. Abel (2022) documents with US-data that negative feedback from leaders decreases workers' job satisfaction and perceived importance of the task, whereas praises from leaders do not have any effect. The adverse effect of negative feedback doubles when it is received from a female leader. Using the same research design, Abel and Buchman (2024) reports that feedback effects do not differ between workers assigned to male and female leaders among gig economy workers in India. Our paper advances this nascent literature by showing how female leadership relates to the structure of social networks in the workplace. Moreover, by distinguishing between supportive and unsupportive leaders, we can uncover an asymmetry of how men and women react to these two different types of leaders. In particular, our analysis of how unsupportive female leaders are perceived and relate to worse workplace climate draw a more nuanced picture of the literature, which often seems to suggest that same-gender interactions are uniformly better for female employees (see, e.g., Matsa and Miller (2011), Kurtulus and Tomaskovic-Devey (2012), Kunze and Miller (2017), Flabbi et al. (2019), Battaglini et al. (2023), Adhvaryu et al. (2023), or Ronchi and Smith (2024)). This need not be the case, as already shown, for example, by Bertrand et al. (2019) who finds no effect of

female presence in corporate boardrooms on other women beyond the women who made it to the boardrooms. Similarly, Bagues et al. (2017) and Bagues and Esteve-Volart (2010) report that the share of females in hiring committees does not change the likelihood of females getting hired or even decreases it. Compared to these papers, we examine networks and workplace climate within teams, and look at voluntary job separations and how they relate to female leadership.

Second, we contribute to the literature on self-selection into leadership roles. This literature documents consistent gender differences in self-selecting into leadership positions and strives to understand the factors explaining this difference. Much of this literature utilizes controlled lab settings and points to gender differences in specific attributes, such as confidence, responsibility aversion, fear of backlash, aversion to competition and risk-taking, in explaining the documented gender gap in the willingness to become a leader (see, e.g., Coffman (2014), Chen and Houser (2019), Bordalo et al. (2019), Alan et al. (2020), Born et al. (2020), Haegele (2022)). We advance this literature by showing for 24 large corporations that actual female leaders do not necessarily share male attributes. Instead, our results strongly suggest that women bring their own style of leadership to corporate life and manage interpersonal relationships differently than men, which accords well with the findings of Matsa and Miller (2013), Bednar and Gicheva (2014).[2]

Overall, our results suggest that the fair representation of female leadership may have benefits beyond efficiency and social justice concerns by going hand in hand with a less segregated workplace, stronger professional support links, and less voluntary quits by female employees. Recent work by Azulai et al. (2020), Castro et al. (2022), Alan et al. (2023), and Haeckl and Rege (2024) shows that organizational and relational culture can be improved via training programs. Yet, cultural transformations may be painfully slow. Innovative training programs notwithstanding, increasing female presence in decision-making positions and improving support by leaders may be a faster and higher-return approach to establishing a healthy relational culture in the workplace.

The rest of the paper is organized as follows. Section 2 provides the background and the context for the study. Section 3 describes our data collection protocol and outcomes of interest. Our descriptive results are presented and discussed in Section 4. Section 5 details our empirical framework and reports our main results. Section 6 concludes.

[2]Matsa and Miller (2013) show that the increased presence of female managers due to a board quota in Norway reduces workforce reduction and short-term profits. Bednar and Gicheva (2014) instead consider the female friendliness of athletic directors in a non-corporate setting. Our paper, instead, offers insights into how female leadership is associated with the relational culture in a corporate setting.

2 Background and Context

In 2019, we enlisted 24 large corporations in Turkiye to study workplace culture from the point of view of the relational atmosphere in the corporate world. Our main criterion for including a firm in our study was that the firm had centralized and transparent subordinate-leader matching practices whereby the sole criterion to appoint a leader to a department or a team within a department was their qualifications, and these qualifications were clearly stated both in the external and internal platforms used. 'Transparent subordinate-leader matching' means that assignments are based solely on technical qualifications, conducted by the HR unit, with gender not considered in any part of the process. This was verified through HR testimonies, confirming that subordinate-leader matching is free from gender concerns. As we elaborate below, satisfying this criterion was the first step to achieving internally valid results. The study had two objectives, resulting in two distinct projects. The first project explored whether a particular training program can effectively improve the relational atmosphere in large corporations. This project involved a randomized controlled trial (RCT) covering 20 of the initially recruited corporations; see Alan et al. (2023). The current project aims to understand whether male and female leaders have different characteristics and whether a leader's gender is related to workplace climate.

Enlisting these firms meant their full cooperation in allowing us to collect detailed individual information from their white-collar professionals of all ranks on demographics, cognitive and non-cognitive skills (fluid IQ, emotional intelligence, verbal creativity), social networks, economic and social preferences, perceived workplace climate, and HR-data on separations and promotions. Recruitment of the firms involved multiple meetings with their CEOs, HR officials, and compliance departments to make sure they fit our criteria and eventually signing confidentiality agreements and research collaboration protocols with each of them.[3] Out of 30 corporations with which we interacted through several meetings, we secured the collaboration of 24 companies from 6 sectors that met our criteria.[4] A number of these firms are large multinationals operating in Turkiye, and

[3]Each formal document was signed by the relevant company's CEO, and the president of Kadir Has University. We obtained ethics approval from Kadir Has University Institutional Review Board.

[4]Among these 24 firms, we removed one defense firm from our RCT study based on the indication that they forced their employees to participate in the program. However, the firm management asked us to collect the baseline data anyways, and we did to maintain our relationships with them. They then underwent a significant structural change, so we did not ask for their admin data and never offered them to join our RCT project. Our RCT study was offered to 23 firms and accepted by 20, as reported in Alan et al. (2023). This paper uses all the data collected from all 24 firms, including this defense firm, covering more than 2,000 white-collar professionals at baseline (Fall 2019). Note

the majority of them are companies that belong to large conglomerates. Therefore, our final sample of firms covers significant players with large market shares in their sectors: defense, chemical, energy, finance, construction, and textile.

The relationship between female leadership and the workplace climate can be identified if the practice of matching leaders with subordinates does not involve any selection mechanism other than matching on observable characteristics. Our key assumption for identification is that the assignment to female leaders is as good as random once we control for the share of females in the department, the nature of the job performed by the employee, and firm fixed effects. There is a threat to identification if (i) employees can sort into teams based on leader gender, (ii) leaders could select their subordinates for their teams, or (iii) HR officers use a selective allocation mechanism based on leader gender or individual characteristics that may be correlated with gender. To the extent that these practices were correlated with the outcomes of interest, our results could not be given causal interpretations.

As mentioned above, we did our best to rule out this threat at the recruitment stage. We set our primary criterion to join our study as having to declare centralized, transparent, and fair recruitment and team formation practices through compliance departments based solely on individual qualifications required for the task at hand. In addition to obtaining these declarations, we ran an extensive survey asking HR officials to provide a detailed account of their firm's hiring and subordinate-leader matching practices. We confirm the initially declared as-good-as random matching mechanisms, conditional on the qualifications required for the respective job. Only one out of 24 firms declared that the gender of the leader might sometimes play a role in forming teams.[5] The officials confirmed in the rest of the firms that recruitment, team formation, and leader-subordinate match practices are never based on gender, always based on qualifications for the task at hand.[6]

We use our rich data to provide evidence that a leader's gender is nearly exogenous to the characteristics of their subordinates in our firms, conditional on the nature of the job performed,

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that our findings are robust to the exclusion of this defense company.

[5]In addition, one firm did not respond to the survey (the defense company previously mentioned). Our results are robust to excluding either or both of these companies from the sample.

[6]None of the corporations we approached had a match practice based on gender. However, some corporations with an interest in participating declared that supervisors (team leaders) might be consulted in choosing subordinates for some tasks on some occasions. We took this as an indication of selection and did not include these firms in our study.

the proportion of female employees in the department, and firm fixed effects. We also show that measured subordinate characteristics are balanced across male- and female-led teams. However, we refrain from interpreting our estimates as purely causal.

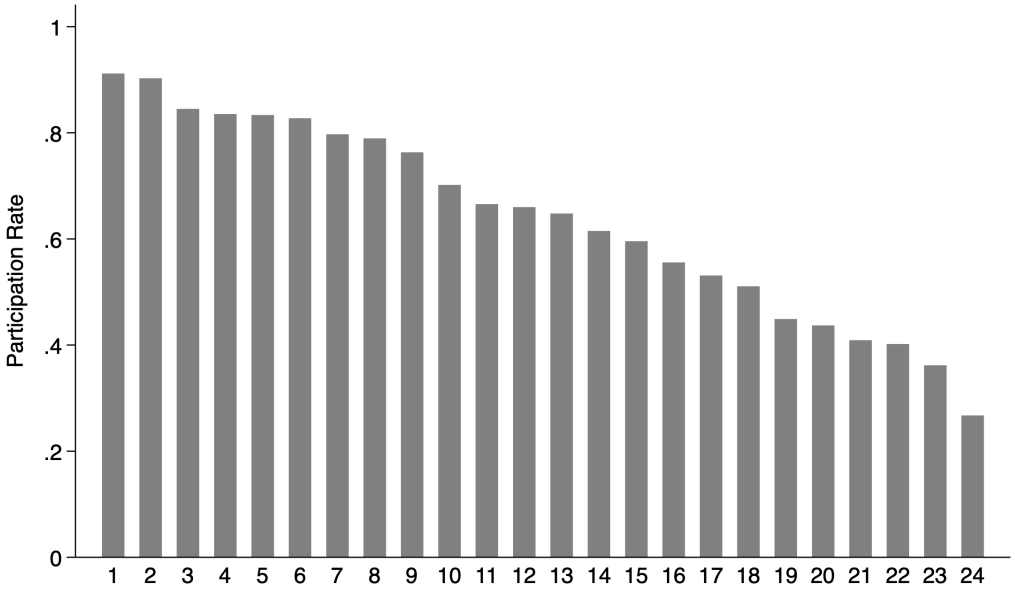
3 Data Collection and Characterization of Workplace Climate

3.1 Data Collection Protocol

In Fall 2019, we visited each firm in person, gathered employees and team leaders, department by department, in meeting rooms, and collected our data. An average data collection session lasted about 3 hours, and we held three sessions, each of which started with a brief introduction. Designated HR coordinators informed all white-collar workers before our visit, and only those who wanted to participate in the study came to meeting rooms. We made sure that companies informed their workers that participation was voluntary and that not participating would not have any consequences for them. On average, 63% of the professionals participated in our Fall 2019 data collection sessions. Figure 1 illustrates participation rates across the 24 firms, with rates ranging from as high as 91% to as low as 27%. At the department level, participation rates vary between 100% and 0%. Note that less-than-perfect participation concerns external validity, not internal validity. For non-participants, we have data only on a limited set of characteristics: gender, leadership status, department, and firm information. We assessed whether participation probability varied by gender and leadership status, controlling for firm fixed effects. We find that female employees were 9 percentage points more likely to participate than male employees (p-value = 0.004). Leaders were 2 percentage points less likely to participate, but this difference is not statistically significant (p-value = 0.58). Importantly, we also checked whether participation in our survey and experiment depended on one's team leader's gender, but it did not, as we show in Table A.11 in the Appendix.[7]

[7]We do not have access to leader information of the non-participants but we know in which department they work. We, therefore, test differential participation based on leader gender using department level data on participation rates and proportion of female leaders within departments.

Figure 1: Study Participation Rates Across Firms



The figure shows the proportion of employees in each of the 24 firms who consented to and participated in the study (i.e., in-person data collection sessions).

In the first session, we played incentivized games to elicit social and economic preferences (in lab-in-the-field experiments). To complement our goal of eliciting individual characteristics, we conducted three major cognition tests in the second session. This was followed by a detailed social network elicitation in the third session. All data collection was online, with participants using their mobile devices. An experimenter (a Turkish-speaking member of our academic team) guided participants through incentivized games, cognitive tests, and social network elicitation templates, as these required additional explanation. Once these sections were completed, participants were directed to a survey link for the remaining questions, which did not require further guidance. Preventing participants' communication with other departments for the incentivized games was our most important logistical challenge in large firms. To address this, we conducted our incentivized experiments in parallel using different meeting rooms.

3.2 Outcomes: Characterization of Relational Climate in the Workplace

In characterizing the relational culture in the firm, we consider several indicators. Our primary outcomes relate to the nature of social networks, in particular, the degree of inter-gender interactions

and support. We also utilize administrative data to add more objective measures to our outcome space, including job separations and promotions. We elaborate on these measures below.

3.2.1 Social Networks

Supportive networks are markers of a healthy workplace climate and are important to achieve job satisfaction, develop a sense of belonging to the firm, and boost solidarity with colleagues (Srivastava et al., 2018; Guadalupe et al., 2020). We collected social network data in two domains of interactions, professional and personal. For the former, participants were asked to list up to 3 colleagues they regularly consult when they need professional (work-related) help. For the latter, they were asked to nominate up to 3 colleagues they consulted in personal matters, allowing for overlaps across both domains; see the exact phrasing of the network elicitation in the Online Appendix Section B. Using these nominations, we construct individual (node) level and department-level outcome measures that characterize the nature of social interactions established in the firm.

Our node-level network measures use out-degree ties, that is, the nominations made by a participant. The minimum value of out-degree is 0, corresponding to no nomination, whereas the maximum possible value is set to 3 colleagues. In a healthy workplace, we expect leaders to provide professional and personal help to their subordinates. Therefore, our main focus is whether team leaders are nominated by their subordinates. We are also interested in the gender composition of nominations. For this, we construct a measure that gives the share of female colleagues nominated by a participant.

Our second set of network measures includes department-level gender homophily indices. For this, we follow Coleman (1958) and construct a homophily index for females and males separately. Coleman's Homophily Index summarizes the degree to which the members of a group form links with the members of the same group (referred to as inbreeding), and it is constructed as follows:

Let F and M denote groups of females and males in a department, respectively. Let us also denote the number of intra-gender links formed by group i in department j as s_{ij}, and the total number of links formed by group i in department j as t_{ij}, where $i \in \{F, M\}$. The ratio $\frac{s_{ij}}{t_{ij}}$ then gives us the share of within-group (homophilic) ties for group i.

Denoting w_{ij} as the expected proportion of within-group links of group i if the links are formed

at random, the excess homophily of group i is defined as $\frac{s_{ij}}{t_{ij}} - w_{ij}$. To make this index invariant to department size and gender composition, following Coleman (1958), we normalize excess homophily by $1 - w_{ij}$, which is the maximum possible excess homophily that can be observed for group i. If, however, excess homophily is negative (forming more links with the out-group compared to in-group), we then normalize the excess homophily index by w_{ij}. This ensures that the measure takes values between -1 and +1. Consequently, Coleman's Homophily Index for group i in department j is given by:

$$C_{ij} = \begin{cases} \frac{\frac{s_{ij}}{t_{ij}} - w_{ij}}{1 - w_{ij}} & if \quad \frac{s_{ij}}{t_{ij}} - w_{ij} \geq 0 \\ \frac{\frac{s_{ij}}{t_{ij}} - w_{ij}}{w_{ij}} & if \quad \frac{s_{ij}}{t_{ij}} - w_{ij} < 0 \end{cases}$$

We compute Coleman's Homophily Index separately for females and males in both professional and personal support domains.

3.2.2 Perceived Workplace Climate

In the final part of the data collection session, participants were directed to an online survey platform. The survey included detailed questions on demographics and a rich set of item-response questions to measure workplace climate (see the Online Appendix C for all questions). We focus on six indices to proxy workplace climate: i) workplace satisfaction, ii) meritocracy, iii) collegiality, iv) job satisfaction, v) behavioral norms, and vi) leader professionalism.[8] We construct each workplace climate index by performing a standard principal component analysis (PCA) on a set of item-response questions, with the construction designed so that higher values represent favorable indicators. For each of our 6 indices, we extract the first principal component as the relevant index measure. The resulting index has a mean of zero and unit variance, so the estimated quantities are expressed in standard deviation units. The items that make up each index are listed in Online

[8] An example for each proxy is as follows: i) Workplace satisfaction: "I am very pleased to have chosen to work at this company.", ii) Meritocracy: "I believe if I work hard and perform well here, I will be promoted very quickly.", iii) Collegiality: "Everyone's ideas are listened to and taken into consideration in our department.", iv) Job satisfaction: "I am happy to have chosen this job.", v) Behavioral norms: "How often do you observe your department colleagues in the following situations? Helping someone/Protecting someone else's rights/etc.", vi) Leader professionalism: "I completely trust our department leader's professionalism."

Appendix C. In addition to these proxies, which we use as our primary outcomes, we construct a gender norms index using several item-response questions, with higher values indicating more modern (equal) gender role beliefs (specific items are listed in the Online Appendix C).

3.3 Administrative Data

We were able to complement our experimental and survey data with official records on job separations and promotions. Initially, we had planned to collect data on employee separations and promotions in the spring of 2020, following the completion of the training intervention evaluated in Alan et al. (2023). However, on April 1, 2020, the Turkish government issued a decree prohibiting employee layoffs nationwide in response to the Covid-19 pandemic, a ban that remained in effect until June 30, 2021. We therefore selected our time window, from July 1, 2021, to November 30, 2021, to exclude this period, as the layoff ban ruled out any involuntary job separations. In addition to separation data, we also obtained individual-level data on promotions for the same period.

3.4 Individual Characteristics: Economic and Social Preferences, Cognitive and Sociocognitive Skills

We elicited economic and social preferences relevant to describing the workplace climate. We elicited competitiveness using a version of Niederle and Vesterlund (2007). The first stage involved participants completing as many additions as possible in 2 minutes, applying a piece rate scheme of 3 Turkish Lira (TL) (equivalent of $0.5 in September 2019) per correct answer. The tournament in the second stage involved randomly forming three-person groups (anonymously) within the department and applying a tournament scheme. A participant would earn three times the piece rate (9TL) per correct answer if and only if they came first in the group (with ties being broken randomly). Otherwise, they received no payment. Finally, in the third stage, participants were asked to self-select into one payment scheme, either piece rate or tournament. In the latter case, their performance would be compared to their group members' stage 2 (tournament) performances. The binary indicator of tournament choice in the final decision is our measure of competitiveness.

To measure risk attitudes, each participant received a 30TL endowment that could be invested in a risky venture (Charness & Gneezy, 2010). The venture tripled the initial investment with a 50% chance and wiped it out entirely otherwise. The participants were told that the amount they

did not invest in the risky venture remained safe. The amount of investment into the risky venture is our measure of a participant's risk tolerance, which lies between 0 and 30TL.

To measure cooperation, we played a simple public goods game (Fischbacher et al., 2001). In this game, participants were randomly assigned to 3-person anonymous groups within their departments and were given a 30TL endowment, which they could contribute to a joint project. The project provided a 100% certain return so that the computer doubled the total contributions within each group. The doubled contributions were then divided equally among all three group members, regardless of their initial contribution. Our measure of cooperation is the amount contributed to the project, which lies between 0 and 30TL.

After having played these three games, participants were asked what fraction of their experimental earnings from these games they were willing to donate to disadvantaged children in Eastern Turkiye.[9] The fraction they stated (between 0 and 100%) is our measure of altruism.

Monetary payoffs were provided as shopping gift cards for a major supermarket chain in Turkiye. Participants received the payoff from one randomly selected game, following a standard practice in experimental economics to mitigate potential endowment effects. Detailed instructions for the incentivized games and implementation rules are provided in the Online Appendix D.

We also measured participants' cognitive and non-cognitive abilities. To measure fluid IQ, we implemented Raven's Progressive Matrices (Court & Raven, 1962). Raven's test provides a measure of abstract reasoning ability, which is typically considered "innate".[10] We also measured verbal creativity (Mednick, 1962; Reiter-Palmon & Illies, 2004; Hughes et al., 2018). For this, participants were given three unrelated words and asked to find a single word that turns all three into meaningful phrases when added to the end or the beginning of all three words. Our final measure of cognitive capacity is also known as a socio-cognitive ability, cognitive empathy. To measure this, we implemented the "Reading the Mind in the Eyes Task" developed by Baron-

[9] All donated funds were used to provide school and essential cleaning supplies to primary and secondary public schools in Southeast Turkiye.

[10] Recent research in psychology finds that there is no gender difference in general intelligence but in certain specific cognitive abilities. E.g., males are found to be better in mental rotation and visual processing; whereas females are found to be better in verbal creativity and processing speed (Halpern et al., 2020; Reynolds et al., 2022; Giofrè et al., 2024). The psychological research on gender differences particularly in Raven's Progressive Matrices test performance provides mixed findings. While Court (1983) and Rushton and Čvorović (2009) report no gender differences in Raven's Progressive Matrices test; Abad et al. (2004), Bakhiet et al. (2015), Waschl (2017) report that males on average perform better than females possibly due to visuospatial ability being required by the test.

Cohen et al. (2001) and Baron-Cohen et al. (1997). In this test, participants were given pictures of different people's eyes and asked to pick the correct emotion reflected in those eyes by choosing one of the four options presented. This test is known to measure emotional intelligence (cognitive empathy), also referred to as perspective-taking ability. Perspective-taking ability is considered one of the most important socio-cognitive skills that regulates one's social relationships, and it is likely to be an important leadership quality (Wolff et al., 2002; Bourke et al., 2020). Detailed instructions regarding the measurement of cognitive and non-cognitive abilities are provided in the Online Appendix E.

In addition to helping us assess the internal validity of our results, these rich individual data allow us to examine the gender differences in a battery of important skills among corporate professionals. To the best of our knowledge, our paper is the first to show the gender differences in cognitive, sociocognitive, and economic and social preferences among actual corporate leaders.

Overall, we have data on more than 2,000 white-collar professionals in unprecedented detail to characterize the relational atmosphere within a firm. We conjecture that teams with female leaders have a different relational climate than teams with male leaders. If this is the case, we expect to see differences in the structure of support networks, workplace climate perceived by employees, job separations, and promotions under female leadership. We also hypothesize that the relationship between female leaders and the workplace climate may differ for female and male employees.

4 Data and Descriptive Results

4.1 Sample Characteristics

Table 1 summarizes our individual-level measures, separately for females and males, and split into different panels. The last two columns in each panel provide the gender difference and p-values obtained from the test of equality of means across gender, controlling for firm fixed effects and clustering the standard errors at the firm level.

About 34.7% of our sample consists of female professionals. This number closely reflects the female representation in leading companies in Turkiye in 2016 of 41% (McKinsey&Company, 2016). From Panel I of Table 1, we see that female employees are, on average, two years younger than male employees and less likely to be married. While fluid IQ does not differ across gender, women

performed significantly better in our emotional intelligence (cognitive empathy) test, and men performed better in the verbal creativity test. Panel II presents the differences in economic and social preferences across gender. Consistent with most of the experimental literature, female professionals in our sample are significantly more risk averse (Borghans et al., 2009; Croson & Gneezy, 2009) and less competitive than men (Niederle & Vesterlund, 2007). We also find female professionals to be less cooperative than males[11], but we observe no gender differences in altruism.

Strikingly, female professionals hold a more pessimistic view of their workplace environment than their male colleagues, as shown in Panel III. Women report significantly lower job and workplace satisfaction and perceive worse behavioral norms. While standard deviation differences are commonly interpreted for constructs like IQ, the economic significance of such differences in measures like job satisfaction or behavioral norms is less straightforward, especially as benchmarks in corporate settings are limited. For example, how should we interpret a 0.114 standard deviation gender difference in behavioral norms? For context, Alan et al. (2023) found that an innovative training program improved workplace satisfaction by 0.27 standard deviations and behavioral norms by about 0.1, while also significantly reducing employee turnover. These findings highlight the importance of workplace social climate, suggesting that a 0.1 standard deviation difference in behavioral norms may reasonably be considered economically significant.

[11] Although this result might seem running counter to the previous work on the topic, a recent study by Furtner et al. (2021) suggests that beliefs of females might be more malleable and sensitive to subtle social cues and to the social context when it comes to conditional cooperation. Coupling this with the finding that females are less satisfied in environments where the share of males is larger (Lordan & Pischke, 2022), it is not very surprising that females appear to be less cooperative in this particular setting.

Table 1: Individual Level Characteristics

Panel I: Individual Characteristics

	N	Males	Females	Difference (F-M)	P-value of Difference
Age	2774	35.579	33.878	-1.861	0.000***
Married	2774	0.529	0.427	-0.101	0.006***
Tenure	2774	6.562	5.911	-0.410	0.264
Fluid Cognitive Ability	2774	0.059	-0.065	-0.055	0.202
Cognitive Empathy	2774	-0.097	0.190	0.293	0.000***
Verbal Creativity	2774	0.016	-0.010	0.068	0.003***

Panel II: Incentivized Outcomes

	N	Males	Females	Difference (F-M)	P-value of Difference
Risk Tolerance	2774	0.122	-0.204	-0.308	0.000***
Competitiveness	2774	0.576	0.402	-0.165	0.000***
Cooperation	2774	0.087	-0.132	-0.200	0.000***
Altruism	2774	-0.029	0.061	0.058	0.160

Panel III: Survey Outcomes

	N	Males	Females	Difference (F-M)	P-value of Difference
Job Satisfaction	1883	0.085	-0.144	-0.169	0.002***
Workplace Satisfaction	1800	0.099	-0.157	-0.245	0.005***
Collegiality	1915	0.025	-0.059	-0.088	0.143
Behavioral Norms	1856	0.023	-0.057	-0.114	0.047**
Leader Professionalism	1879	0.021	-0.041	-0.073	0.279
Meritocracy	1747	0.010	-0.074	-0.085	0.260

Panel IV: Leader Variables

	N	Males	Females	Difference (F-M)	P-value of Difference
Leader	2774	0.162	0.130	-0.041	0.002***
Under Female Leader	1961	0.225	0.393	0.100	0.009***
Professional Support from Leader	1908	0.591	0.577	-0.013	0.611
Personal Help from Leader	1908	0.485	0.388	-0.112	0.003***

Reported statistics under *Females* and *Males* headings use the female and male subsamples of the full sample. Cognitive test scores, incentivized outcomes other than competitiveness, and survey outcomes are standardized. *Difference (F-M)* column reports the coefficient of female dummy in regressions of variables in first column on female dummy and firm fixed effects. Standard errors are clustered at firm level in these estimations. *P-value* column reports p-values for the estimates in the previous column. Asterisks indicate that coefficient is statistically significant at the 1% ***, 5% **, and 10% * levels.

It is important to reiterate that the word "leader" in our study refers to an employee responsible for multiple white-collar employees. Therefore, a leader is the direct reporting manager for employees in his/her team. With this definition, while some (small) departments have a single leader, larger departments have multiple leaders, with each of them leading a separate team within that department. Note also that due to the hierarchical nature of most firms, most leaders have their leaders as well. We make a strong distinction between a leader and a subordinate by referring to the former as someone who is responsible for several employees, regardless of their number. The latter is an employee who has no supervisory and leadership duties in the firm. We focus solely

on the immediate, direct-report relationship and do not consider higher hierarchical levels, as our analysis centers on teams with relatively focused tasks. Panel IV of Table 1 then presents leadership variables, showing that 13.0% of females and 16.2% of males hold leadership positions in our sample. We also see that 39.3% of females work in female-led teams as opposed to 22.5% for males. While 57.7% (38.8%) of females state that they receive professional (personal) support from their leaders, these proportions stand at 59.1% (48.5%) for males (with the difference for personal support being significantly different across genders).

Table 2 presents the summary statistics on departmental characteristics. The average department size in our sample is 22, with a minimum of 2 and a maximum of 181 white-collar workers. The share of females in departments exhibits substantial heterogeneity, with a mean value of 37.7%, with some departments having almost exclusively male and others exclusively female leaders. Importantly for our study, departmental homophily indices indicate significant male homophily in both professional and personal support domains, with substantial variation across departments. Female homophily is much lower, and in the realm of professional support even negative.

Table 2: Department Level Characteristics

	Mean	SD	Min	Max	N
Department Size	22.026	20.162	2.000	181.000	233
Share of Females	0.377	0.221	0.040	0.909	233
Proportion of Female Leaders	0.283	0.337	0.000	1.000	224
Coleman Male Homophily-Professional	0.214	0.560	-1.000	1.000	195
Coleman Female Homophily-Professional	-0.017	0.590	-1.000	1.000	168
Coleman Male Homophily-Personal	0.244	0.622	-1.000	1.000	193
Coleman Female Homophily-Personal	0.196	0.639	-1.000	1.000	170

Reported statistics use the full sample and present department level characteristics. *Coleman Male Homophily-Professional, Coleman Female Homophily-Professional, Coleman Male Homophily-Personal, Coleman Female Homophily-Personal* indicate the Coleman homophily index for each gender in the professional and personal support networks.

4.2 Characteristics of a Corporate Leader

Here we examine the characteristics of corporate leaders. Table 3 presents the predictive power of demographics, cognitive and non-cognitive abilities, and of economic and social preferences on the probability of being a corporate team leader. Controlling for firm fixed effects, females are 4.7%

less likely to be in a leadership position, as we see in column (1).[12]

Table 3: Characteristics of a Corporate Leader

	Holding a Leadership Position				
	(1)	(2)	(3)	(4)	(5)
Female	-0.047***	-0.017	-0.008	-0.002	-0.028
	(0.015)	(0.019)	(0.019)	(0.017)	(0.021)
Age		0.014***	0.016***	0.016***	
		(0.002)	(0.002)	(0.002)	
Married		0.021	0.031**	0.031**	0.077***
		(0.014)	(0.014)	(0.014)	(0.017)
Tenure		0.002	0.003	0.003	0.012***
		(0.003)	(0.003)	(0.003)	(0.002)
Log Department Size		-0.013	-0.012	-0.012	
		(0.012)	(0.012)	(0.012)	
Department Female Share		0.069	0.057	0.052	0.061
		(0.077)	(0.078)	(0.076)	(0.082)
Fluid Cognitive Ability			0.074***	0.070***	0.063***
			(0.012)	(0.012)	(0.011)
Cognitive Empathy			0.002	0.003	-0.001
			(0.013)	(0.013)	(0.013)
Verbal Creativity			0.024**	0.021*	
			(0.011)	(0.011)	
Risk Tolerance				0.007	0.008
				(0.010)	(0.011)
Competitiveness				0.021	0.035
				(0.019)	(0.022)
Cooperation				0.012	
				(0.011)	
Altruism				0.014	
				(0.009)	
Modern Gender Role Beliefs				0.002	0.009
				(0.009)	(0.010)
N	1703	1703	1703	1703	1703
R^2	0.036	0.130	0.168	0.173	0.110

Reported results are obtained from ordinary least squares (OLS) regressions on the full sample. Dependent variable is a binary indicator of being a leader. All regressions control for firm fixed effects. Column 5 includes covariates chosen by LASSO. Standard errors are clustered at firm level. Asterisks indicate that coefficient is statistically significant at the 1% ***, 5% **, and 10% * levels.

Adding controls for age, tenure in the firm, marital status, department size, and the proportion of females in the department eliminates the gender gap in leadership. The final column presents results using only the controls selected by post-double-selection LASSO. LASSO selects the optimal predictors to include in the model and, in principle, addresses multicollinearity and the issue of multiple testing without compromising the interpretability of the estimated coefficients. Based on the model with LASSO-optimized covariate selection (column 5), we observe that corporate leaders tend to have higher fluid IQ, are more likely to be married, and have greater experience. As the more prominent predictor, a one standard deviation increase in fluid IQ is associated with a 6.3

[12]Eckel et al. (2020) provide an excellent review on gender gaps in leadership, drawing on a plethora of experimental studies.

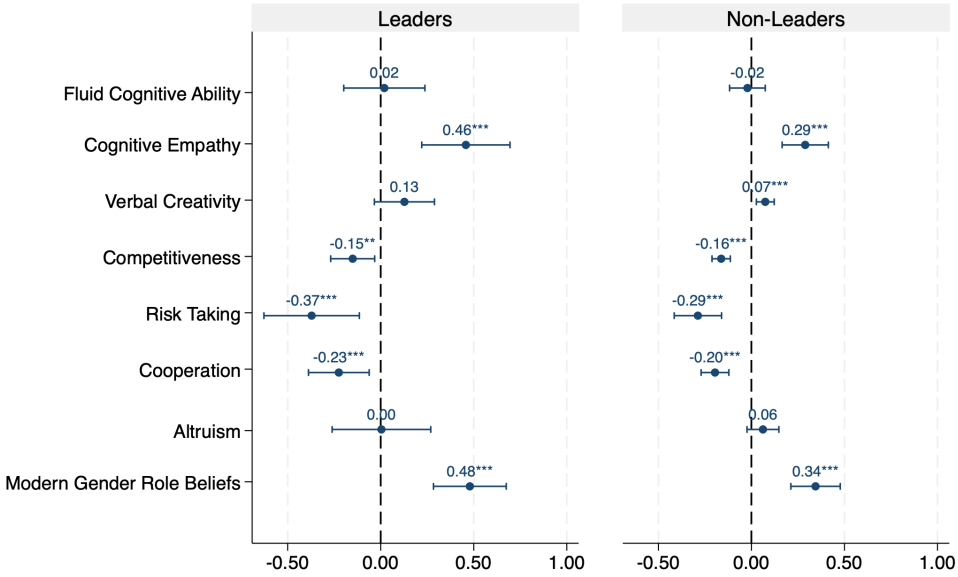
percentage points increase in the likelihood of being a leader. Note also that, contrary to the extensive literature linking competitiveness and risk tolerance to holding leadership positions, the results in Table 3 suggest otherwise.[13]

The next question is whether there are gender differences in these skills and attitudes amongst corporate professionals. Figure 2 plots gender differences in cognitive abilities, social and economic preferences, and gender role beliefs among leaders and non-leaders (subordinates). The first thing to note in this figure is that the gender differences within the leader and non-leader samples follow the same pattern. Controlling for firm fixed effects, female leaders stand out as significantly more risk-averse, less willing to compete, and less cooperative. They hold more progressive gender role beliefs than their male counterparts and exhibit higher emotional intelligence (cognitive empathy). We detect no gender differences in fluid IQ in either leaders or subordinates. These findings suggest that except for fluid IQ, verbal creativity, and altruistic tendencies, the skill set of females who hold leadership positions is not the same as males who have similar positions.

The figure, therefore, shows that female leaders do not necessarily possess more male-like characteristics than non-leader females. On the contrary, the gender differences in characteristics are even more pronounced for the leader sample. The most notable difference is cognitive empathy. Female leaders have significantly higher cognitive empathy than male leaders (0.46 sd, significant at the 1% level). This finding again challenges the view that "male-like" characteristics such as risk tolerance and competitiveness are requisites for leadership positions. Instead, these findings are consistent with those of Adams and Funk (2012), who find that female and male directors differ in their core values and attitudes.

[13]It is noteworthy, however, that the leaders considered in previous related work were typically university students in lab experiment settings (Niederle & Vesterlund, 2007; Eckel & Grossman, 2008; Croson & Gneezy, 2009), whereas we consider actual leaders with subordinates in corporate settings.

Figure 2: Gender Differences in Cognitive Skills and Economic Preferences of Leaders and Non-Leaders

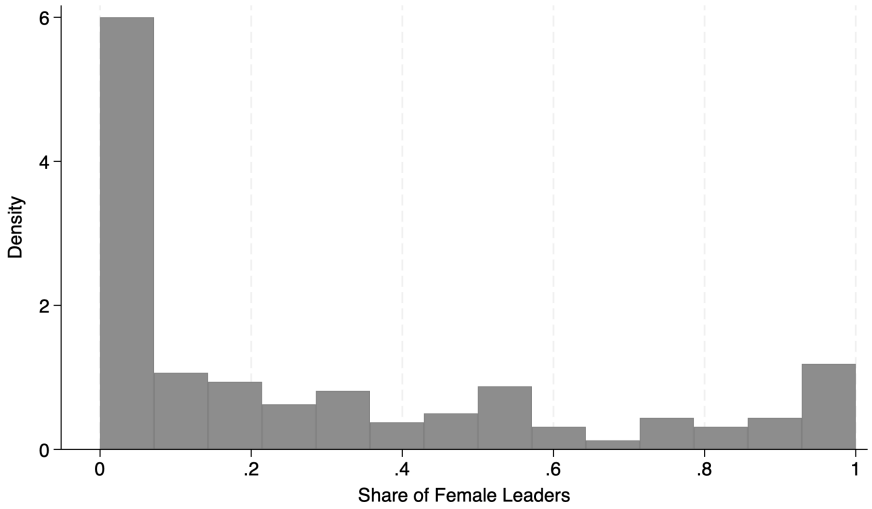


The figure plots the estimated gender differences (females-males) in fluid cognitive ability, cognitive empathy, verbal creativity, risk taking, competitiveness, cooperation, altruism, and holding modern gender role beliefs. *Leader* heading indicates the leader sample, *Non-Leaders* heading indicates the subordinate sample. Coefficients are obtained from ordinary least squares (OLS) estimations by regressing the indicated variable in y-axis on a female dummy, and controlling for firm fixed effects. 95% confidence intervals are based on standard errors clustered at the firm level. Asterisks indicate that coefficient is statistically significant at the 1% ***, 5% **, and 10% * levels.

5 Female Leadership and Workplace Climate

We now turn to exploring the relationship between female leadership and social network formation, perceived workplace climate as well as its effect on job separations and promotions. Our main empirical specification relates working in a female-led team to social networks and workplace climate outcomes. Figure 3 displays the distribution of the proportion of female leaders within departments. While 91 (41%) departments have no female leaders and 18 departments have no male leaders (8%), there is quite a lot of heterogeneity in the proportion of female leaders in the remaining 115 departments.

Figure 3: Distribution of Female Leadership at Department Level



The figure plots the distribution of female leaders at department level. Y-axis is the number of departments. X-axis is the share of female leaders at department level. Bin width is 0.07.

To isolate the effect of female leadership, we exploit variation in the team leader's gender, or the department level variation in the gender composition of leaders. As mentioned in Section 2, we enlisted only the firms with highly centralized and transparent hiring and worker allocation practices to ensure that a selection mechanism does not drive our results. These practices oversee that (i) workers are not allowed to choose their team leaders, (ii) team leaders are not allowed to choose their subordinates, and (iii) HR officials do not consider gender in forming teams and leader-subordinate matching. In the absence of a controlled experiment which randomly allocates leaders to teams, isolating the effect of female leadership requires that within a firm, working under a female leader is exogenous to relevant employee characteristics.

One challenge arises because female leadership and the share of female employees are higher in female-dominated sectors and "female-type jobs". In our data, the percentage of female employees ranges from 20% in the construction sector to 51% in the finance sector. Mechanically, female leadership is more prevalent in sectors and firms employing a higher share of females. We are also more likely to observe more female leaders and female employees in departments dealing with administrative tasks, such as human resources (HR) departments, in contrast to departments related to production. To the extent that social networks and employees' perception of workplace climate relates to these facts, our estimates may be biased. Therefore, we control for firm fixed effects to

account for firm-specific characteristics. We further control for the nature of the job performed to account for the variation driven by "female-type jobs". Our variable for the nature of the job performed maps the task description reported by the employee onto the International Standard Classification of Occupations (ISCO-08) by the International Labour Organization.[14] ISCO-08 classifies all jobs in the world into groups based on their similarity in skill level and skills required for the job. Finally, we control for the share of female employees in the department. Therefore, our empirical strategy relies on the weaker assumption that the assignment to female leaders is as good as random once we control for variables that are mechanically related to working under female leadership.

For the empirical approach to be plausible, employees working under female leaders should not systematically differ from those working under male leaders in any predetermined characteristics (Chetty et al., 2011). To provide further support for the internal validity of our results in this respect, Table 4 reports the balance of demographics and cognitive skills, as well as economic and social preferences, across male and female-led teams. Note that while the unconditional mean difference in the proportion of females working under male versus female leadership is high, suggesting that more females work under female leadership, this difference becomes essentially zero once we control for job roles, the share of females in the department, and firm fixed effects. The last column reports whether the mean difference in the respective characteristic is statistically significant conditional on the share of females in the department, the nature of the job performed (job roles), and firm fixed effects. Overall, we see a reasonable balance. Out of the 11 characteristics considered, only competitiveness seems unbalanced, although the proportion of employees who opted for the tournament scheme looks similar across male and female-led teams (48%). We also conducted balance checks separately for male and female subordinates (Table A.1 in the Online Appendix). We control for emerging imbalances in our analyses to the extent that they were selected by LASSO.

[14]We exclude certain categories of ISCO-08 which are irrelevant for our data, such as agricultural workers and artists. We map our variable for the nature of the job performed onto the following ten categories: engineers, operations staff (e.g., technicians, quality control staff, etc.), IT, C-suite managers, service staff (sales, marketing, etc.), administrative staff, finance, professionals (e.g., firm lawyer, doctor, etc.), logistics, and R&D.

Table 4: Balance Tests with Individual Characteristics

	N	Under Male Leader Mean	Under Female Leader Mean	Normalized Diff.	Conditional Diff.	p-value
Female	1892	0.372	0.550	0.364	0.000	0.988
Age	1892	34.784	33.612	0.155	-0.668	0.197
Married	1892	0.631	0.556	0.154	-0.014	0.720
Tenure	1892	6.962	5.752	0.181	-0.301	0.422
Fluid Cognitive Ability	1721	-0.107	-0.136	0.030	0.039	0.403
Cognitive Empathy	1726	-0.110	0.030	0.142	0.084	0.169
Verbal Creativity	1726	-0.135	-0.172	0.041	0.059	0.231
Competitiveness	1720	0.476	0.485	0.019	0.058	0.012**
Risk Tolerance	1724	0.002	-0.119	0.125	-0.064	0.158
Cooperation	1724	-0.046	-0.141	0.099	-0.032	0.534
Altruism	1724	-0.071	-0.053	0.018	-0.014	0.799

Reported statistics use the subordinate sample. Columns 2 and 3 report unconditional means. Column 4 reports the normalized unconditional differences (Female-Male Leader) à la Imbens and Rubin (2015). Column 5 reports the conditional mean differences, corresponding to the coefficient of working under a female leader from the regression of each characteristic on working under a female leader, conditioning on the share of females within department, nature of the job performed, and firm fixed effects. The last column reports the p-values associated with these coefficients from the same regressions. Standard errors are clustered at firm level. Asterisks indicate that coefficient is statistically significant at the 1% ***, 5% **, and 10% * levels.

If our empirical approach works well, then the inclusion of covariates should not change the results beyond reducing the noise in the estimates. In the Appendix, we report all our individual-level analyses without the individual-level covariates, only conditioning on the share of females in the department, the nature of the job performed, and firm fixed effects. Demonstrating that our results are robust to the exclusion of the individual level characteristics provides compelling evidence alleviating concerns related to observed selection.

5.1 Empirical Model

Our basic empirical specification for individual-level outcomes is as follows:

$$y_{ijf} = \alpha_0 + \alpha_1 \text{FemLead}_{ijf} + \text{IC}'_{ijf}\beta + \gamma \text{FemShare}_{jf} + \delta_f + \varepsilon_{ijf}, \tag{1}$$

where y_{ijf} is the outcome of interest for worker i in department j in firm f. FemLead_{ijf} is the binary indicator of working under a female leader. IC_{ijf} is a vector of individual characteristics for worker i in department j in firm f that are likely predictive of the outcome y, in addition to the nature of the job performed (job role). FemShare_{jf} is the share of female workers in the department. Finally, δ_f represents firm fixed effects. The coefficient of interest in this basic specification is α_1, which we interpret as the association between working under a female leader and a worker's outcome of interest. The above specification is modified as needed to conduct various heterogeneity analyses.

An alternative specification is to use department fixed effects to address potential departmental

sorting. However, this approach reduces statistical power, as it excludes single-team departments and those with single-gender leadership. Nonetheless, we re-ran our main analyses with department fixed effects to check the robustness of our results. Tables A.6-A.9 in the Online Appendix show a similar pattern as the one emerging from the tables in the main text here.[15]

Our department-level empirical specification is as follows:

$$y_{jf} = \alpha_0 + \alpha_1 \text{ShareFemLead}_{jf} + \gamma \text{FemShare}_{jf} + \beta JobRole_{jf} + \delta_f + \varepsilon_{jf}, \tag{2}$$

where y_{jf} is a department-level outcome of interest (for example, an index for male homophily), ShareFemLead_{jf} is the share of female leaders in department j in firm f. Recall that larger departments may have multiple leaders (for separate teams) in our data. Therefore, our department-level analyses use the "share of female leaders" in the department as the variable of interest. Variable FemShare_{jf} is the share of female workers in the department, and $JobRole_{jf}$ controls for the proportion employees working in each job role in department j in firm f. Finally, δ_f denotes firm fixed effects.

In all analyses, we cluster standard errors at the firm level. Because the sample contains a small number of clusters (24 corporations), in addition to clustered robust standard errors, and wild bootstrapped p-values adjusted for the small sample, we present Fisher-exact p-values obtained via randomization inference.[16] We chose our covariates by post-double-selection LASSO to improve precision, and reduce bias from chance imbalances. We defined gender, share of females in the department, nature of the job performed, and firm fixed effects as partialed-out covariates so that they were not penalized by the LASSO. Therefore, in all regressions, we control for the share of females in the department, the nature of the job performed, and firm fixed effects. In the individual-level regressions, our covariate set also includes gender, fluid cognitive ability, verbal creativity, and cooperation. For the department-level regressions, the covariate set includes the share of females

[15] More precisely, the main results discussed in the following subsections for support from leader, and support from non-leader female colleagues persist. We also see that workplace satisfaction is significantly lower under female leaders. However, this is only true for the pooled sample, but not separately for the female sample when we apply department fixed effects. The significant effects on meritocracy also lose precision with department fixed effects. Thus, while the main results hold, we cannot rule out that unobservable department-level characteristics could influence the interpretation of our results.

[16] More specifically, for randomization inference, in each analysis, we shuffle our variable of interest and estimate a placebo effect. We repeat this exercise for a large number of times re-shuffling our variable of interest at each time. We then report the share of placebo effects that are at least as large as the actual effect we estimate, which is denoted by *Fisher's exact p-value*. A smaller Fisher's exact p-value suggests that the actual estimate is unlikely to be driven by pure chance.

in the department, the proportion of each job role within the department, and firm fixed effects.

5.2 Female Leadership and Relational Dynamics in the Workplace

Table 5 reports how working under a female leader is related to nominating the leader in one's professional support network. Recall that participants were asked to nominate three colleagues in full discretion as professional support providers and another three (potentially overlapping, though) as personal support providers. We asked them to consider the entire firm in answering this question and provided the names in a separate document with assigned random id numbers. The nomination involved finding the person to be nominated, then recording their id number.

Table 5: Leader's Gender and Support from Leader

	Professional Support			Personal Support		
	Pooled	Females	Males	Pooled	Females	Males
Under Female Leader	0.028	0.110***	-0.045	0.075**	0.152***	-0.002
	(0.041)	(0.039)	(0.056)	(0.032)	(0.031)	(0.035)
Wild Bootstrap P-value	0.489	0.018	0.439	0.036	0.000	0.956
Mean (Under Male Leader)	0.594	0.547	0.621	0.431	0.333	0.488
N	1604	658	946	1604	658	946
Fisher's exact P-value	0.158	0.005	0.118	0.004	0.001	0.482
P-Value (Male=Female)		0.007			0.000	

Reported results are obtained from ordinary least squares (OLS) regressions for the subordinate sample. Dependent variable is a binary indicator of nominating leader in the network. *Females* columns use the female subsample. *Male* columns use the male subsample. *P-Value (Male=Female)* row tests whether results are statistically different for the male and female subsamples. Covariates selected via post-double-selection LASSO, include gender, fluid cognitive ability, verbal creativity and cooperation, as well as the share of females within department, nature of the job performed and firm fixed effects. Standard errors are clustered at firm level, and wild bootstrapped p-values, adjusted for the small sample, and Fisher's exact p-values, are provided. Asterisks indicate that coefficient is statistically significant at the 1% ***, 5% **, and 10% * levels.

In a positive relational climate, we expect team leaders to be nominated as professional and personal support providers. As seen in Table 5, about 59% (43%) of the employees who work under male leaders nominate their leader as a professional (personal) support provider. Considering the pooled sample, we observe that those who work under a female leader are no more likely to nominate their leader as a professional support provider but significantly more likely to nominate their leader as a personal support provider. The estimated coefficient for female leadership for the probability of receiving personal support is 7.5 percentage points, representing a 17.4% increase. Columns 2 to 6 show that this relationship is driven entirely by female employees. For female subordinates,

working under a female leader is associated with an 11 (15.2) percentage points higher probability of nominating the leader as a professional (personal) support provider, which represents an increase of about 20% (46%). The gender of the leader has no significant relationship to receiving support from the leader for male employees. This heterogeneity is significant at the 1% level. Appendix Table A.2 confirms that the results are robust to the exclusion of individual level covariates.

The relationship of female leadership to the structure of support networks can be seen further in Table 6. It presents the relation of working under a female leader to the percentage of non-leader female colleagues nominated as professional and personal support providers. We see stronger social ties between male and female employees as both have a higher proportion of female colleagues in their professional and personal support networks under female leadership. The estimated coefficients are sizable. Under male leadership, 23.7% of all nominations are extended to female (non-leader) colleagues. This value more than doubles under female leadership (and remains very similar when we exclude individual level characteristics; see Table A.3 in the Appendix).

Next, we investigate departmental-level homophily. Keep in mind that because many departments have several team leaders, our departmental-level analyses use the share of female leaders as the treatment variable.

Table 6: Leader's Gender and Support from Non-Leader Female Colleagues

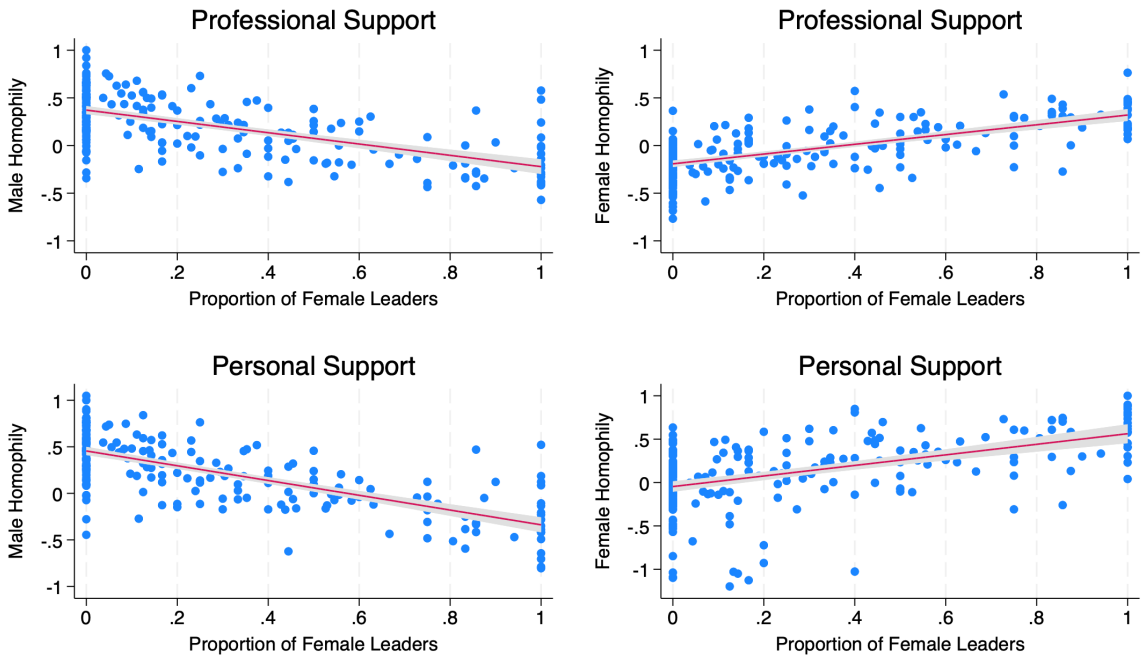
	Professional Support			Personal Support		
	Pooled	Females	Males	Pooled	Females	Males
Under Female Leader	0.252***	0.277***	0.235***	0.227***	0.213***	0.244***
	(0.024)	(0.031)	(0.037)	(0.020)	(0.031)	(0.039)
Wild Bootstrap P-value	0.000	0.000	0.000	0.000	0.000	0.000
Mean (Under Male Leader)	0.237	0.381	0.153	0.309	0.561	0.157
N	1577	648	929	1499	627	872
Fisher's exact P-value	0.000	0.000	0.000	0.000	0.000	0.000
P-Value (Male=Female)		0.361			0.585	

Reported results are obtained from ordinary least squares (OLS) regressions for the subordinate sample. Dependent variable is the share of non-leader female colleagues nominated in the network among all non-leader nominations. *Females* columns use the female subsample. *Male* columns use the male subsample. *P-Value (Male=Female)* row tests whether results are statistically different for the male and female subsamples. Covariates selected via post-double-selection LASSO, include gender, fluid cognitive ability, verbal creativity and cooperation, as well as the share of females within department, nature of the job performed, and firm fixed effects. Standard errors are clustered at firm level, and wild bootstrapped p-values, adjusted for the small sample, and Fisher's exact p-values, are provided. Asterisks indicate that coefficient is statistically significant at the 1% ***, 5% **, and 10% * levels.

Figure 4 presents the relationship of the proportion of female leaders in a department to the

level of male and female homophily in that department. It becomes immediately visible that there is a negative relation to male homophily (left panel), but a positive one for female homophily (right panel). This is consistent with our node-level findings that female leaders have workers (both males and females) who form more professional ties with their female colleagues.[17] Table A.10 and Figure A.1 in the appendix confirm the relationship of female leadership and homophily also when controlling for the share of females in the department and firm fixed efects.

Figure 4: Proportion of Female Leaders and Homophily



The figure plots female and male Coleman homophily index at department level using OLS estimation with the proportion of female leaders within department, controlling for the share of females in the department, proportion of employees in each job role, and firm fixed effects. The shaded area indicates the 95% confidence intervals based on clustered standard errors at firm level.

5.3 Leader's Gender, Employee Separation, and Promotions

Recall that we were granted access to individual-level data on layoffs and quits that took place between July 1, 2021, and November 30, 2021. This was about 1.5 years after measuring our outcome variables. For this, we are compelled to use a subsample of the firms for the following

[17]Note that female leadership changes the structure of the inter-gender interactions without increasing the overall network density, i.e., without creating additional social links within the firm.

two reasons: (i) 4 firms have dropped out of the project, three at the onset of COVID-19 and one at the baseline stage, (ii) In Fall 2020, we implemented a randomized intervention on half of the remaining 20 firms, which effectively reduced job separations (Alan et al., 2023). Hence we run the analysis on the employees of 10 control companies, free from the effect of the intervention.[18]

Table 7 presents the relationship of female leadership to employee separation and promotions. First, note that we find no effect on any of these outcomes for the pooled sample. However, these null results conceal an interesting heterogeneity regarding voluntary separations. As seen in Column 5, females working under female leaders are 6.7 percentage points less likely to separate from their jobs voluntarily. Considering the voluntary separation rate of about 12% under male leadership, the estimated effect represents a 56% lower separation rate under female leadership. While this result appears positive, it may reflect that females have fewer outside options. However, a comparison of overall quitting rates between male and female subordinates shows them to be quite similar: 6% for men and 5% for women. Although this difference is in the expected direction, it is economically and statistically insignificant (p-value = 0.29).

The probability of promotion of a female employee under male leadership is 7.4%, and this value is 9.2% for male employees. Female leadership increases the probability of promotion for both male and female employees by 2 percentage points, but these estimates do not reach statistical significance. Therefore our promotion results do not support the women-help-women hypothesis à la Kunze and Miller (2017). Estimates without covariates, reported in Appendix Table A.4, echo these results.

[18]To validate findings within the separations subsample, we restricted our analysis to the firms included in the separation regressions in Table 7 and re-estimated our main specifications. The results, available upon request, remain materially similar despite a substantial loss of power, suggesting that our administrative subsample is not biased. This outcome is expected, as this subsample represents the randomly selected control group of an RCT.

Table 7: Leader's Gender, Employee Separation (Layoffs and Quits) and Promotions

	Layoffs			Quits			Promotions		
	Pooled	Females	Males	Pooled	Females	Males	Pooled	Females	Males
Under Female Leader	0.007	-0.008	0.030	-0.017	-0.067**	0.011	0.011	0.026	0.021
	(0.009)	(0.006)	(0.023)	(0.016)	(0.026)	(0.024)	(0.023)	(0.034)	(0.027)
Wild Bootstrap P-value	0.527	0.410	0.287	0.215	0.043	0.614	0.641	0.392	0.460
Mean (Under Male Leader)	0.010	0.007	0.011	0.078	0.119	0.057	0.086	0.074	0.092
N	486	183	303	486	183	303	486	183	303
Fisher's exact P-value	0.266	0.495	0.056	0.287	0.066	0.377	0.349	0.298	0.289
P-Value (Male=Female)		0.166			0.045			0.893	

Reported results are obtained from ordinary least squares (OLS) regressions for the subordinate sample. Dependent variable is a binary indicator of layoff, quit, or promotion. *P-Value (Male=Female)* row tests whether results are statistically different for the male and female subsamples. Covariates selected via post-double-selection LASSO, include gender, fluid cognitive ability, verbal creativity and cooperation, as well as the share of females within department, nature of the job performed and firm fixed effects. Standard errors are clustered at firm level, wild bootstrapped p-values, adjusted for the small sample, and Fisher's exact p-values, are provided. Asterisks indicate that coefficient is statistically significant at the 1% ***, 5% **, and 10% * levels.

5.4 Leader's Gender and Perceived Workplace Climate

Table 8 presents the relationship of working under a female leader to various perceived workplace climate indicators. In Panel I, we see a striking negative relation to workplace satisfaction and perceived meritocratic values for the pooled sample. Employees working under female leaders report 0.132 standard deviations lower workplace satisfaction and 0.110 standard deviations lower meritocratic values in their firm. While department collegiality and job satisfaction seem to be higher under female leadership, these effects do not reach statistical significance. Reported behavioral norms and perceived leader professionalism are also lower under female leadership, although they do not reach statistical significance either. The results are comparable when we exclude the set of individual level covariates (see Appendix Table A.5).

Table 8: Leader's Gender and Reported Workplace Climate

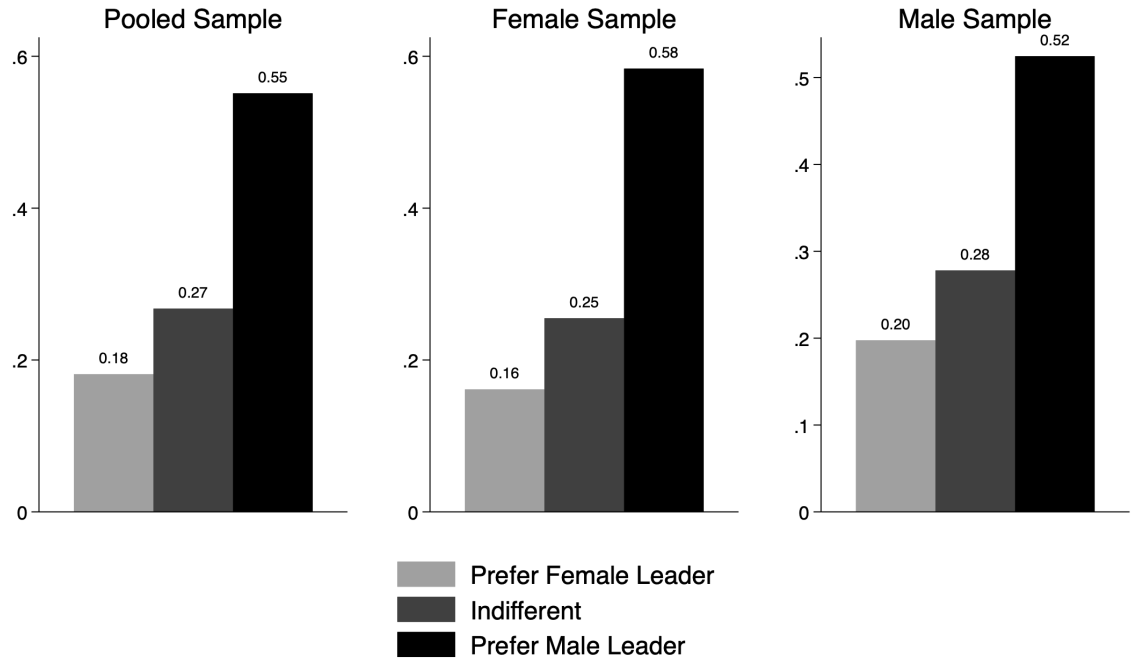
	W-Satisfaction	Meritocracy	Collegiality	Job Satisfaction	Behavioral Norms	Leader Prof.
Panel I: Pooled Sample						
Under Female Leader	-0.132**	-0.110*	0.022	0.030	-0.047	-0.054
	(0.056)	(0.055)	(0.084)	(0.070)	(0.088)	(0.082)
Wild Bootstrap P-value	0.026	0.061	0.810	0.688	0.620	0.522
Mean (Under Male Leader)	0.010	-0.026	-0.015	-0.022	0.010	0.023
N	1424	1384	1518	1491	1467	1493
Fisher's exact P-value	0.013	0.039	0.343	0.298	0.224	0.193
Panel II: Female Sample						
Under Female Leader	-0.199*	-0.193**	0.047	-0.056	-0.009	0.030
	(0.099)	(0.077)	(0.115)	(0.101)	(0.137)	(0.107)
Wild Bootstrap P-value	0.068	0.018	0.695	0.600	0.953	0.765
Mean (Under Male Leader)	-0.135	-0.052	-0.090	-0.195	-0.039	-0.038
N	604	589	637	633	621	624
Fisher's exact P-value	0.016	0.018	0.296	0.276	0.471	0.353
Panel III: Male Sample						
Under Female Leader	-0.076	-0.019	0.021	0.083	-0.058	-0.143
	(0.070)	(0.074)	(0.110)	(0.081)	(0.092)	(0.115)
Wild Bootstrap P-value	0.305	0.788	0.860	0.290	0.544	0.265
Mean (Under Male Leader)	0.101	-0.009	0.031	0.087	0.041	0.061
N	820	795	881	858	846	869
Fisher's exact P-value	0.163	0.395	0.363	0.129	0.242	0.041
P-Value (Male=Female)	0.297	0.034	0.829	0.205	0.701	0.153

Reported results are obtained from ordinary least squares (OLS) regressions for the subordinate sample. Dependent variable is a standardized workplace climate item as indicated. Covariates selected via post-double-selection LASSO, include gender, fluid cognitive ability, verbal creativity and cooperation, as well as the share of females within department, nature of the job performed and firm fixed effects. 'W-Satisfaction' stands for workplace satisfaction, whereas 'Leader Prof.' stands for leader professionalism. *P-Value (Male=Female)* row tests whether results are statistically different for the male and female subsamples. Standard errors are clustered at firm level, wild bootstrapped p-values, adjusted for the small sample, and Fisher's exact p-values, are provided. Asterisks indicate that coefficient is statistically significant at the 1% ***, 5% **, and 10% * levels.

Even more striking is that these negative perceptions seem stronger among female employees. Females report 0.199 standard deviations lower workplace satisfaction under female leadership compared to male leadership. Females working under female leaders report much worse perceived meritocratic values (0.193 standard deviations lower) than males working under female leaders, and this gender difference is statistically significant.

These negative perceptions become even more puzzling as we show that female leadership is associated with fewer voluntary separations. Adding more mystery to the puzzle, Figure 5 depicts employees' preferences for their leaders' gender. As can be seen, 18% of all employees in our sample prefer to work under female leadership, with 27% stating indifference and 55% a preference for male leadership. What is striking is there is not much gender heterogeneity in these results. More than half of employees, 52% of males, and 58% of females, state that they prefer to work with male leaders.

Figure 5: Leader Gender Preferences



The figure plots the shares of subordinates who prefer having a female leader, a male leader, and remain indifferent between the two. The left panel plots the corresponding shares in the pooled sample; the middle panel in the female sample; and the right panel in the male sample.

5.5 Mechanism: The Role of Social Support

If we consider gender segregation and voluntary quits to be negative workplace climate indicators, the results on workplace climate perceptions and leader gender preferences appear to be at odds with the earlier results on the relational dynamics. With the objective of unraveling the mechanisms, we explore heterogeneity with respect to social support from leaders. Indeed, these preferences reveal a very interesting pattern when leaders are considered to be supportive types. We consider subordinates who nominated their leaders within their primary support networks to be working under 'supportive' leaders. We should mention at the outset that this subsample analysis is exploratory and intended to be suggestive, not causal.

As seen in Figure 6, under supportive leadership, both males and females working under female leaders state that they prefer female leaders. Under supportive female leaders, male employees think that female leaders have more understanding of their professional and personal matters, and

female employees believe that female leaders are better. Interestingly, when the leader is considered unsupportive, males who work under female leaders still seem to prefer female leaders, while females who work under females do not prefer female leaders.[19]

Given all these results, the question stands as to why female employees working under female leaders form better professional and personal ties with their leaders and prefer to stay in their firm, but still prefer to work under male leadership and report such negative workplace satisfaction and meritocratic values under female leadership? To understand what drives these results, we explore our rich data and provide some suggestive evidence on the possible rationale behind these negative female perceptions under female leadership. Our primary explanation is that female employees hold their female leaders to a higher standard than their male leaders. While an unsupportive male leader generates negative perceptions among female employees, an unsupportive female leader generates a much deeper disappointment.

Figure 7 provides support, albeit suggestively, for this explanation. The figure plots differences in climate indicators reported by subordinates under female versus male leaders. Panel 1 shows the results for the situation where subordinates nominated their leader as professional support provider. In this panel, we see that the gender of the leader does not matter for male and female employees when leaders are considered supportive. However, when the leader is considered unsupportive, as seen in Panel 2, while for male employees, the gender of the leader still does not matter for their perceived workplace climate, female employees paint a dark workplace climate picture under female leadership.[20] They report 0.47 standard deviations lower workplace satisfaction, 0.34 standard deviations lower meritocratic values, 0.23 standard deviations lower job satisfaction, and perceive much worse behavioral norms within their department under unsupportive female leaders. Interestingly, in both supportive and unsupportive cases, employees consider their leaders' conduct professional. These findings remain stable when we do not include the individual level characteristics as controls (see Appendix Figure A.3).

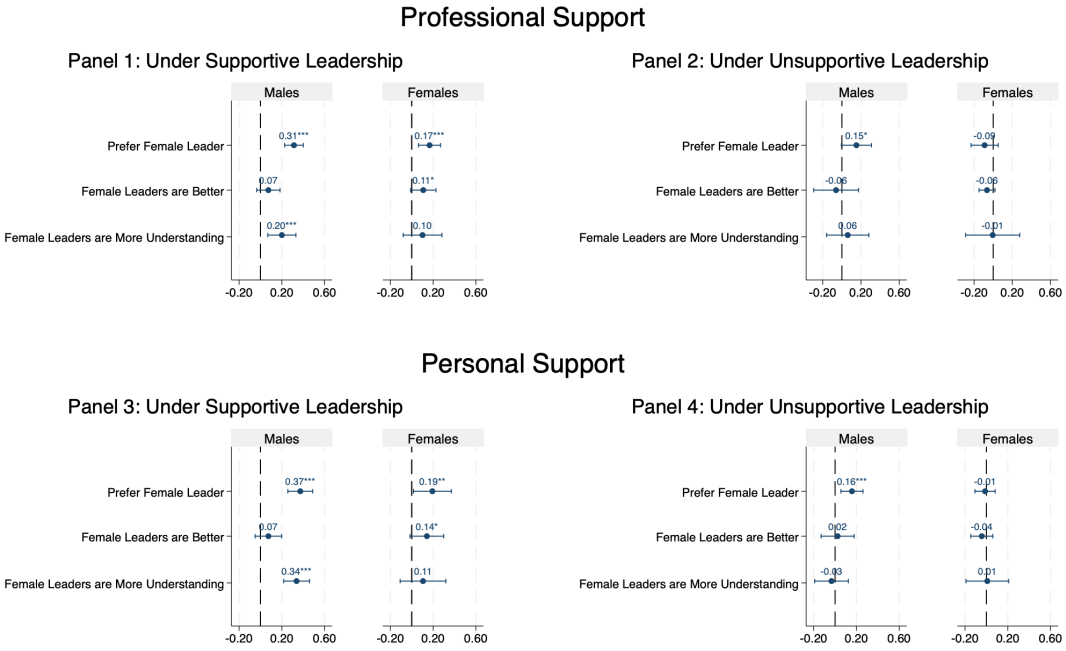
To sum up, while our explanation is suggestive and based on exploratory rather than causal analysis, it aligns with documented findings on gendered expectations in workplace and political

[19]The results are robust to the exclusion of individual level covariates, as illustrated in Appendix Figure A.2.

[20]The unexpected finding that under unsupportive leadership male employees working under female leaders report higher job satisfaction could speak to the findings in Rickne and Folke (2023), which links workplace gender diversity to higher levels of job satisfaction.

settings (Huddy & Terkildsen, 1993; Carli, 2001; Mavin, 2008; Abel, 2022; Chakraborty & Serra, 2023).[21]

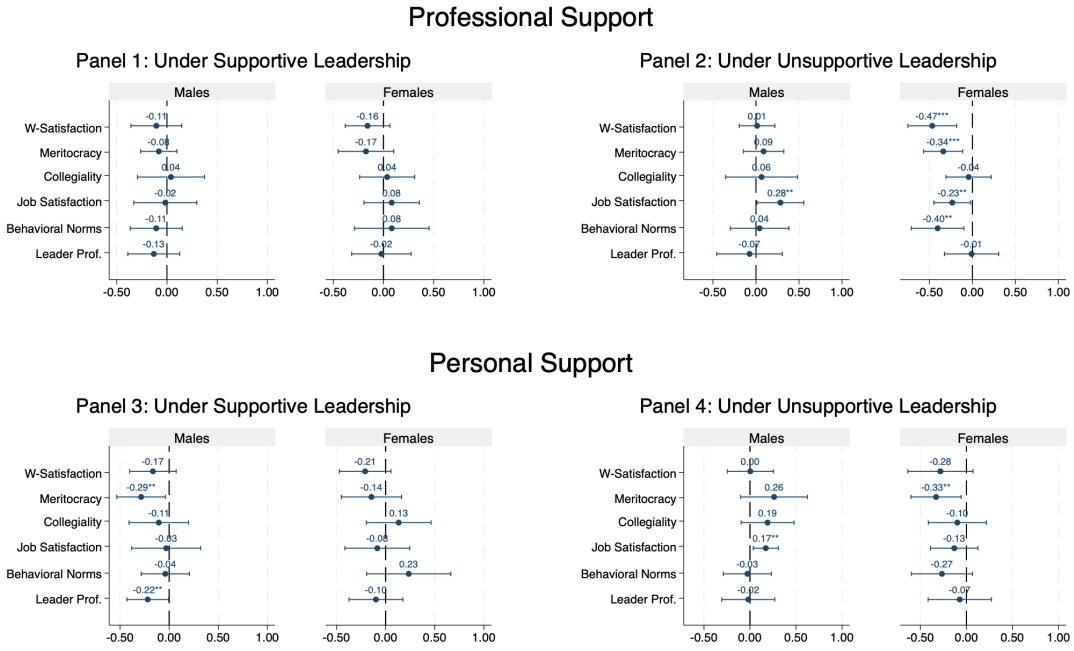
Figure 6: Leader Gender Preferences Under Supportive and Unsupportive Leadership



The figure plots effects of having a female leader on leader gender preferences separately for female and male employees under supportive and unsupportive leaders. Coefficients are obtained from ordinary least squares (OLS) estimations by regressing leader gender preferences on a binary indicator of having a female leader, and covariates selected via post-double-selection LASSO, including fluid cognitive ability, verbal creativity and cooperation, as well as the share of females within department, nature of the job performed, and firm fixed effects. 95% confidence intervals are based on standard errors clustered at the firm level. Asterisks indicate that coefficient is statistically significant at the 1% ***, 5% **, and 10% * levels.

[21] An alternative explanation might involve gender differences in social image concerns. Male subordinates may be more hesitant to report female leaders as unsupportive, which could result in female subordinates appearing more critical of female leaders. However, Grossman et al. (2019) finds that while female leaders tend to receive lower ratings than male leaders overall, male and female subordinates generally do not differ in their evaluations of female leaders. This pattern holds in our data as well, except when a female leader is perceived as unsupportive.

Figure 7: Climate Perceptions Under Supportive and Unsupportive Leadership



The figure plots effects of having a female leader on workplace climate separately for female and male employees under supportive and unsupportive leaders. Coefficients are obtained from ordinary least squares (OLS) estimations by regressing standardized measures of workplace climate on a binary indicator of having a female leader, and covariates selected via post-double-selection LASSO, including fluid cognitive ability, verbal creativity and cooperation, as well as the share of females within department, nature of the job performed, and firm fixed effects. 95% confidence intervals are based on standard errors clustered at the firm level. In Panel 1, regressions with the male sample contain 490-543 observations, and regressions with the female sample contain 343-373 observations. In Panel 2, regressions with the male sample contain 276-309 observations, regressions with the female sample contain 220-245 observations. In Panel 3, regressions with the male sample contain 396-435 observations, and regressions with the female sample contain 228-250 observations. Panel 4, regressions with the male sample contain 370-417 observations, and regressions with the female sample contain 335-368 observations. Asterisks indicate that coefficient is statistically significant at the 1% ***, 5% **, and 10% * levels.

6 Conclusion

Using data from over 2,000 white-collar workers in 24 companies in Turkiye, covering diverse industries, we study the role of female leadership in shaping the workplace climate. For our analysis, we used incentivized games, extensive surveys of perceived workplace climate, social networks, and administrative records on promotions and separations. To understand the role of female leaders in the relational climate on the workplace, we rely on the individual-level variation in working under

a female leader, or the between-department variation in the share of female team leaders within a department. After recruiting companies with transparent and gender-neutral HR practices, we would like to argue that exposure to female leadership is as good as random once we control for variables that are mechanically related to working under female leadership.

Overall, our results suggest that female leadership is strongly associated with the relational culture in the workplace. First, we document that female leaders possess a different skill set than male leaders, with the exception of basic cognitive capacity. Specifically, female leaders are significantly less competitive, more risk-averse, and exhibit higher cognitive empathy. Secondly, we find a more inclusive workplace under female leadership, where (i) male homophily is lower, (ii) female subordinates have more access to professional and personal support from leaders, and (iii) both males and females establish more links with female colleagues who are not leaders. Moreover, female employees have a lower probability of quitting their jobs under female leadership, with no effect detected on their promotion probabilities.

Despite these positive effects, more than half of the employees in our data prefer to work under male leadership. Employees working with female leaders report significantly lower workplace satisfaction and worse meritocratic values for their firms, and these negative perceptions are driven entirely by female employees. We suspect that female leaders may be judged more harshly than their male counterparts, as shown in Abel (2022) or Dupas et al. (2021). Female subordinates might hold higher expectations for female leaders, leading to a more negative perception of workplace climate when these expectations go unmet.

An alternative explanation for this finding could involve female subordinates lowering their aspirations when exposed to female leaders (Azmat & Ferrer, 2017). So, while promoting female leadership in corporations is undoubtedly a crucial step towards achieving gender equality, it is not sufficient on its own to ensure a healthy workplace environment, in particular for female employees. We show that having a supportive leader is strongly related to a healthy workplace climate. Although the evidence we document is suggestive, the lower job separation rates associated with supportive leadership are especially valuable in times of tight labor markets (Friebel et al., 2023). These findings suggest that corporations should have an eye towards supportive leaders, and highlights the importance of communication between leaders and subordinates.

We believe that our findings apply beyond our setting. Besides our access to these firms and

the suitability of their HR practices to examine the role of the leaders' gender, Turkiye offers an ideal setting to study female leadership and workplace climate in large corporations. On the one hand, it is a large OECD country with relatively high rates of female corporate professionals and high rates of female leadership. According to McKinsey's "Women Matter Turkiye 2016" report (McKinsey&Company, 2016), although female participation in labor force is still low in Turkiye, female representation in the leading companies (41%) is only slightly lower than that of Latin America (43%) and not so far from that of the US (53%). The representation of females in executive committees is 25% in Turkiye, which is higher than 8% in Asia, 17% in the US, and 20% in Europe. On the other hand, despite significant advances made regarding gender equality since the foundation of the secular republic in 1923, the conflict between traditional and modern gender norms remains in all walks of life. Given that we reached out to prominent modern corporations employing highly educated male and female professionals, our findings are likely to be generalizable to countries where there is a relatively high presence of females in the corporate sector, but nevertheless, gender equality in corporate life is still a distant goal.

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