Gendered Language in Job Advertisements Relates to Gender Sorting in Public Labor Markets: A Multi-Source Analysis

Abstract

While increasing gender diversity is a desirable goal, contemporary research often overlooks gender sorting in the public labor market. Such structural self-selection among job seekers may considerably weaken efforts to increase diversity. We investigate how job advertisements contribute to gender sorting by examining *gendered language* and the *gender of the contact person*. We theorize two mechanisms and test them using a unique multi-source dataset consisting of real job advertisements, a survey among recruiters issuing these job advertisements, and organization-level data (n = 1,859). Results from hierarchical linear models indicate that more feminine *wording* relates to a higher number and share of applications by women. Our research contributes to public administration research, theorizing why, structurally, women may apply less for some public sector jobs. We derive implications for research and policymakers and emphasize the relevance of gender sorting mechanisms in public sector recruiting.

Keywords

recruitment, job advertisements, quantitative text analysis

Wordcount: 7,873

Evidence for Practice

- Public organizations should critically evaluate the language used in job advertisements to avoid deterring female applicants.
- As the contact person's gender did not significantly impact the quantity or quality of applications, we suggest that practitioners should explicitly focus on gendered language.
- Regularly evaluating the entire recruitment process for unintended gender-sorting effects can help public organizations achieve their diversity goals more effectively.

Introduction

Public organizations face increasing challenges in attracting and retaining a qualified and diverse workforce (Sievert, Vogel, and Feeney 2022; Jakobsen, Løkke, and Keppeler 2023). At the same time, public organizations strive to promote diversity within their workforce (e.g., Greenan et al., 2019; Linos, 2018). Fostering gender diversity through recruitment is relevant from two distinct perspectives. First, scholars point to an intrinsic value of diversity, especially related to gender. In combination with other factors, diversity can increase organizational performance (Ding, Lu, and Riccucci 2021; McCrea, Zhu, and Johansen 2022). Second, attracting a more diverse set of job seekers promises to increase the pool of applicants because it creates a broader interest in working for public organizations (Ng and Sears 2015; Olsen et al. 2016). We focus on a potential hurdle to recruiting for diversity: gender sorting. This theoretical mechanism offers an explanation for why gender imbalances occur in the public sector despite a high commitment to fostering hiring for diversity (Johnston, Alberti, and Kravariti, 2024; Opstrup and Villadsen).

When aiming to increase gender diversity, public organizations primarily try to attract more diverse applicants at the beginning of the recruitment process (Newman and Lyon 2009). For public organizations, job advertisements constitute the initial (and often the only) step when targeting potential candidates. By reading and interpreting job advertisements, job seekers can then infer the characteristics of the job and the organization necessary to decide whether to apply (Sievert, Vogel, and Feeney 2022; Vogel, Döring, and Sievert 2024). Despite aiming to utilize job advertisements to foster diversity (e.g., Linos, 2018), they can have unintended effects on potential applicants. The way in which public organizations present themselves in job advertisements can considerably affect organizational attraction (Sievert, Vogel, and Feeney 2022; Keppeler and Papenfuß 2021) and, thus, can result in *sorting mechanisms* on the labor market (Castilla and Rho

2023). Sorting mechanisms constitute shifts on the labor market, simultaneously increasing the attraction of some groups while discouraging others (e.g., Fernandez & Friedrich, 2011; Rivera, 2012). Focusing on gender sorting mechanisms is relevant for theory development and from a practical perspective. Still, public administration research falls short of addressing this potential hurdle to both recruitment and diversity management. Even though scholars and practitioners commonly advocate addressing the genderedness of job advertisements, robust empirical studies are scarce (e.g., Vogel et al., 2023).

We address this research gap by theorizing two separate mechanisms of gender sorting in job advertisements. We argue that (1) gendered language and (2) the gender of the contact person can discourage women (and men) from applying to specific vacancies (Fernandez and Friedrich 2011; Castilla and Rho 2023; Gaucher, Friesen, and Kay 2011). Previous scholarship indicates that traditionally male-associated occupations often employ assertive, agentic language, while job advertisements for stereotypically female-related roles may utilize more communal language (Gaucher, Friesen, and Kay 2011). Moreover, job advertisements display an indication of the contact person's gender, which is relevant because this is the first point of contact (Castilla and Rho 2023; Hentschel et al. 2021). As such, we theorize that representation effects should lead to additional gender sorting.

To test our hypotheses, we analyze a novel multi-source dataset containing the texts and meta-data from real job advertisements. We subjected the texts to a machine learning model to analyze the job advertisements' language for masculinity and femininity; the contact person's gender was manually coded. We combine this dataset with matched survey responses about the recruitment process and the applicant pool from the recruiters who posted the job advertisements (n = 1,859 matched observations). The findings from hierarchical linear models indicate that

feminine wording relates to a higher number and share of applications by women. A female contact person did not exhibit statistically significant effects. Additionally, we find that gendered language is unrelated to a higher number of applications, the recruiters' perception of the quality of applicants, and the satisfaction with the selected candidate.

Our study contributes to public administration research and provides insights for policymakers and practitioners. First, we theorize and empirically demonstrate gender sorting mechanisms in public sector labor markets. Our study demonstrates the relevance of seemingly subtle aspects of public sector recruitment. While previous studies focus on formal diversity policies broadly (Groeneveld and Verbeek 2012; Satzger and Vogel 2023), sectoral differences (Cordes and Vogel 2023; Fowler and Birdsall 2020), or motivational factors (Asseburg et al. 2020; Kjeldsen and Jacobsen 2013; Vogel, Döring, and Sievert 2024), we provide a different and promising perspective. We outline how gender sorting mechanisms constitute a relevant research focus for scholars addressing diversity management and recruiting. Our theorizing integrates the public administration literature with research on organizational psychology and human resource management, allowing a robust theoretical perspective advancing the discourse on public sector recruiting. Second, the study sheds light on how gender sorting affects (or fails to affect) public organizations. Since gendered language did not relate to changes in the quality of applicants (and the selected candidate), we can posit that public organizations likely do not experience many adverse consequences arising from gendered language practices. Overall, our findings have important implications. For jobs lacking gender diversity, we suggest critically evaluating the recruitment processes' genderedness, specifically the language used in job advertisements.

Theoretical Framework

Job Advertisements and Gender Sorting

Public sector recruiters primarily rely on job advertisements to attract applicants for vacancies (Sievert, Vogel, and Feeney 2022). Posting job advertisements ensures a quick and comprehensible overview of the job and the organization while indicating which type of applicants the employer tries to attract (Baum and Kabst 2014; Breaugh 2013). This initial point of contact is relevant to reducing information asymmetries for job seekers (Connelly et al. 2011). Public organizations harness this early point of contact to maximize attractiveness and convey what they expect from applicants (De Cooman & Pepermans, 2012; Walker & Hinojosa, 2013). Recruiters actively shape how job advertisements reflect these aspects and what best to include (e.g., Kuhn & Shen, 2023), aiming to attract a sufficient number of desirable candidates. In this study, we deliberately focus on the gender diversity of the applicant pool. As such, job advertisements deterring diverse candidates, e.g., women in male-dominated professions, would counteract public organizations' efforts to increase diversity.

This phenomenon, coined *gender sorting*, can considerably undermine the recruitment efforts of public organizations. Gender sorting constitutes a systematic mechanism where male and female job seekers exhibit structurally different application choices for a vacancy (Fernandez and Friedrich 2011). The information provided initially in job advertisements affects whether job seekers consider applying for a given vacancy (e.g., Gomes & Neves, 2011), whether they remain in the selection process (e.g., Ryan et al., 2000), and whether they accept a potential job offer (e.g., Hausknecht et al., 2004). Theoretical arguments from management and organization science help explain potential decision-making processes underlying the gender sorting mechanism. First, language in job advertisements should affect gender sorting in applicant pools and the recruitment

processes in general (Gaucher, Friesen, and Kay 2011; Hentschel et al. 2021). Several studies showcase that gendered wording is present in job advertisements (e.g., Gaucher et al., 2011; Hodel et al., 2017), constituting the descriptive component of our research focus. Furthermore, these observed differences also exhibit consequences for gender diversity. Masculine wording can negatively affect whether women perceive a given vacancy as attractive (Gaucher, Friesen, and Kay 2011). Second, aside from the wording of the vacancy description, the contact person's gender has been suggested as a potentially significant signal for a job advertisement's genderedness (Hentschel et al. 2021; Castilla and Rho 2023). This reasoning aligns with the representative bureaucracy research. Following arguments on symbolic representation (e.g., Theobald & Haider-Markel, 2009), the contact person could act as a tangible signal about the job and the organization, resulting in structurally different application choices by men and women. As such, the gender of a contact person could result in a similar yet separate gender sorting mechanism.

Gendered Language and Recruitment Outcomes

Previous scholarship indicates that traditionally male-associated occupations often employ agentic, action-oriented language, such as "lead," "compete," and "dominant." Job advertisements for typically female-related roles may utilize more communal language and words like "support," "understand," and "interpersonal skills" (Gaucher, Friesen, and Kay 2011; Askehave and Zethsen 2014). This *gendered* usage of language mirrors prevalent gender norms and, in turn, can influence job applicants' perceptions and expectations of a particular role (Castilla and Rho 2023; Coffman, Collis, and Kulkarni 2024). The root causes of these imbalances are subject to various theoretical perspectives. For example, theories such as social role theory argue that entrenched societal expectations of gender roles manifest in the choice of language in job advertisements (Dutz, Hubner, and Peus 2022; Hodel et al. 2017; Vervecken, Hannover, and Wolter 2013). Previous

scholarship suggests that unconscious biases can affect how individuals express information — subconsciously, an employer or recruiter may associate certain roles with specific genders due to societal stereotypes, resulting in gendered language (Gaucher, Friesen, and Kay 2011). In addition, incorporating ideas from stereotype threat theory (Spencer, Logel, and Davies 2016) helps explore the consequences of gendered language for applicant behavior in the labor market (Dinhof et al., 2023). This theoretical perspective identifies a deterring effect of mismatched language. Scholars argue that job advertisements using heavily gendered language can discourage candidates who do not identify with the associated gender from applying. For instance, women might feel less qualified or welcomed by job advertisements exhibiting traditionally masculine language, even if they are well equipped for the role.

While job advertisements typically indicate that all genders are welcome to apply, the overall wording of the advertisement may still be imbalanced. Previous research indicates that job advertisements display gendered language, especially for gender-dominated fields, arguing that gendered language originates from gender dominance in a given profession (Gaucher, Friesen, and Kay 2011). We expect that the wording used in public sector job advertisements reflects underlying gender imbalances of jobs, occupations, or even sub-sectors. Such gendered language conveys information about which type of prospective employee the organization desires (Castilla and Rho 2023) and sustains gender stereotypes related to occupations (e.g., Vervecken et al., 2013). We argue that gendered wording will affect the composition of the initial applicant pool. Scholarship in social psychology hints at how language affects individual behavior (e.g., Ellemers, 2018; Maass, 1999). As outlined by Gaucher et al. (2011, p. 111), "subtle variations in the gendered wording used in advertisements may affect people's perception of jobs, such that men and women will find jobs described in language consistent with their own gender most appealing precisely

because it signals they belong in that occupation." Job seekers may anticipate the potentially biased evaluations occurring during recruitment and selection (Castilla and Rho 2023). This relates to how job seekers judge competencies vis-à-vis the anticipated selection criteria and decisions of recruiters. Female job seekers likely estimate a lower probability of receiving a job offer in stereotypically male fields when this is reflected in a job advertisement's wording. In such cases, they tend to be more reluctant to apply (Barbulescu and Bidwell 2013). We expect that those job advertisements with stereotypically masculine wording will be associated with gender sorting and, thus, adverse recruitment outcomes related to gender diversity. On the other hand, we expect that feminine wording should have the opposite effect, i.e., more women applying. The individual choices in the labor market should result in a structural change of applicant pools for given vacancies. Hence, we expect job advertisements with stereotypically female wording to attract more female applicants and relate to a higher share of women. Formally, we hypothesize:

> ***H1a:*** *Higher femininity of the job advertisements relates to a higher number of women applying to the advertised job.*
>
> ***H1b:*** *Higher femininity of the job advertisements relates to a higher share of women (compared to men) applying to the advertised job.*

Gender of Contact Person and Recruitment Outcomes

Job advertisements always relate to a recruitment process, including selection and hiring, once applications are received (Vogel, Döring, and Sievert 2024; Sievert, Vogel, and Feeney 2022). Accordingly, organizations determine a person responsible for the recruitment process. This recruiter typically manages and distributes the job advertisements' development and realization

(Walker & Hinojosa, 2013) and is often involved in subsequent steps of the recruiting process. Job seekers are generally aware of this when encountering a job advertisement (Hentschel et al. 2021; Rynes, Bretz, and Gerhart 1991). Hence, they can draw inferences based on *whom* the job advertisement displays as a contact person (Castilla and Rho 2023). Thus, we argue that the recruiter's gender, inferred based on the name and the salutation, likely affects job seekers' application choices.

We extend the reasoning by building on theoretical arguments suggesting that recruiters' gender affects job seekers within the overarching recruitment process. One reason relates to homophily (Kazmi et al. 2022; Greenberg and Mollick 2017), an argument that we can also find in representative bureaucracy theory (Theobald and Haider-Markel 2009; Riccucci and Van Ryzin 2017). Homophily theory suggests that individuals are more attracted to others they experience as similar to themselves (McPherson, Smith-Lovin, and Cook 2001; Kazmi et al. 2022). As such, job seekers could be more inclined to interact with recruiters matching their gender. Similarly, job seekers should also hold different expectations about the recruitment process depending on the gender of the contact person. Thus, congruence in minority status should affect the composition of the recruitment pool (Stoll, Raphael, and Holzer 2004). Women should be more willing to interact with this recruiter and potentially expect better chances to succeed. Hence, we expect more women to apply to these advertised jobs and a higher share of women in the applicant pool overall. Formally, we hypothesize:

> ***H2a:*** *A female contact person in the job advertisements relates to a higher number of women applying to the advertised job.*

H2b: *A female contact person in the job advertisements relates to a higher share of women (compared to men) applying to the advertised job.*

Data and Methods

Data Source 1: Digital Job Advertisements

Our study builds on a multi-source dataset to provide robust inferences, as outlined in Figure 1. First, we collected the textual and metadata of job advertisements in Germany. We obtained advertisements posted on a central public sector recruitment website (http://www.bund.de) using an automatic web crawler over nine months between June 2020 and March 2021 (n = 58,668 job advertisements). Aside from the textual data, we extracted meta-data, such as contract type, salary tier, or job type. The job type variable consists of 18 different categories (e.g., general administration, IT, or education). We aggregated these categories into six larger subsectors (administrative, business, science, social, technical, and others). To ensure high data quality, we employed a data-cleaning process. Furthermore, we excluded advertisements without contact information. Our final database included 33,642 job advertisements.

This database provides us with several benefits. First, it encompasses solely public sector job advertisements, providing us with data of high relevance to public administration research. Second, it contains advertisements from organizations of all governmental levels, types of public organizations, as well as geographic areas. This variety increases the ecological validity of our analysis. Third, the website is linked to other significant public sector job advertisement sites. Thus, we are sure we obtained most of the relevant job advertisements across Germany.

[Figure 1 here]

Data Source 2: Recruiter Survey

The textual data of the job advertisements is combined with survey data, which we collected from recruiters responsible for the respective advertised positions. This allows us to combine descriptive data about the content and language of the advertisements with relevant outcomes of the recruiting process. Due to the large amount of job advertisements, we restricted our sample. Specifically, we selected one advertisement per recruiter email using a randomization mechanism. Ultimately, we were left with a sample of 7,026 eligible recruiters. We used the email addresses listed in the contact information section of the selected job advertisements. We invited them all to participate in our survey in April 2021, ensuring that a considerable share of recruitment processes had already been concluded. The invitation indicated the specific job advertisement that the survey is referring to. This ensured that recruiters could refer specific questions to the specific recruitment processes. After three weeks, a reminder was sent out to increase participation. 1,863 recruiters completed the survey (response rate = 26.5%).

The survey was implemented online. As the survey was conducted in German, we translated validated items and discussed critical cases among the research team and with a practitioner to ensure the face validity of our measures. To further strengthen the validity of our instrument, we took additional measures: First, we received peer feedback from a public sector recruiter to ensure that all relevant aspects of a successful recruitment process were covered in our survey. Second, we pre-tested our survey with public sector professionals and colleagues to ensure that item wording is comprehensible.

The following survey items were included to test our hypotheses. Unless indicated otherwise, all items were measured on a 7-point Likert scale (1 = fully disagree, 7 = fully agree). Appendix A shows the exact wording of the items.

Number of female applicants: Additionally, we asked recruiters to indicate the number of applicants who identified as female. This measure assesses the advertisement's success in attracting more female applicants. Furthermore, combining both frequency measures, we calculated the *share of female applicants* per advertisement. This allows for assessing whether specific advertisement features make jobs generally more attractive or for female applicants only.

We added three additional measures of recruitment success: (1) *Number of applicants:* To account for the argument that a larger applicant pool is beneficial for the overall recruitment process, we included a measure for that quantity of applications (Becker and Huselid 1998; Collins and Han 2004). (2) *Satisfaction with the applicant pool:* We asked recruiters about their satisfaction with their respective application pool. Building on Collins & Han (2004) and Dineen & Allen (2016), we used a scale consisting of four items (Cronbach's $\alpha = .85$). Respondents gave their assessment of the pool's overall, quality, the recruiters' expectations, and the potential of picking adequate candidates. *(3) Satisfaction with the selected candidate:* If recruiters indicated that the process led to an appointment, we asked them about their satisfaction with the respective candidate (n = 1,400). This variable provides an especially interesting contribution to previous research as we include data about actual recruitment decisions.

Data Source 3: Register Data

As our data is observational, we included a rich set of supplementary data from registries. This allows controlling for the share of women working in a particular job and avoids capturing a spurious relationship if the language in job advertisements for jobs predominantly occupied by

women is more female. We used data on the share of women in 31 jobs in the state of Hamburg (Personalamt Hamburg 2022) and categorized each job advertisement in our dataset according to the scheme. Additionally, we controlled for the geographic location of the organization and the respective population density using data from the Federal Statistical Office of Germany. This measure of urbanicity might affect the attractiveness of a job and the likelihood of female applications. Lastly, we manually coded the governmental level of our respective public organizations (federal, state, local, and social security administrations (independently organized in Germany) and others).

Statistical Analysis

When examining (gendered) language, the main challenge is identifying a reliable and valid indicator. Previous research used a predefined set of 83 feminine or masculine words (Gaucher, Friesen, and Kay 2011) to assess how strongly a particular text uses gendered language. This approach, however, does not allow for differentiation between strongly gendered and mildly gendered words. Hence, we adopt a different approach to determine how gendered the language of a text is, namely word embeddings (Castilla and Rho 2023). Word embeddings are a widely used machine learning technique in computational text analysis. This approach represents each (part of a) word as a vector of numbers. The vectors are created in a way that they represent the semantic meaning of a word in a way that words that are close to each other in the vector space are close in meaning. These vectors are created by training a machine-learning model with a large text corpus. Unlike previous studies, we used fastText because it was the best-performing unsupervised model for detecting gendered language in a study by Cryan et al. (2020). We used

the pre-trained fastText model (Grave et al. 2018), trained on about three million words from German Wikipedia and around 17.7 million words from scraped German websites[1].

fastText allows the calculation of a femininity score for each advertisement to infer how gendered the language is in a job advertisement. The femininity score for a single word is calculated by subtracting the similarity of the word with a masculine reference word (such as "man") from the similarity to the feminine antonym (such as "woman") and multiplying it by 100. This way, words with a feminine loading receive a high positive score, and masculine-loaded words have a high negative score. For example, cultural-sensible has a score of 7.0, and ambition has a score of -8.0. Figure 2 presents a representation of the vector-based distances of exemplary words. We repeated this approach with four antonym pairs (woman–man, women–men, female–male, and feminine–masculine)[2] and calculated the femininity score for all words in every job advertisement as the mean of these four values. Each job advertisement was assigned a single femininity score by averaging the score of all words in the ad. Appendix B showcases the approach for two exemplary job advertisements. In addition, we coded the recruiter's gender based on the salutation and name presented in the respective job advertisement.

[Figure 2 here]

We can draw meaningful inferences from the calculated femininity score, the recruiter's gender, and the rich information captured in our dataset. Since we focus on the relation of gendered language and recruiter gender with recruitment outcomes, we subjected the data to regression

[1] https://commoncrawl.org

[2] We did not use the antonym pairs she–he, her–him, and hers–his used by Castilla & Rho (2023) because they are conflated with third person pronouns which are used in formal German language. Girl–boy was omitted because the feminine part does not differentiate between singular (girl) in plural (girls) in German.

analysis. Because our data structure is clustered, we ran hierarchical linear regression models with five different dependent variables collected with the recruiter survey: The number of applications received for the advertisement, the number of women applied, the proportion of women among all applications, recruiters' satisfaction with the applications, and with the selected candidate. The hierarchical regression models build on the recruiter's assessment provided in the survey as level 1 (n = 1,859) and on the information gathered about the recruiting organizations (k = 1,023) as level 2. The resulting intercept-only models include the covariates to account for variation related to the recruitment process, the job, and the organization.

Results

Descriptive Overview

First, we provide descriptive statistics (full overview in Appendix C). The number of women applying for a job differs widely, with a mean of 12.76 (*SD* = 20.96, Median = 6.00), and their share of all applications is 51.39 % (*SD* = 30.70). On average, the job advertisements have a femininity score of -0.233 (*SD* = 0.356), indicating a relatively neutral use of language with a slight tendency towards masculine words. The descriptive analysis indicates an average of 22.38 applications following the job advertisements (*SD* = 30.42). In addition, recruiters indicate a mean satisfaction of 4.24 for the applicant pool (*SD* = 1.51) and 6.04 for the selected candidate (*SD* = 1.50). Furthermore, our sample has a high variability of jobs and organizations. In addition, Figure 3 specifies the distribution of the femininity score across the job advertisements. The scores follow a normal distribution with few high and low values.

[Figure 3 here]

Hypothesis Testing

We used two hierarchical linear models to test the effects of gendered language and gender of the contact person. The regression models account for a wide range of potentially confounding factors, including the "share of women in job category." This variable ensures that we do not overestimate the main effect, primarily because women are more likely to apply to female-dominated jobs. Advertisements for these jobs tend to use more feminine words. The main results are depicted in Table 2; Appendix C outlines a complete table including all covariates. We find support for our hypotheses H1a and H1b. A higher femininity score is associated with an increased number of applications by women (H1a, model 1: $b = 7.378$, SE = 1.509, $p < 0.001$) and a higher share of female applicants (H1b, model 2: $b = 18.511$, SE = 1.801, $p < 0.001$). Consequently, a higher masculinity score is associated with a lower number and smaller share of women applying. This implies that the femininity of language present in job advertisements attracts more female applicants in absolute numbers and more in comparison with male applicants. A one-unit increase in the femininity score attracts more than seven additional applications from women while increasing the share of female applicants by almost 19 %. Regarding H2a and H2b, we find that a female contact person is not associated with a statistically significant higher number (model 1: $b = -0.404$, SE = 0.932, $p = .664$) of female applicants. The contact person's gender is slightly related to a higher share of female applicants but only on a 10 % significance level (model 2: $b = 2.087$, SE = 1.128, $p = .065$). Thus, our findings lend no support to either H2a or H2b.

[Table 1 here]

Robustness Tests and Exploratory Analysis

Aside from the overall assessment of gender language in job advertisements, we further investigated potential interaction effects we deemed relevant. These results, however, should be considered solely exploratory due to the risk of multiple testing and lack of theoretical elaborations. First, we investigated whether the significant associations of gendered language found in our hypotheses-guided analysis results from heterogeneity. Indeed, different job sectors, reflecting local gender imbalances (e.g., Hoff et al., 2024), may skew the findings. For that purpose, we included an interaction term for the sector with the lowest representation of women (see analysis in Appendix D), namely technical jobs. We find no statistically significant effect for that interaction (see Appendix F). Thus, this sub-sector does not seem to drive the overall effect. Second, we investigated whether the effect of gendered language is especially strong or weak in job advertisements for leadership positions. We operationalized leadership positions based on the position's salary tier, correlating with leadership responsibilities in the German system. While top-level management positions have a substantially lower share of female applicants (see Appendix G), we find no heterogenous effects of gendered language for that sub-group. Lastly, we also included additional outcome measures (see Appendix E). We find no effect of gendered language on the overall number of applications, the recruiters' satisfaction with the applicant pool's quality, or the selected candidate.

Discussion

Gender Sorting in Public Labor Markets

The results partially support our theorizing, showing that job advertisements with more feminine wording are associated with a higher number and share of women among the applicants. In turn,

job advertisements exhibiting more masculine wording attracted fewer women. These findings support the central theoretical mechanism indicating that public sector labor markets are subject to gender sorting. We demonstrate that language used in job advertisements can discourage women (and men) from applying to specific vacancies (Fernandez and Friedrich 2011; Castilla and Rho 2023; Gaucher, Friesen, and Kay 2011). Our study demonstrates the relevance of seemingly subtle information signals for public sector recruitment. Previous studies focused on various factors contributing to recruitment outcomes, including diversity (Jakobsen, Løkke, and Keppeler 2023). Scholars highlighted the relevance of formal diversity policies (Groeneveld and Verbeek 2012; Satzger and Vogel 2023), sectoral differences (Cordes and Vogel 2023; Fowler and Birdsall 2020), or motivational factors (Asseburg et al. 2020; Kjeldsen and Jacobsen 2013; Vogel, Döring, and Sievert 2024). While these factors often originate from arguments deeply embedded in public management and policy-oriented research, we expand the view to neighboring disciplines. We offer a robust and novel theoretical perspective on public sector recruitment. Our theorizing integrates the literature with research on organizational psychology and human resource management (Castilla and Rho 2023; Gaucher, Friesen, and Kay 2011; Hentschel et al. 2021). Accordingly, gender sorting mechanisms constitute a relevant research focus for scholars addressing (gender) diversity in public administration research.

While gendered language had the expected effects, we did not observe a statistically significant effect for the contact person's gender. Contrary to our theorizing, the number and share of women applying was not higher if a woman was listed as the contact person. Following arguments from representative bureaucracy research (e.g., Johnston et al., 2023; Riccucci & Van Ryzin, 2017), we expect that the gender of the contact person might not be the most relevant signal for job seekers. Given that they will likely have limited contact with that person, especially after a

potential hiring, their application decision seems unaffected. Instead, we suspect that who they would work with (e.g., supervisor) would be more relevant (e.g., Sievert, 2023). However, such information is seldom disclosed in job advertisements and, thus, beyond the scope of this study.

Our combined findings contribute to public sector recruiting research because they illuminate our understanding of how gender sorting works and how it affects public organizations. First, we found that the effect of gendered language is consistent and independent of sectoral subgroups or (non-)leadership positions. Second, we found that gendered language does not relate to the overall size of the application pool. Thus, the language effect seems to be symmetrical for both genders. Third, we analyzed the recruiters' perceived applicant pool quality, remaining unaffected. Thus, regardless of gendered wording and contact person, the job advertisements resulted in an equally qualified applicant pool. This finding is important because it negates a common criticism that diversity initiatives face. If gender sorting does not change applicant pool quality, policymakers and public organizations do not face a compromise when consciously developing tools to tackle masculine wording. Fourth, we also analyzed the recruiters' satisfaction with the selected candidate. Job advertisements with gendered language did not result in better or worse candidates. This finding reiterates the prior argument. Public organizations may use gendered language to achieve a more balanced workforce without detriment to these recruitment criteria.

Some additional implications arise from these observations. First, policymakers and public organizations are well-advised to consider these findings. The gendered language and gender of the contact person do not affect the applicant pool's size or quality. If public organizations are unaware of the gender sorting mechanisms, they are unlikely to adjust recruitment practices. Especially for jobs where diversity is still lacking, we suggest critically evaluating the recruitment

processes' genderedness, specifically the language used in job advertisements. Several private sector organizations showcase potential approaches to reduce gendered language, e.g., through automated approaches to identify and remove gendered wording (Castilla and Rho 2023). Second, our findings account for potential criticisms related to a conscious use of gendered wording. Altering how gendered a job advertisement is does not affect how successfully an organization attracts a qualified (or satisfactory) applicant pool. Instead, gendered language constitutes a precondition for either preferably hiring men or women for a given vacancy (explicitly or implicitly). As such, policymakers and public organizations striving for higher gender diversity could reduce gendered wording so as not to deter either gender from applying. Alternatively, they could deliberately use gendered language to facilitate gender diversity in their workforce actively.

Limitations and Future Research Agenda

Our research design and empirical analysis come with methodological compromises. We applied natural language processing (i.e., automated quantitative text analysis) to identify gendered language. While our analysis applies a robust analytical procedure tested in previous studies, natural language processing is seldom perfect. A common problem is the contextual embeddedness of individual words (Correll et al. 2020). Our approach includes rating each word in the job advertisement but does not entirely account for how it is used. For example, some words may be interpreted as feminine even though they are used with a neutral connotation. Thus, the femininity score constitutes a proxy for feminine language. We think it constitutes a good proxy for our chosen research design because it allows the simultaneous processing of many job advertisements (e.g., Cryan et al., 2020).

Similarly, the survey-based approach used for the dependent variables introduces shortcomings. The dependent variables cannot objectively reflect recruitment outcomes, only

subjectively. We compromise between the ability to match our data sources and precision. The measures, e.g., the number of applications and the quality of the applicant pool, are subject to potential biases and imprecision. Some respondents might generally overestimate how well a selected candidate fits the vacancy. We assume that recruiters are among those best suited to assess measures such as the quality of the application pool, but their perceptions may still be biased. Future studies could try to implement a more complex assessment of recruitment outcomes, e.g., through triangulation. Given that multiple individuals collaborate in recruitment processes, future studies could try to capture the perceptions of these different individuals.

Our inferences are based on job advertisements in Germany. The national context may very well affect how gendered language works and how job seekers interpret, e.g., feminine wording. In addition, public organizations in Germany may act differently when constructing job advertisements compared to their counterparts in other countries. Generally, they often have limited freedom about the content of job advertisements (resulting from, e.g., collective labor agreements). Thus, we call for replications across different countries and administrative traditions (Walker et al., 2019), also considering different public sector contexts.

Future research should further explore the research focus on gender sorting. Since recruitment entails a long process, including several episodes where applicants and organizations meet, e.g., job interviews, assessment centers, or negotiations, researchers could build on our findings and track the following recruitment process steps. Does the effect of gendered language carry through the following process steps? How substantial is the effect of gendered language in job advertisements compared to the role of individual recruiters? In addition, our design cannot directly observe but solely infer the micro-level decision-making of job seekers. Thus, further research on the decision-making of job seekers seems promising. While some studies already

examine how gendered language affects potential job seekers (e.g., Gaucher et al., 2011), we see the need for further empirical testing. We need to understand how men and women process gendered language and how this affects their behavior in the labor market. Similarly, while we focus on applicant behavior, our research follows a central argument about recruiters: They more or less deliberately produce gendered job advertisements. Future research should, thus, examine what drives recruiters when preparing job advertisements and during the recruitment process more generally. Overall, we advocate for further investigating micro-level effects in recruitment processes.

Conclusion

Our study investigates the effect of focal gender signals found in basically all job advertisements: the genderedness of its language and the contact person's gender. We show that gendered language relates to the number and share of female applicants for respective vacancies. The recruiter's gender appears to be irrelevant. These findings are derived from a comprehensive set of web-crawled job advertisements combined with a recruiter survey and register data.

These findings emphasize the occurrence of gender sorting in public sector jobs based on the language used in job ads. Policymakers and recruiters are well-advised to consider these findings if they aim for a more representative workforce. Our exploratory analysis also indicates that there seems to be no negative effect on the size and quality of the application pool. Thus, our study provides several starting points for further investigation. As the investigated phenomenon of gender sorting is increasingly essential to several job sectors (like technical and social jobs), understanding underlying mechanisms is critical to tackling challenges of gender imbalance. Moreover, these mechanisms might shed light on other self-selection processes beyond gender.

References

Askehave, Inger, and Karen Korning Zethsen. 2014. “Gendered Constructions of Leadership in Danish Job Advertisements.” *Gender, Work & Organization* 21 (6): 531–45. https://doi.org/10.1111/gwao.12053.

Asseburg, Julia, Judith Hattke, David Hensel, Fabian Homberg, and Rick Vogel. 2020. “The Tacit Dimension of Public Sector Attraction in Multi-Incentive Settings.” *Journal of Public Administration Research and Theory* 30 (1): 41–59. https://doi.org/10.1093/jopart/muz004.

Barbulescu, Roxana, and Matthew Bidwell. 2013. “Do Women Choose Different Jobs from Men? Mechanisms of Application Segregation in the Market for Managerial Workers.” *Organization Science* 24 (3): 737–56. https://doi.org/10.1287/orsc.1120.0757.

Baum, Matthias, and Rüdiger Kabst. 2014. “The Effectiveness of Recruitment Advertisements and Recruitment Websites: Indirect and Interactive Effects on Applicant Attraction.” *Human Resource Management* 53 (3): 353–78. https://doi.org/10.1002/hrm.21571.

Becker, Brian E., and Mark A. Huselid. 1998. “High Performance Work Systems and Firm Performance: A Synthesis of Research and Mangerial Implications.” In *Research in Personnel and Human Resources Management*, edited by G. R. Ferris, 16:53–101.

Breaugh, James A. 2013. “Employee Recruitment.” *Annual Review of Psychology* 64 (1): 389–416. https://doi.org/10.1146/annurev-psych-113011-143757.

Castilla, Emilio J., and Hye Jin Rho. 2023. “The Gendering of Job Postings in the Online Recruitment Process.” *Management Science* 69 (11): 6912–39. https://doi.org/10.1287/mnsc.2023.4674.

Coffman, Katherine B., Manuela R. Collis, and Leena Kulkarni. 2024. “Whether to Apply.” *Management Science* 70 (7): 4649–69. https://doi.org/10.1287/mnsc.2023.4907.

Collins, Christopher J., and Jian Han. 2004. “Exploring Applicant Pool Quantity and Quality: The Effects of Early Recruitment Practice Strategies, Corporate Advertising, and Firm Reputation.” *Personnel Psychology* 57 (3): 685–717. https://doi.org/10.1111/j.1744-6570.2004.00004.x.

Connelly, Brian L., S. Trevis Certo, R. Duane Ireland, and Christopher R. Reutzel. 2011. “Signaling Theory: A Review and Assessment.” *Journal of Management* 37 (1): 39–67. https://doi.org/10.1177/0149206310388419.

Cooman, Rein De, and Roland Pepermans. 2012. “Portraying Fitting Values in Job Advertisements.” *Personnel Review* 41 (2): 216–32. https://doi.org/10.1108/00483481211200042.

Cordes, Jana, and Rick Vogel. 2023. “Comparing Employer Attractiveness of Public Sector Organizations to Nonprofit and Private Sector Organizations: An Experimental Study in Germany and the U.S.” *Review of Public Personnel Administration* 43 (2): 260–87. https://doi.org/10.1177/0734371X211065349.

Correll, Shelley J., Katherine R. Weisshaar, Alison T. Wynn, and Jo Anne Delfino Wehner. 2020. “Inside the Black Box of Organizational Life: The Gendered Language of Performance Assessment.” *American Sociological Review* 85 (6): 1022–50. https://doi.org/10.1177/0003122420962080.

Cryan, Jenna, Shiliang Tang, Xinyi Zhang, Miriam Metzger, Haitao Zheng, and Ben Y. Zhao. 2020. “Detecting Gender Stereotypes: Lexicon vs. Supervised Learning Methods.” In *Proceedings of the 2020 CHI Conference on Human Factors in Computing Systems*, 1–11. New York, NY, USA: ACM. https://doi.org/10.1145/3313831.3376488.

Dineen, Brian R., and David G. Allen. 2016. “Third Party Employment Branding: Human Capital Inflows and Outflows Following ‘Best Places to Work’ Certifications.” *Academy of Management Journal* 59 (1): 90–112. https://doi.org/10.5465/amj.2013.1091.

Ding, Fangda, Jiahuan Lu, and Norma M. Riccucci. 2021. “How Bureaucratic Representation Affects Public Organizational Performance: A Meta-Analysis.” *Public Administration Review* 81 (6): 1003–18. https://doi.org/10.1111/puar.13361.

Dinhof, Katharina, Sheeling Neo, Isa Bertram, Robin Bouwman, Noortje de Boer, Gabriela Szydlowski, Jurgen Willems, and Lars Tummers. 2024. “The Threat of Appearing Lazy, Inefficient, and Slow? Stereotype Threat in the Public Sector.” *Public Management Review* 26 (7): 1941–62. https://doi.org/10.1080/14719037.2023.2229326.

Dutz, Regina, Sylvia Hubner, and Claudia Peus. 2022. “When Agency ‘Fits’ Regardless of Gender: Perceptions of Applicant Fit When Job and Organization Signal Male Stereotypes.” *Personnel Psychology* 75 (2): 441–83. https://doi.org/10.1111/peps.12470.

Ellemers, Naomi. 2018. “Gender Stereotypes.” *Annual Review of Psychology* 69 (1): 275–98. https://doi.org/10.1146/annurev-psych-122216-011719.

Fernandez, Roberto M., and Colette Friedrich. 2011. “Gender Sorting at the Application Interface.” *Industrial Relations* 50 (4): 591–609. https://doi.org/10.1111/j.1468-232X.2011.00654.x.

Fowler, Luke, and Chris Birdsall. 2020. “Are the Best and Brightest Joining the Public Service?” *Review of Public Personnel Administration* 40 (3): 532–54. https://doi.org/10.1177/0734371X19836152.

Gaucher, Danielle, Justin Friesen, and Aaron C. Kay. 2011. “Evidence That Gendered Wording in Job Advertisements Exists and Sustains Gender Inequality.” *Journal of Personality and Social Psychology* 101 (1): 109–28. https://doi.org/10.1037/a0022530.

Gomes, Daniel, and José Neves. 2011. “Organizational Attractiveness and Prospective Applicants’ Intentions to Apply.” *Personnel Review* 40 (6): 684–99. https://doi.org/10.1108/00483481111169634.

Grave, Edouard, Piotr Bojanowski, Prakhar Gupta, Armand Joulin, and Tomas Mikolov. 2018. “Learning Word Vectors for 157 Languages,” February. http://arxiv.org/abs/1802.06893.

Greenan, Nathalie, Joseph Lanfranchi, Yannick L’Horty, Mathieu Narcy, and Guillaume Pierné. 2019. “Do Competitive Examinations Promote Diversity in Civil Service?” *Public Administration Review* 79 (3): 370–82. https://doi.org/10.1111/puar.13053.

Greenberg, Jason, and Ethan Mollick. 2017. “Activist Choice Homophily and the Crowdfunding of Female Founders.” *Administrative Science Quarterly* 62 (2): 341–74. https://doi.org/10.1177/0001839216678847.

Groeneveld, Sandra, and Stijn Verbeek. 2012. “Diversity Policies in Public and Private Sector Organizations.” *Review of Public Personnel Administration* 32 (4): 353–81. https://doi.org/10.1177/0734371X11421497.

Hausknecht, John P., David V. Day, and Scott C. Thomas. 2004. “Applicant Reactions to Selection Procedures: An Updated Model and Meta-Analysis.” *Personnel Psychology* 57 (3): 639–83. https://doi.org/10.1111/j.1744-6570.2004.00003.x.

Hentschel, Tanja, Susanne Braun, Claudia Peus, and Dieter Frey. 2021. “Sounds like a Fit! Wording in Recruitment Advertisements and Recruiter Gender Affect Women’s Pursuit of Career Development Programs via Anticipated Belongingness.” *Human Resource Management* 60 (4): 581–602. https://doi.org/10.1002/hrm.22043.

Hodel, Lea, Magdalena Formanowicz, Sabine Sczesny, Jana Valdrová, and Lisa von

Stockhausen. 2017. “Gender-Fair Language in Job Advertisements: A Cross-Linguistic and Cross-Cultural Analysis.” *Journal of Cross-Cultural Psychology* 48 (3): 384–401. https://doi.org/10.1177/0022022116688085.

Hoff, Kevin A., Kenneth E. Granillo-Velasquez, Alexis Hanna, Mike Morris, Hannah S. Nelson, and Frederick L. Oswald. 2024. “Interested and Employed? A National Study of Gender Differences in Basic Interests and Employment.” *Journal of Vocational Behavior* 148 (February): 1–19. https://doi.org/10.1016/j.jvb.2023.103942.

Jakobsen, Mette, Ann-Kristina Løkke, and Florian Keppeler. 2023. “Facing the Human Capital Crisis: A Systematic Review and Research Agenda on Recruitment and Selection in the Public Sector.” *Public Administration Review* 83 (6): 1635–48. https://doi.org/10.1111/puar.13733.

Johnston, Karen, Federica Alberti, and Foteini Kravariti. 2024. “Representative Bureaucracy and Organizational Attractiveness: An Experimental Study of Symbolic Representation of the US and UK Police.” *Public Administration Review* 84 (2): 293–307. https://doi.org/10.1111/puar.13675.

Kazmi, Maryam A., Christiane Spitzmueller, Jia Yu, Juan M. Madera, Allison S. Tsao, Jeremy F. Dawson, and Ioannis Pavlidis. 2022. “Search Committee Diversity and Applicant Pool Representation of Women and Underrepresented Minorities: A Quasi-Experimental Field Study.” *Journal of Applied Psychology* 107 (8): 1414–27. https://doi.org/10.1037/apl0000725.

Keppeler, Florian, and Ulf Papenfuß. 2021. “Employer Branding and Recruitment: Social Media Field Experiments Targeting Future Public Employees.” *Public Administration Review* 81 (4): 763–75. https://doi.org/10.1111/puar.13324.

Kjeldsen, Anne Mette, and Christian Bøtcher Jacobsen. 2013. “Public Service Motivation and Employment Sector: Attraction or Socialization?” *Journal of Public Administration Research and Theory* 23 (4): 899–926. https://doi.org/10.1093/jopart/mus039.

Kuhn, Peter, and Kailing Shen. 2023. “What Happens When Employers Can No Longer Discriminate in Job Ads?” *American Economic Review* 113 (4): 1013–48. https://doi.org/10.1257/aer.20211127.

Linos, Elizabeth. 2018. “More than Public Service: A Field Experiment on Job Advertisements and Diversity in the Police.” *Journal of Public Administration Research and Theory* 28 (1): 67–85. https://doi.org/10.1093/jopart/mux032.

Maass, Anne. 1999. “Linguistic Intergroup Bias: Stereotype Perpetuation Through Language.” In *Advances in Experimental Social Psychology, Vol. 31*, 79–121. https://doi.org/10.1016/S0065-2601(08)60272-5.

McCrea, Austin M., Ling Zhu, and Morgen S. Johansen. 2022. “Managing Diversity Differently: The External Environment and Cross-Sector Differences in Diversity Management.” *Journal of Public Administration Research and Theory* 32 (2): 436–54. https://doi.org/10.1093/jopart/muab027.

McPherson, Miller, Lynn Smith-Lovin, and James M Cook. 2001. “Birds of a Feather: Homophily in Social Networks.” *Annual Review of Sociology* 27 (1): 415–44. https://doi.org/10.1146/annurev.soc.27.1.415.

Newman, Daniel A., and Julie S. Lyon. 2009. “Recruitment Efforts to Reduce Adverse Impact: Targeted Recruiting for Personality, Cognitive Ability, and Diversity.” *Journal of Applied Psychology* 94 (2): 298–317. https://doi.org/10.1037/a0013472.

Ng, Eddy S., and Greg J. Sears. 2015. “Toward Representative Bureaucracy: Predicting Public

Service Attraction Among Underrepresented Groups in Canada." *Review of Public Personnel Administration* 35 (4): 367–85. https://doi.org/10.1177/0734371X14544546.
Olsen, Jesse E., Charles K. Parsons, Luis L. Martins, and Vera Ivanaj. 2016. "Gender Diversity Programs, Perceived Potential for Advancement, and Organizational Attractiveness." *Group & Organization Management* 41 (3): 271–309. https://doi.org/10.1177/1059601115583579.
Personalamt Hamburg. 2022. "Personalbericht 2022- Kennzahlenbuch." https://www.hamburg.de/personalamt/veroeffentlichungen/30214/personalberichtswesen/.
Riccucci, Norma M., and Gregg G. Van Ryzin. 2017. "Representative Bureaucracy: A Lever to Enhance Social Equity, Coproduction, and Democracy." *Public Administration Review* 77 (1): 21–30. https://doi.org/10.1111/puar.12649.
Rivera, Lauren A. 2012. "Hiring as Cultural Matching: The Case of Elite Professional Service Firms." *American Sociological Review* 77 (6): 999–1022. https://doi.org/10.1177/0003122412463213.
Ryan, Ann Marie, Joshua M. Sacco, Lynn A. McFarland, and S. David Kriska. 2000. "Applicant Self-Selection: Correlates of Withdrawal from a Multiple Hurdle Process." *Journal of Applied Psychology* 85 (2): 163–79. https://doi.org/10.1037/0021-9010.85.2.163.
Rynes, Sara L., Robert D. Bretz, and Barry Gerhart. 1991. "The Importance of Recruitment in Job Choice: A Different Way of Looking." *Personnel Psychology* 44 (3): 487–521. https://doi.org/10.1111/j.1744-6570.1991.tb02402.x.
Satzger, Melissa, and Rick Vogel. 2023. "Do Inclusive Workplace Policies Foster Employer Attractiveness? Comparative Evidence From an Online Employer Review Platform." *Public Personnel Management* 52 (4): 566–89. https://doi.org/10.1177/00910260231187536.
Sievert, Martin. 2023. "The Limited Impact of Reference Groups' Symbolic Gender Representation on Willingness to Coproduce." *Public Administration Review* 83 (3): 587–602. https://doi.org/10.1111/puar.13619.
Sievert, Martin, Dominik Vogel, and Mary K. Feeney. 2022. "Formalization and Administrative Burden as Obstacles to Employee Recruitment: Consequences for the Public Sector." *Review of Public Personnel Administration* 42 (1): 3–30. https://doi.org/10.1177/0734371X20932997.
Spencer, Steven J., Christine Logel, and Paul G. Davies. 2016. "Stereotype Threat." *Annual Review of Psychology* 67 (1): 415–37. https://doi.org/10.1146/annurev-psych-073115-103235.
Stoll, Michael A., Steven Raphael, and Harry J. Holzer. 2004. "Black Job Applicants and the Hiring Officer's Race." *ILR Review* 57 (2): 267–87. https://doi.org/10.1177/001979390405700206.
Theobald, Nick A., and Donald P. Haider-Markel. 2009. "Race, Bureaucracy, and Symbolic Representation: Interactions between Citizens and Police." *Journal of Public Administration Research and Theory* 19 (2): 409–26. https://doi.org/10.1093/jopart/mun006.
Vervecken, Dries, Bettina Hannover, and Ilka Wolter. 2013. "Changing (S)Expectations: How Gender Fair Job Descriptions Impact Children's Perceptions and Interest Regarding Traditionally Male Occupations." *Journal of Vocational Behavior* 82 (3): 208–20. https://doi.org/10.1016/j.jvb.2013.01.008.
Vogel, Dominik, Matthias Döring, and Martin Sievert. 2024. "Motivational Signals in Public Sector Job Advertisements and How They Relate to Attracting and Hiring Candidates." *Public Management Review* 26 (10): 2868–2900. https://doi.org/10.1080/14719037.2023.2291068.

Walker, H. Jack, and Amanda S. Hinojosa. 2013. “Recruitment: The Role of Job Advertisements.” *The Oxford Handbook of Recruitment*, no. June: 1–29. https://doi.org/10.1093/oxfordhb/9780199756094.013.015.

Walker, Richard M, Gene A Brewer, M Jin Lee, Nicolai Petrovsky, and Arjen van Witteloostuijn. 2019. “Best Practice Recommendations for Replicating Experiments in Public Administration.” *Journal of Public Administration Research and Theory* 29 (4): 658–658. https://doi.org/10.1093/jopart/muy062.

Figure 1: Overview of data collections

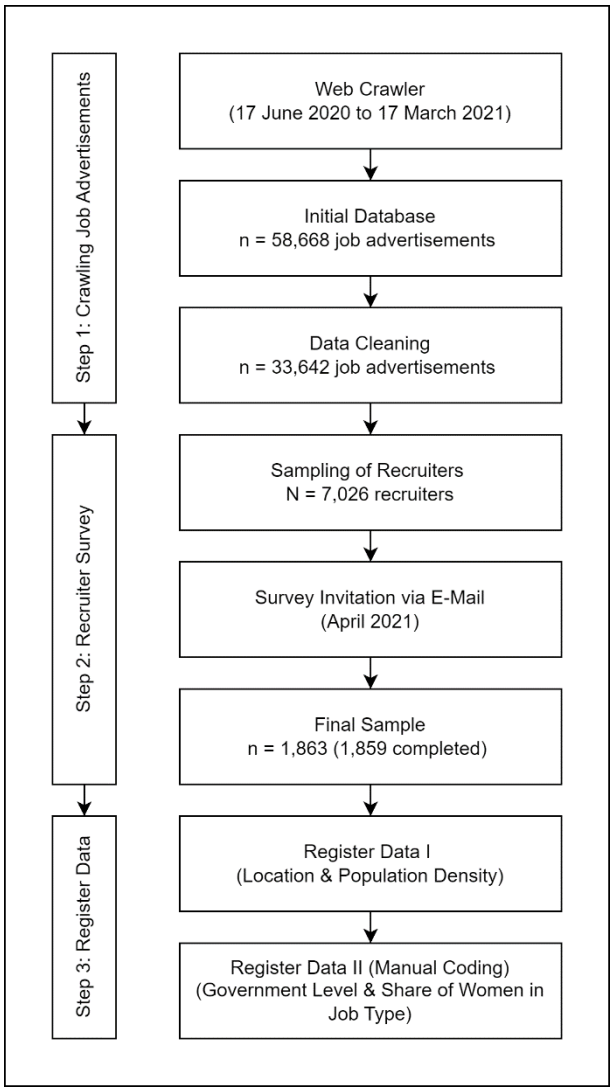
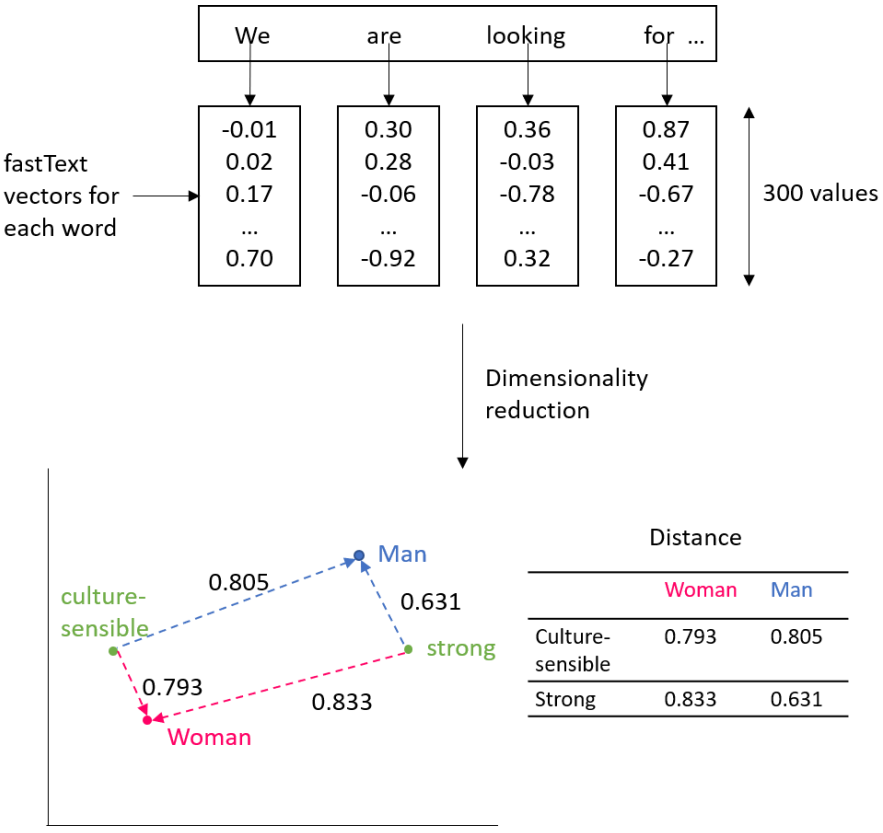


Figure 2: Creating word embeddings and extracting information



Distance

	Woman	Man
Culture-sensible	0.793	0.805
Strong	0.833	0.631

Figure 3: Distribution of femininity scores over all job advertisements.

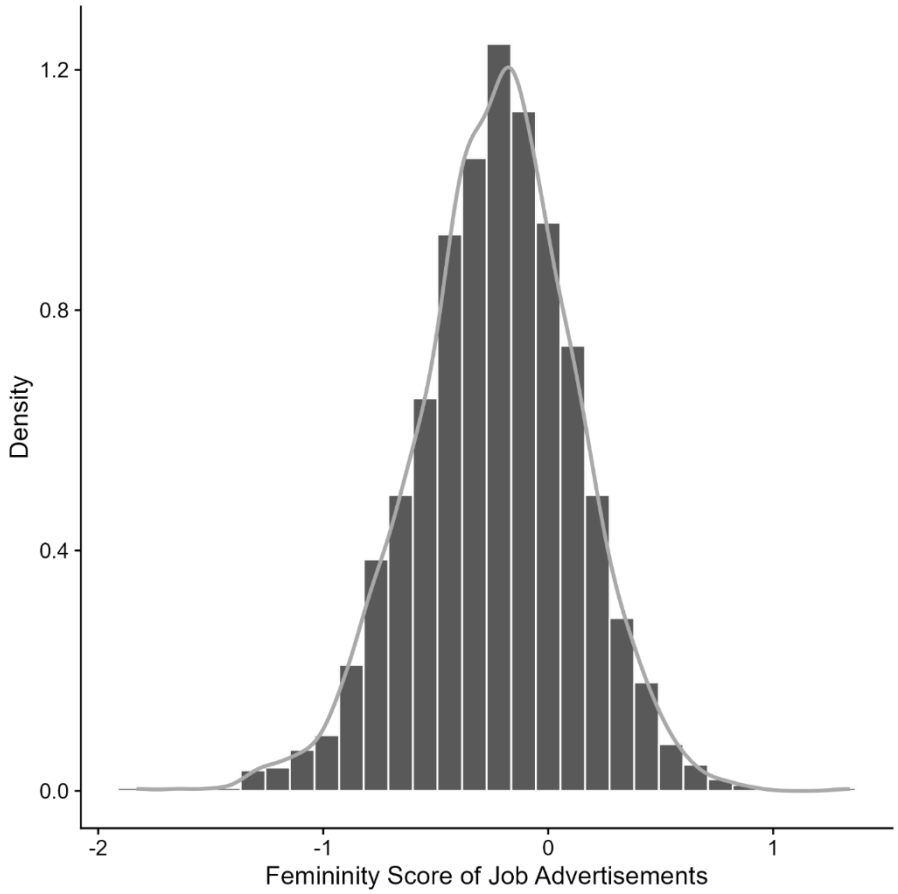


Table 1: Hierarchical Linear Models for Femininity Score and Female Contact Person

	Number of applications by women	**Proportion of applications by women**
	(1)	**(2)**
Femininity Score	7.378 ***	18.511 ***
	(1.509)	(1.801)
Female Contact Person (1 = yes)	-0.404	2.087 +
	(0.932)	(1.128)
Share of Women in Job Category	15.197 ***	57.328 ***
	(2.623)	(3.170)
Intercept	9.625 **	31.439 ***
	(2.980)	(3.420)
Controls	*YES*	*YES*
SD level 2 resid.	6.864	5.365
SD level 1 resid.	18.651	23.276
n (job ads)	1859	1859
n (employers)	1023	1023
logLik	-8140.856	-8492.291
AIC	16331.713	17034.581

Note: Hierarchical linear model with restricted maximum likelihood estimator. Standard errors in parentheses.
*** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$; + $p < 0.1$.

Appendix

Appendix A: Survey Items

Variable	Operationalization
Number of Applications by Women	How many applications by women did you receive for the advertised position?
Percentage Applications by Women	[Calculated from number of applications and number of applications by women]
Number of Applications	How many applications did you receive for the advertised position?
Satisfaction With Applicant Pool (Cronbach's $\alpha = .85$)	The following statements refer to the pool of applicants who applied for the advertised position. How strongly do you agree or disagree with the following statements: (1 = do not agree at all; 7 = totally agree) • The pool of applicants was characterized by a high quality. • Overall, the applicants met the requirements for the advertised position. • It was possible to choose between several applicants who met the requirements for the advertised position. • There were several applicants we would have liked to hire for the advertised position.
Satisfaction With Selected Candidate	How satisfied are you with the selected candidate? (1 = very unsatisfied; 7 = very satisfied)

Appendix B: Exemplary Job Advertisements

The following two figures depict one job advertisement with a high femininity score (0.73) and one with a low femininity score (-1.29). In both figures we highlighted two strongly feminine (purple), two strongly masculine (blue), and two neutral words (yellow).

Social pedagogue for counseling in pediatric practices for the district of XXX

[...]

The fields of activity -0.50 and tasks of socio-educational counseling in pediatric practices are:

- - Cooperation with various pediatric practices and collaboration with the practice teams
- - Advice for parents, children and young people on parenting and family issues 6.24

[...]

We offer:

- - Fixed-term employment for the duration of the project 0.31 (at least until the end of 2021)
- - pay in accordance with the collective agreement (TV-L S 11b)

[...]

We would like you to have:

- - Degree in social work or comparable qualifications

[...]

- - Professional experience in the field of educational counseling 6.14 or comparable -6.45 activities
- - Experience in networking with other institutions
- - Experience of working cooperatively in a multidisciplinary -4.18 team

[...]

Clerk (m/f/d) Office of Public Order for office and field service

[...]

The municipality of XXX is looking to fill a position in the area of public order for indoor, outdoor and on-call duty -6.34 in the evenings and at weekends as soon as possible.

[...]

Relevant practical experience in the field of public order as well as knowledge of conflict resolution and self-protection -6.46 are advantageous 2.30.

As the service requires a considerable amount of patrolling on foot and investigating facts on uneven terrain, an appropriate -0.11 level of fitness is required.

Disabled persons are expressly encouraged to apply, provided that their disability does not prevent the above-mentioned assignment.

The application must be submitted 3.92 with informative documents (e.g. certificates 0.12, assessments) by 28.02.2021 at the latest via the online application portal of the municipality of XXX at XXX.

[...]

Appendix C: Descriptive Statistics

Variable	n	Mean	*SD*	Min	Max
Number of Applications by Women	1,859	12.764	20.956	0	385
Percentage Applications by Women	1,859	51.388	30.695	0.000	100
Number of Applications	1,859	22.376	30.423	1	600
Satisf. with Quality of Applications	1,859	4.235	1.505	1.000	7
Satisf. with Selected Candidate	1,400	6.035	1.503	1	7
Femininity Score	1,859	-0.233	0.356	-1.830	1.340
Gender of Contact Person	1,859	0.532	0.499	0	1
Share of women in job category	1,859	0.568	0.200	0.029	0.968
Population Density	1,859	167.059	2,738.188	0.0002	111,111
Foreign Country	1,859	0.021	0.143	0	1
Part-Time Contract	1,859	0.252	0.434	0	1
Full-Time Contract	1,859	0.427	0.495	0	1
Full-Time or Part-Time Contract	1,859	0.321	0.467	0	1
Non-Permanent Contract	1,859	0.432	0.495	0	1
Permanent Contract	1,859	0.568	0.495	0	1
Master's Degree	1,859	0.287	0.452	0	1
No Graduation	1,859	0.044	0.204	0	1
Professional Training	1,859	0.234	0.423	0	1
Bachelor's Degree	1,859	0.412	0.492	0	1
Top-Level Leadership	1,859	0.006	0.080	0	1
Foreign Local Staff	1,859	0.017	0.130	0	1
Gov. Level: Federal	1,859	0.123	0.328	0	1
Gov. Level: Local	1,859	0.357	0.479	0	1
Gov. Level: State	1,859	0.385	0.487	0	1
Gov. Level: Other	1,859	0.124	0.330	0	1
Gov. Level: Social Security Admin.	1,859	0.012	0.108	0	1
Subsector Administrative	1,859	0.291	0.454	0	1
Subsector Business	1,859	0.042	0.202	0	1
Subsector Science	1,859	0.094	0.292	0	1
Subsector Social	1,859	0.137	0.344	0	1
Subsector Technical	1,859	0.109	0.312	0	1
Other Subsectors	1,859	0.327	0.469	0	1

Appendix D: Full results

Effects of Femininity Score and Female Contact Person

	Number of applications by women (1)	Proportion of applications by women (2)
Femininity Score	7.378 ***	18.511 ***
	(1.509)	(1.801)
Female contact person	-0.404	2.087 +
	(0.932)	(1.128)
Share of Women in Job Category	15.197 ***	57.328 ***
	(2.623)	(3.170)
Type of Contract (ref.: Part-Time Contract)		
Full-Time Contract	-1.025	-13.940 ***
	(1.253)	(1.517)
Full-Time or Part-Time Contract	-0.421	-11.272 ***
	(1.354)	(1.633)
Permanent Contract	1.534	-0.628
	(1.039)	(1.255)
Education required (ref.: Master's Degree)		
No Graduation	8.577 ***	7.590 *
	(2.495)	(3.011)
Professional Training	6.437 ***	8.029 ***
	(1.398)	(1.696)
Bachelor's Degree	-0.807	0.092
	(1.256)	(1.519)
Top-Level Leadership	-7.430	-25.814 ***
	(5.814)	(7.015)
Foreign Local Staff	-9.563	-7.914
	(7.992)	(9.601)
Population Density	-0.000	-0.000 +
	(0.000)	(0.000)
Government Level (ref.: Federal Level)		
Local	-5.211 *	0.508
	(2.164)	(2.394)
State	-1.752	2.405
	(2.126)	(2.315)
Social Security Administration	17.109 ***	13.208 *
	(5.069)	(5.768)
Other	1.189	-0.286
	(2.445)	(2.732)
Foreign Country (1 = yes)	-0.065	8.258
	(7.587)	(9.147)
Subsector (ref.: Administrative)		
Technical	-7.759 ***	-14.239 ***
	(1.745)	(2.104)
Business	-2.428	-3.363
	(2.432)	(2.942)
Science	-3.096	-1.717

	(2.172)	(2.563)
Social	-3.258 +	4.068 *
	(1.717)	(2.062)
Other	-3.344 **	-5.116 ***
	(1.225)	(1.469)
Intercept	9.625 **	31.439 ***
	(2.980)	(3.420)
SD level 2 resid.	6.864	5.365
SD level 1 resid.	18.651	23.276
n (job ads)	1859	1859
n (employers)	1023	1023
logLik	-8140.856	-8492.291
AIC	16331.713	17034.581

Note: Hierarchical linear model with restricted maximum likelihood estimator. Standard errors in parentheses.
*** p < 0.001; ** p < 0.01; * p < 0.05; + p < 0.1.

Appendix E: Additional dependent variables

	Number of applications (1)	Satisfaction with quality of applications (2)	Satisfaction with the selected candidate (3)
Femininity Score	3.697	0.179	0.162
	(2.266)	(0.112)	(0.131)
Female contact person	-0.841	-0.059	-0.075
	(1.391)	(0.070)	(0.082)
Share of Women in Job Category	6.595 +	0.507 *	0.102
	(3.920)	(0.197)	(0.230)
Type of Contract (ref.: Part-Time Contract)			
Full-Time Contract	2.341	-0.084	-0.041
	(1.871)	(0.094)	(0.107)
Full-Time or Part-Time Contract	4.129 *	-0.137	-0.134
	(2.025)	(0.101)	(0.116)
Permanent Contract	2.207	-0.011	0.066
	(1.552)	(0.078)	(0.091)
Education required (ref.: Master's Degree)			
No Graduation	11.051 **	-0.101	-0.332
	(3.733)	(0.187)	(0.208)
Professional Training	5.862 **	-0.167	-0.203 +
	(2.086)	(0.105)	(0.122)
Bachelor's Degree	-3.382 +	-0.418 ***	-0.214 +
	(1.876)	(0.094)	(0.110)
Top-Level Leadership	-8.164	0.424	0.318
	(8.707)	(0.435)	(0.620)
Foreign Local Staff	-9.645	-0.286	-1.869 *
	(12.000)	(0.595)	(0.724)
Population Density	-0.000	-0.000	-0.000 **
	(0.000)	(0.000)	(0.000)
Government Level (ref.: Federal Level)			
Local	-9.894 **	-0.041	0.267 +
	(3.336)	(0.147)	(0.151)
State	-6.013 +	0.093	0.126
	(3.292)	(0.142)	(0.140)
Social Security Administration	13.079 +	0.596 +	0.620 +
	(7.767)	(0.356)	(0.361)
Other	0.294	0.088	0.222
	(3.759)	(0.168)	(0.175)
Foreign Country (1 = yes)	-7.501	0.273	2.154 *
	(11.374)	(0.567)	(0.838)
Subsector (ref.: Administrative)			
Technical	-12.788 ***	-0.335 *	0.005
	(2.612)	(0.130)	(0.160)
Business	-3.199	0.235	-0.038
	(3.639)	(0.182)	(0.207)

Science	-4.330	-0.047	0.155
	(3.261)	(0.158)	(0.174)
Social	-6.018 *	-0.038	0.122
	(2.572)	(0.128)	(0.150)
Other	-4.519 *	-0.108	-0.008
	(1.838)	(0.091)	(0.104)
Intercept	26.798 ***	4.374 ***	6.029 ***
	(4.536)	(0.211)	(0.228)
SD level 2 resid.	11.654	0.316	0.000
SD level 1 resid.	27.487	1.447	1.499
n (job ads)	1859	1859	1400
n (employers)	1023	1023	810
logLik	-8879.282	-3387.993	-2572.104
AIC	17808.564	6825.987	5194.208

Note: Hierarchical linear model with restricted maximum likelihood estimator.
Standard errors in parentheses.
*** p < 0.001; ** p < 0.01; * p < 0.05; + p < 0.1.

Appendix F: Interaction effects with technical subsector

	Number of applications by women (1)	Proportion of applications by women (2)
Femininity Score	7.499 ***	18.139 ***
	(1.576)	(1.883)
Female contact person	-0.407	2.097 +
	(0.932)	(1.129)
Share of Women in Job Category	15.144 ***	57.478 ***
	(2.630)	(3.178)
Subsector (ref.: Administrative)		
Technical	-8.271 **	-12.647 ***
	(2.603)	(3.149)
Femininity Score x Technical	-1.283	3.990
	(4.858)	(5.876)
Business	-2.419	-3.388
	(2.433)	(2.942)
Science	-3.109	-1.675
	(2.173)	(2.565)
Social	-3.285 +	4.148 *
	(1.720)	(2.066)
Other Subsectors	-3.345 **	-5.116 ***
	(1.226)	(1.469)
Type of Contract (ref.: Part-Time Contract)		
Full-Time Contract	-1.024	-13.947 ***
	(1.253)	(1.518)
Full-Time or Part-Time Contract	-0.414	-11.299 ***
	(1.355)	(1.634)
Permanent Contract	1.536	-0.635
	(1.039)	(1.256)
Education required (ref.: Master's Degree)		
No Graduation	8.586 ***	7.568 *
	(2.496)	(3.012)
Professional Training	6.436 ***	8.036 ***
	(1.398)	(1.696)
Bachelor's Degree	-0.810	0.101
	(1.256)	(1.520)
Top-Level Leadership	-7.476	-25.688 ***
	(5.818)	(7.019)
Foreign Local Staff	-9.569	-7.850
	(7.995)	(9.603)
Population Density	-0.000	-0.000 +
	(0.000)	(0.000)
Government Level (ref.: Federal Level)		
Local	-5.214 *	0.491
	(2.166)	(2.397)
State	-1.768	2.428
	(2.128)	(2.318)

Social Security Administration	17.109 ***	13.158 *
	(5.072)	(5.772)
Other	1.180	-0.280
	(2.446)	(2.734)
Foreign Country (1 = yes)	-0.068	8.221
	(7.590)	(9.149)
Intercept	9.695 **	31.254 ***
	(2.990)	(3.432)
SD level 2 resid.	6.881	5.386
SD level 1 resid.	18.652	23.276
n (job ads)	1859	1859
n (employers)	1023	1023
logLik	-8138.322	-8489.371
AIC	16328.644	17030.741

Note: Hierarchical linear model with restricted maximum likelihood estimator. Standard errors in parentheses.
*** p < 0.001; ** p < 0.01; * p < 0.05; + p < 0.1.

Appendix G: Interaction effects with leadership positions

	Number of applications by women (1)	Proportion of applications by women (2)
Femininity Score	8.535 ***	21.324 ***
	(1.701)	(1.997)
Female contact person	-0.590	1.777
	(0.944)	(1.127)
Share of Women in Job Category	14.662 ***	56.097 ***
	(2.666)	(3.174)
Leadership Position (1 = yes)	-3.205	-3.176
	(2.138)	(2.517)
Femininity Score x Leadership Position	-3.631	-6.488
	(3.774)	(4.500)
Type of Contract (ref.: Part-Time Contract)		
Full-Time Contract	-0.989	-13.612 ***
	(1.265)	(1.509)
Full-Time or Part-Time Contract	-0.332	-10.946 ***
	(1.365)	(1.622)
Permanent Contract	1.632	-0.725
	(1.057)	(1.259)
Education required (ref.: Master's Degree)		
No Graduation	7.538 **	7.262 *
	(2.731)	(3.237)
Professional Training	5.354 **	7.448 ***
	(1.715)	(2.044)
Bachelor's Degree	-1.959	-0.603
	(1.607)	(1.914)
Top-Level Leadership	-6.146	-24.708 ***
	(5.957)	(7.074)
Foreign Local Staff	-0.000	-0.000 *
	(0.000)	(0.000)
Population Density	-5.142 *	1.116
	(2.208)	(2.382)
Government Level (ref.: Federal Level)		
Local	-1.750	2.758
	(2.169)	(2.299)
State	16.937 **	13.605 *
	(5.139)	(5.712)
Social Security Administration	1.259	-0.062
	(2.483)	(2.709)
Other	1.195	14.510
	(8.230)	(9.773)
Subsector (ref.: Administrative)		
Technical	-7.726 ***	-14.122 ***
	(1.756)	(2.086)
Business	-1.932	-2.800
	(2.474)	(2.945)

Science	-2.286	-0.991
	(2.277)	(2.665)
Social	-3.448 *	3.657 +
	(1.729)	(2.044)
Other	-3.486 **	-5.219 ***
	(1.238)	(1.461)
Intercept	11.389 ***	33.174 ***
	(3.188)	(3.570)
SD level 2 resid.	7.200	5.286
SD level 1 resid.	18.661	23.047
n (job ads)	1827	1827
n (employers)	995	995
logLik	-8006.427	-8324.598
AIC	16064.854	16701.197

Note: Hierarchical linear model with restricted maximum likelihood estimator. Standard errors in parentheses.
*** p < 0.001; ** p < 0.01; * p < 0.05; + p < 0.1.